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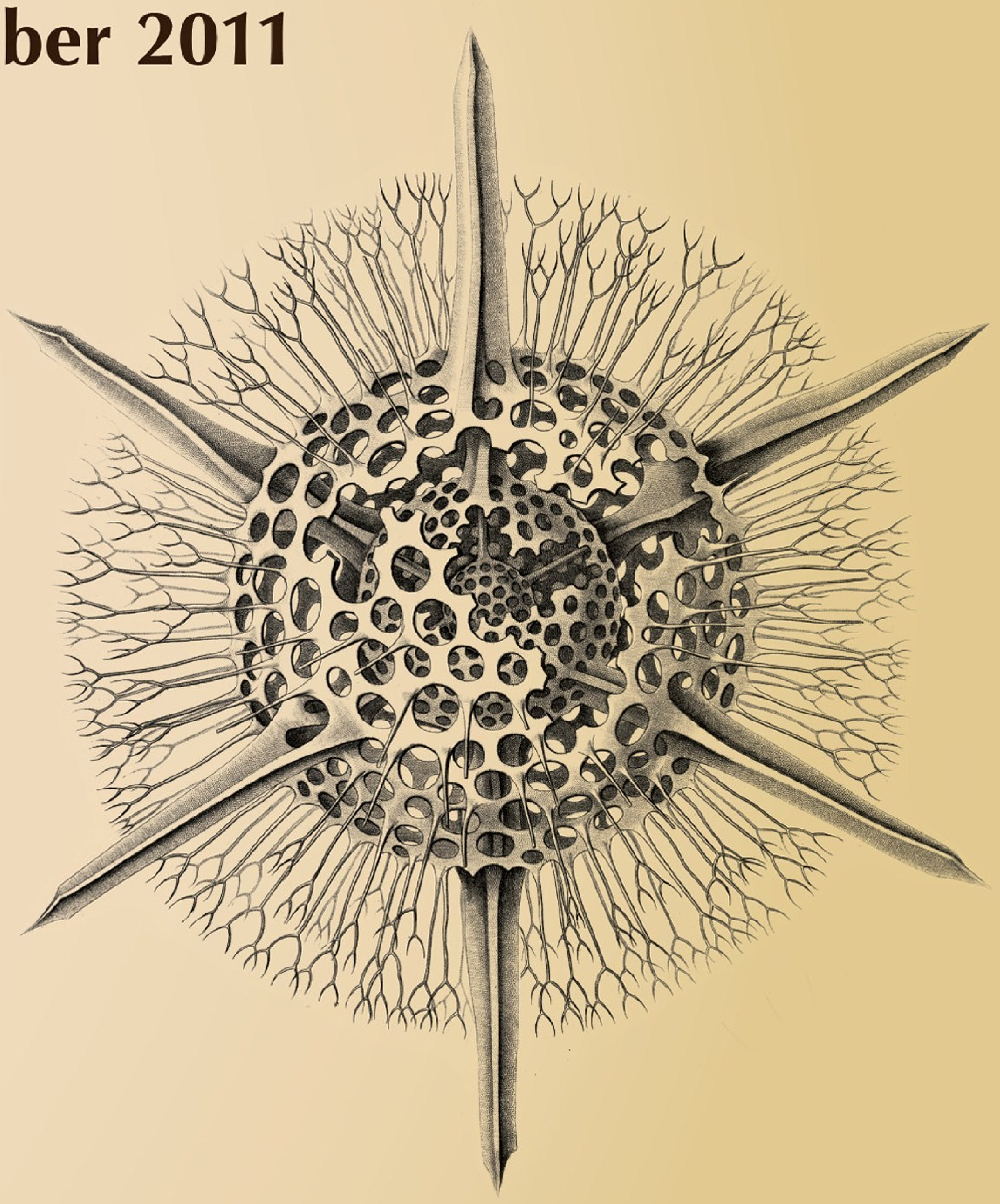
Eighth Romanian Symposium on Paleontology

Bucharest, 29-30 September 2011



Abstract Book

Edited by

Zoltán CSIKI
University of Bucharest

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ABSTRACT BOOK

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(University of Bucharest)

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Abstract Book
The 8th Romanian Symposium on Paleontology
Bucharest, 29-30 September 2011

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Symposium Programme
THE 8TH ROMANIAN SYMPOSIUM ON PALEONTOLOGY

26 - 28 September 2011 - PRE-CONFERENCE FIELDTRIPS

Fieldtrip A1 – *MICROPALAEONTOLOGY OF THE CRETACEOUS FROM THE EASTERN CARPATHIANS AND OCEANIC ANOXIC EVENTS*
Fieldtrip leaders:
Dr. Mihaela C. Melinte-Dobrinescu (National Institute of Marine Geology and Geo-ecology – GEOECOMAR Bucharest), **Dr. Relu Roban** (University of Bucharest)

Fieldtrip A2 – *MAASTRICHTIAN CONTINENTAL DEPOSITS WITH DINOSAUR REMAINS FROM SOUTHERN TRANSYLVANIA*
Fieldtrip leaders:
Dr. Dan Grigorescu, **Dr. Zoltán Csiki** (University of Bucharest)

28 – 30 September 2011 - CONFERENCE

Wednesday, 28 September

17.00 – 20.00 **Arrival of the participants and registration** (at the symposium venue)

19.00 – ...... **Icebreaker party** (at the symposium venue)

Thursday, 29 September 2011

From 8.00 onwards – Registration (at the symposium venue; registration will be available during all day)

9.00 – 10.00 – Plenary Session: Welcome speeches

10.00 – 13.00 – Session on Micropaleontology
10.00 – 10.20 **Neagu, Th.** - The agglutinated foraminifera *Uvigerinammina* MAJZON 1943 - morpho-systematic considerations.
10.20 – 10.40 **Wan, X.-Q. & Gao, L.-F.** - Late Jurassic to Early Cretaceous biostratigraphy in southern Tibet.
10.40 – 11.00 **Stoica, M., Floroiu, A. & Dincă, C**. - Albian ostracods from the Moesian Platform (Romania).
11.00 – 11.20 **Popescu, Gh. & Crihan, I. M.** - Oligocene and Lower Miocene planktonic foraminifera from Transylvania.

11.20 – 11.40 – Coffee Break

11.40 – 12.00 **Filipescu, S., De Leeuw, A. & Beldean, C.** - Revision and calibration of some foraminifera biozones in the marine Miocene from Romania.
12.00 – 12.20 **Szabo, B., Bercea, R., Balázs, Zs., & Filipescu, S**. - Paleoenvironmental changes along the Oligocene – Miocene transition in Gura Vitioarei section (Prahova District, Romania), based on foraminifera assemblages.
12.20 – 12.40 **Briceag, A., Stoica, M. & Melinte-Dobrinescu, M.C**. - Holocene microfaunas and nannofloras of the W Black Sea.
12.40 – 13.00 **Telespan, A., Kaminski, M. A., Bălc, R., Filipescu, S. & Varga, I.** - The Life cycle of *Entzia* (Foraminifera) in the salt marsh at Turda, Romania.

10.00 – 13.00 – Session on Paleobotany
10.00 – 10.20 **Iamandei S., Iamandei E. & Grădinaru E.** - New Liassic woods from Holbav, Romania.
10.20 – 10.40 Bodor, E. R. - Plant mesofossils of the Upper Cretaceous Iharkút vertebrate fossil site (Bakony Mts., Hungary).
10.40 – 11.00 **Popa, M. E., Csiki, Z., Vasile, Ș. & Săvescu, M. O. B.** - The Maastrichtian macroflora of the Hațeg and Rusca Montană basins.
11.00 – 11.20 **Saint Martin, S., Saint Martin, J. P., Néraudeau, D. & Girard, V.** - Microorganisms from Santonian amber of Southern France.

11.20 – 11.40 – Coffee Break

11.40 – 12.00 **Iamandei S., Iamandei E. & Dumitrescu Sabou M.** - Petrified wood from Căprioara Valley, Feleacu Hill, Cluj.
12.00 – 12.20 **Paraschiv, V.** - Fossil disseminules from the Middle Miocene deposits of Oltenia.
12.20 – 12.40 **Diaconu, F.** - The paleoecology analysis of Mio-Pliocene flora in Mehedinţi District, Romania.
12.40 – 13.00 **Corneanu, C. G., Corneanu, M., Danci, O. & Vişoiu, D.** - Cytological and morphological features of the some fossil and present-day correspondent species from *Taxodiaceae* family.

13.00 – 14.40 – Lunch Break

14.40 – 18.00 – Session on paleontology and paleoenvironment of the Mesozoic Haţeg County
14.40 – 15.00 **Csiki, Z., Vasile, Ş. & Venczel, M.** - Evolutionary and paleobiogeographic significance of a new madtsoiid snake from the Maastrichtian of the Haţeg Basin.
15.00 – 15.20 **Csiki, Z. & Vremir, M.** - A large-sized (?)Late Maastrichtian titanosaur from Râpa Roşie, Sebeş.
15.20 – 15.40 **Dyke, G. J., Vremir, M., Kaiser, G. and Naish, D. W.** - A drowned Mesozoic bird breeding colony.
15.40 – 16.00 **Vremir, M., Dyke, G., & Csiki, Z.** - Late Cretaceous pterosaurian diversity in the Transylvanian and Haţeg basins (Romania): new results.

16.00 – 16.20 – Coffee Break

16.20 – 16.40 **Melinte-Dobrinescu, M. C., Vărzaru, C., Briceag, A. & Pura, D.** - Late Cretaceous marine fossil assemblages of the Haţeg Country.

16.40 – 17.00 **Vasile, Ş., Zaharia, A., Csiki, Z. & Grigorescu, D.** - The first report of continental fossil remains from Crăguiş (Haţeg Basin, Romania), and their stratigraphical significance.

17.00 – 17.20 **Panaiotu, A.G., Ciobănete, D., Panaiotu, C.G. & Panaiotu, C.E.** - New palaeomagnetic data from the Haţeg Basin, Romania.

17.20 – 17.40 **Popescu, A.- G., Soare, B. & Csiki, Z.** - Mineralogical characterisation of clay mineral assemblages from the Maastrichtian continental deposits of Râul Mare valley, Haţeg Basin – Paleoenvironmental implications.

17.40 – 18.00 **Csiki, Z., Weishampel, D. B., Benton, M. J., Codrea, V. & Grigorescu, D.** - Stretched between continents – the paleogeographic affinities of the Haţeg vertebrate fauna and a possible scenario for its evolutionary history.

14.40 – 16.00 – Session on Invertebrate paleontology

14.40 – 15.00 **Grădinaru, E.** - Occurrence of the Bivalvia *Monotis (Monotis) salinaria-haueri* group in the Upper Norian (Upper Triassic) of Tulcea Unit, North Dobrogean Orogen.

15.00 – 15.20 **Grigore, D.** - Ataxioceratidae species from "Acanthicum Beds" of Ghilcoş (East Carpathians – Romania).

15.20 – 15.40 **Ţibuleac, P.** - New data on the phylloceratid fauna of the Praşca Klippe (Early Jurassic, Rarău Syncline, Eastern Carpathians, Romania).

15.40 – 16.00 **Bojar, A.-V., Bojar, H.-P. & Tufar, W.** - Stable isotope distribution in deep-sea hydrothermal barnacles, Manus Basin, Papua New Guinea: a key in understanding their ecology.

16.00 – 16.20 – Coffee Break

16.20 – 18.00 – Session on Paleosedimentary ambiances

16.20 – 16.40 **Roban R. D., Melinte-Dobrinescu M. C. & Rusu A. M.** - The Cretaceous Audia Formation from the Eastern Carpathians, Romania: palaeosedimentary environments.

16.40 – 17.00 **Răţoi, B. G., Brânzilă, M. & Anistoroae, A.** - Sedimentary facies analysis of the *Cryptomactra* Formation (Moldavian Platform – Backbulge depozone).

17.00 – 17.20 **Floroiu, A., Stoica, M., Popescu, G. & Crihan, I.-M.** - The Maeotian / Pontian boundary in the Buzău Area (Dacian Basin) – Paleoenvironmental implications.

17.20 – 17.40 **Enciu, P.** - Middle Miocene-Quaternary evolution of the westernmost part of the Dacian Basin.

17.40 – 18.00 **Chira, C. M., Juravle, D.T. & Igritan, A.** - Eocene-Oligocene calcareous nannoplankton from Putna Valley (Suceava county, Romania).

19.00 – ..... Conference Dinner

<u>Friday, 30 September, 2011</u>

09.00 – 12.40 – Session on Mesozoic vertebrate paleontology

09.00 – 09.20 **Cuny, G., Liard, R., Deesri, U., Liard, T., Khamha, S. & Suteethorn, V.** - A new shark fauna from the Phu Kradung Formation (latest Jurassic – earliest Cretaceous) of Thailand.

09.20 – 09.40 **Cuny, G., Martin, J. E. & Sarr, R.** - A neoselachian elasmobranch fauna from the Late Cretaceous of Senegal.

09.40 – 10.00 **Cavin, L. & Giner, S.** - *Tomognathus*, a voracious halecomorph fish that roamed the Cretaceous seas.

10.00 – 10.20 **Grellet-Tinner, G., Fiorelli, L. E. & Salvador, R. B.** - The water vapor conductance of Cretaceous neosauropod eggs from Sanagasta, La Rioja, Argentina, with paleobiological implications for neosauropod eggs and nesting environments.
10.20 – 10.40 **Dyke, G. J., Benton, M. J., Posmosanu, E. and Naish, D. W.** - A fresh look at the famous bird and pterosaur fossils from the Cornet bauxite.

10.40 – 11.00 – Coffee Break

11.00 – 11.20 **Buffetaut, E.** - Giant birds from the Late Cretaceous of southern France: an update.
11.20 – 11.40 **Le Loeuff, J.** - Sauropod diversity in the Late Cretaceous of Southern Europe.
11.40 – 12.00 **Tortosa, T., Dutour, Y., Cheylan, G. & Buffetaut, E.** - Continental vertebrates from the Upper Cretaceous of Provence (SE France): A review of the local biodiversity and biostratigraphy.
12.00 – 12.20 **Vremir, M. M. & Rabi, M.** - Primitive pleurodiran turtles (Dortokidae) in the late Cretaceous-early Paleogene of central-East Europe.
12.20 – 12.40 **Csiki, Z., Martin, J.E., Rabi, M. & Vasile, Ş.** - Unexpected survival and wide distribution of *Theriosuchus* in the Late Cretaceous Europe.

09.00 – 10.20 – Session on Global Cretaceous Oceanic Anoxic Events (OAEs) and climatic changes
09.00 – 09.20 **Sanchez-Hernandez, Y., Maurrasse, F. J-M. R., Moreno-Bedmar, J. & Sen, I.** - Preliminary interpretation of the Cabo section, Sierra de Prada, south Central Pyrénnées, NE Spain.
09.20 – 09.40 **Melinte-Dobrinescu, M.C.** - Cretaceous anoxic events in the Romanian Carpathians: state of the art.
09.40 – 10.00 **Cetean, C. G., Bălc, R., Kaminski, M. A. & Filipescu, S.** - The OAE 2 in the southern Eastern Carpathians, integrated biostratigraphy and paleoenvironmental changes reflected by the agglutinated foraminifera assemblages.
10.00 – 10.20 **Gao, L.-F., Zhang, Z.-G., Wan, X.-Q., Zhang, P. & Liu, C.-S.** - The revelation of the modern ocean iron release experiment for the study of palaeoceanography: Causative mechanism of the CORBs.

10.40 – 11.00 – Coffee Break

11.00 – 12.40 – Session on Mesozoic biostratigraphy and paleoenvironments
11.00 – 11.20 **Valenzuela-Ríos, J. I., Sendino, M. C., Gámez Vintaned, J. A. & Lamolda, M. A.** - Benefits of multidisciplinary collaboration to Palaeontology; some examples from the Spanish IGCP.
11.20 – 11.40 **Gale, L., Kolar-Jurkovšek, T., Šmuc, A. & Rožič, B.** - Integrated foraminiferal and conodont biostratigraphy from the Rhaetian strata of the Slovenian Basin (Southern Alps).
11.40 – 12.00 **Lazăr, I., Grădinaru, M. & Petrescu, L.** - Bioencrustation and bioerosion of the Middle Jurassic hardgrounds from SE Carpathians (Bucegi Mountains, Dâmbovicioara Basin, Romania).
12.00 – 12.20 **Dragastan, O. N., Herbig, H.-G. & Popa, M. E.** - Paleogene *Halimeda* algal biostratigraphy from Middle and Central High Atlas (Morocco): Paleoecology, paleogeography and some taxonomical considerations.
12.20 – 12.40 **Bucur, I.I, Rashidi, K. & Senowbari-Daryan, B.** - Lower Cretaceous calcareous algae from central Iran.

12.40 – 14.00 – Lunch Break

14.00 – 15.00 – Session on Cenozoic vertebrate paleontology and Geoconservation

14.00 – 14.20 **Nicoară, I.** - The position of the faunal asembledge from the Stolniceni formation, in chronology of *Hipparion* fauna of Eastern Parathetys.

14.20 – 14.40 **Croitor, R.** - A preliminary report on paleobiogeography of early human dispersal in Western Eurasia.

14.40 – 15.00 **Grigorescu, D., Andrăşanu, A., Csiki, Z. & Vasile, Ş.** - Geoconservation in Romania: urgent measures and actions required.

15.00 – 15.20 – Coffee Break

14.00 – 15.00 – Session on Mesozoic biostratigraphy

14.00 – 14.20 **Ivanova, D., Chatalov, A. & Bonev, N.** - Age and depositional environment of Aliki Limestone, NE Greece.

14.20 – 14.40 **Tchoumatchenco, P., Rabrenović, Dr., Radulović, V. & Maleshević, N.** - Trans-border (north-east Serbia/north-west Bulgaria) correlation of the Jurassic lithostratigraphic units.

14.40 – 15.00 **Ivanova, D., Metodiev, L. & Koleva-Rekalova, E.** - Stratigraphy of the Early Jurassic sediments of the Central Fore Balkan, Bulgaria.

15.00 – 15.20 – Coffee Break

15.20 – 16.40 – Poster Session

17.00 – 18.00 – General Assembly of the Society of Romanian Paleontologists

19.00 – …… – Visit to the Geological Museum, and Farewell Party (at the Geological Museum, 2 Kiseleff Street)

LIST OF POSTER PRESENTATIONS

1. **Antoniade, G.-C.** - Lower Cretaceous stratigraphy from Cernavoda lock - new section (South Dobrogea)
2. **Beldean, C. & Filipescu, S.** - High-resolution biostratigraphy of the Early - Middle Miocene transition in north-western Transylvanian Basin
3. **Bindiu, R. & Filipescu, S**. - Foraminiferal assemblages on turbidite deposits from the northern part of the Tarcău Nappe. Age and paleoenvironmental interpretation
4. **Brustur, T., Szobotka, Ş.-A. & Stănescu, I.** - The ichnogenus *Thalassinoides* from the Kersonian deposits of Buleta (W Râmnicu Vâlcea, Romania)
5. **Codrea A. V., Bejan D. & Ursachi L.**- Mânăstirea: a New Pliocene vertebrate locality in Moldova
6. **Gallemí, J., Lazăr, I., López, G. & Martínez, R.** - The Turonian-Coniacian macrofaunal distribution in the Babadag Syncline (Northern Dobrogea, SE Romania) revisited. First results

7. **Gallemí, J., Lazăr, I., López, G., Martínez, R., Bernárdez, E., Pons, J.M. & Dragomir, B.P.** - Albian to Coniacian macrofaunal distribution around Ostrov and Medgidia (Southern Dobrogea, SE Romania). Preliminary results
8. **Gardner, J. D., Venczel, M. & Szentesi, Z.** - Santonian Albanerpetontids from Hungary
9. **Iamandei S., Iamandei E., Bozukov V. & Tzenov, B.** - Fossil woods from Rhodopes, Bulgaria
10. **Macaleţ, R.** - Pontian mollusc faunas in the Eastern Dacic Basin (Romania)
11. **Mogorici, C.** - A general view of the Sarmatian stage from the Republic of Moldova
12. **Paraschiv, V. & Sebe, O.-G.** - Fossil flora and microfossils from Morilor Valley, Mehedinți County
13. **Popa, M. V.** - Miocene gastropods from the Borod Basin (Apuseni Mountains, Romania). Cerithioidea Superfamily
14. **Popescu, D.A., Popa, L.M., Popescu, L.G., Panaiotu, C.E., & Grădinaru, E.** - Anisian (Middle Triassic) carbonate microfacies from Murighiol area, North Dobrogean Orogen
15. **Radu, E. & Neagu, Th**. - The microbiostratigraphy of the Upper Cretaceous deposits belonging to Macla Formation (Macla Nappe) from the Buzău Valley – Zabratau Valley – Bota Mare Valley area (Intorsura Buzăului zone)
16. **Saint Martin, J.P., Belhadji, A., Belkebir, L., Mansour, B., Néraudeau, D. & Saint Martin, S**. - Towards a Messinian ecostratigraphy: the Algerian example
17. **Săsăran, E., Codrea, V. & Csiki, Z.** - Fluvial systems – meandering rivers: a case study from Nălaţ-Vad area (Haţeg Basin, Romania)
18. **Săsăran, L.** - On the presence of the genus *Pseudopolyconites* Milovanović in the Upper Cretaceous deposits from Northern Apuseni Mountains: biostratigraphic and biogeographic significance
19. **Silye, L. & Bălc, R.** - Sedimentary facies and depositional environment of the Bozeş Formation (Southeastern Apuseni Mts.)
20. **Tanţău, I., Feurdean, A. & Fărcaş, S.** - Holocene variability in the range distribution and abundance of *Quercus* in Romania
21. **Tiţă, R.** - Miocene gastropod fauna (Turridae) from Bahna Basin (Southern Carpathians) Romania
22. **Ţabără, D. & Popescu, L.** - Palynology and palynofacies of Gura Şoimului Formation from Bistriţa-Râşca Half-window
23. **Velitzelos, E., Kostas, C. C., Iamandei, S. & Iamandei, E.** - The Miocene Petrified Forest of Limnos, Greece

CONTENT

POSTER

Lower Cretaceous stratigraphy from Cernavoda lock - new section (South Dobrogea)

Antoniade G.-C.

Geological Survey of Romania – The National Museum of Geology, Kiseleff Pavel Dimitrievici G-ral. Ave., No.2, Sct.1, Bucharest, Romania, e-mail: claudia.antoniade@gmail.com; antoniade.claudia@igr.ro

Keywords: litho-biostratigraphy, Cernavoda lock, lower Cretaceous

This paper presents for the first time the Lower Cretaceous deposits from a new geological section in southern Dobrogea. All data come from the Cernavoda lock section, an outcrop that was not studied before. The deposits of this new profile have been studied both from a lithostratigraphical and a biostratigraphical point of view. From the lithological perspective, the Lower Cretaceous deposits from Cernavoda lock are dominated by marls and marly-limestones which frequently are associated with oolitic limestones, as well as bioclastic pelsparite-micritic, and bioconstructed spongal limestones. Micropaleontological samples from these deposits reveal a microfauna rich in agglutinated and porcelaneous foraminifera, in ostracods, and in algae. Most ostracods identified in these deposits are taxa belonging to the superfamily Cytheracea. Both foraminiferal, algal, and ostracod associations indicate a Berriasian-Valanginian age. The Lower Cretaceous deposits of the Cernavoda lock are characteristic to a shelf carbonate platform, with shallow, near-shore waters. This area is one of the richest outcrops from Southern Dobrogea, both in micro-and in macrofossils, compared to other Lower Cretaceous deposits of this region, and is different in the composition of the fossils groups represented, more diverse than that from the classic Cernavoda profile.

POSTER

High-resolution biostratigraphy of the Early - Middle Miocene transition in north-western Transylvanian Basin

Beldean, C.[1], Filipescu, S.[1] & Bercea, R.[1]

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Keywords: *Streptochilus-Bolivina* Biozone, *Orbulina* Biozone, Râpa Dracului, Paratethys

The Early - Middle Miocene boundary can be studied in the north-western Transylvanian Basin, at the transition between the Hida Formation (deep-sea turbidites and coarse-grained fan delta sediments - Tischler, 2005, Krezsek & Bally, 2006, Filipescu & Beldean, 2008, Beldean et al., 2011) and the Middle Miocene hemipelagites and volcanic tuffs of the Dej Formation (Popescu, 1970).

The foraminifera from Râpa Dracului (Dej) section have been investigated in order to observe the characters of the Early - Middle Miocene transition. The lower part of Râpa Dracului section starts with sandstones and mudstones followed by coarse-grained debritic flows belonging to the Hida Formation. In the upper part of the section these are followed by the Dej Tuff.

Distinct biostratigraphic features have been observed. Planktonic *Streptochilus* has been identified in the lower part of the section. These assemblages correspond to *Streptochilus-Bolivina* Abundance Biozone, biostartigraphically located between the Early Miocene assemblages with trochospiral globigerinids and the first occurence of Middle Miocene *Praeorbulina* (Beldean et al., 2010). Typical Badenian planktonic assemblages with *Praeorbulina* and *Orbulina* occur in the upper part of the section. A similar situation was observed in other sections from the north-western Transylvanian Basin (Ciceu-Giurgeşti, Pâglişa, Zagra) were the *Streptochilus – Bolivina* assemblage are followed by *Praeorbulina* and finally *Orbulina* zones.

Our recent observations in the Transylvanian Basin showed that the early stage of the sea-level rise, associated to the high organic input (LST), should be assimilated to the *Streptochilus - Bolivina* Abundance Zone. The character of the assemblage suggests paleogeographic connections to the Indo-Pacific area. The following assemblages, with the bloom of *Praeorbulina* and later *Orbulina* during the main phase of the transgression suggest large marine connections, including the connection to the Mediterranean area.

Acknowledgements

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POSTER

Foraminiferal assemblages on turbidite deposits from the northern part of the Tarcău Nappe. Age and paleoenvironmental interpretation

Bindiu, R.[1] & Filipescu, S. [1]

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Keywords: agglutinated foraminifera, turbidites, Paleogene, Bucovina, morphogroup analysis

Due to its size and stratigraphic and tectonic complexity, the Tarcău Nappe represents the most important unit of the Carpathian flysch. The present study focuses on several sections located in the northern Moldavia (Bucovina), in order to obtain data on age and paleoenvironmental settings. All the studied sections consist of diverse types of agglutinated foraminifera assemblages, "flysch – type" (Kaminski, 1988) being dominant, with coarsely agglutinated specimens such as *Saccammina, Psamosphaera* and thick walled tubular forms such as *Nothia*, *Bathysiphon.* The section on Suceava valley consists of medium grained siliciclastic turbidites organized in T_{b-c} Bouma divisions. The internal fabric (convolute structures) of sandstones suggests high density turbidity currents. Near the top, sedimentary succession is represented by T_{c-e} divisions with very fine grained hemipelagites, deposited in a well oxygenated environment (red color and presence of ichnofossils). The foraminiferal assemblages are dominated by M_1 morphogroup (Kaminski & Gradstein, 2005) with tubular species such as *Bathysiphon, Nothia, Rhabdamina, Hyperammina.* In the vicinity, at Straja, the local abundances of *Glomospira* specimens suggest an early Eocene age; at Palma, the finding of *Rzehakina fissistomata* suggests the Paleocene age (Olszewska, 1997); at Ciumarna and Paltinu, planktonic foraminifera represent more than 90% of the assemblage, with specimens like *Globigerina ouchiataensis*, *Globigerina bolii*, *Catapsydrax unicavus* suggesting Oligocene to Early Miocene ages.

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ORAL

Plant mesofossils of the Upper Cretaceous Iharkút vertebrate fossil site (Bakony Mts., Hungary)

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Keywords: Normapolles, *Sphaeracostata barbackae*, *Caryanthus*, Magnoliaceae, paleoecology

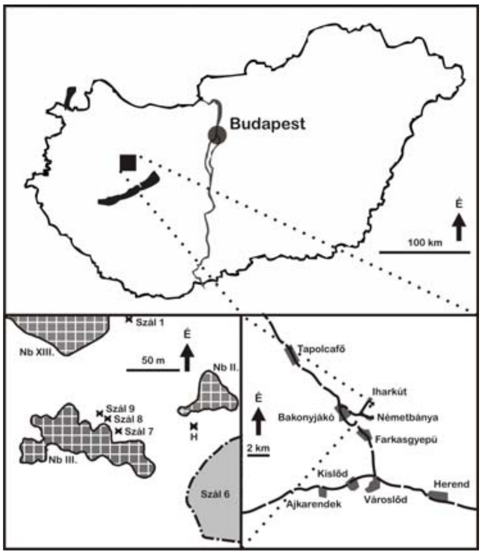

Figure 1: Location of Iharkút

Iharkút locality is situated in the Bakony Mts., Western Hungary (Fig. 1.). At the fossil site several vertebrate remains were unearthed (Ősi et al. in press.). The studied plant fossils occurred in the Upper Cretaceous Csehbánya Formation, which is a fluvial, floodplain unit consisting of variegated clays, paleosols and silt with intercalations of sand and sandstone layers. Palynological studies of Baranyi determined the Santonian age of the sediments. During the microvertebrate studies of Szentesi (Szentesi & Venczel 2010) a remarkable variety of plant mesofossils has been recovered. The studied mesofossils come from three layers of the fossil site. More than 1500 seeds and fruits have been studied so far.

The mesoflora of Iharkút is important in providing direct information of ecosystem and the flora of the rich and diverse vertebrate fauna. The first results of the plant mesofossil study suggest an Angiosperm dominated vegetation with high frequency of Normapolles related plants. The dominant form is under description as *Sphaeracostata barbackae* BODOR et BARANYI (in prep.). From this species almost 1000 specimens were studied. The *Caryanthus* FRIIS 1983 genus and a form similar to a morphotype ("Taxon 1") described from Haţeg (LINDFORS et al. 2010) also appeared (Fig 2.). In addition to the Normapolles related mesofossils, the Iharkút material includes a high number of Magnoliaceae, Hamamelidaceae and Sabiaceae related fossils as well as ones that are not classifiable yet. The Magnoliaceae is mainly represented by the *Padragkutia* genus. The most important species of the genus is the *Padragkutia haasii* KNOBLOCH & MAI 1984.This species is represented by more than 300 specimens in the material.

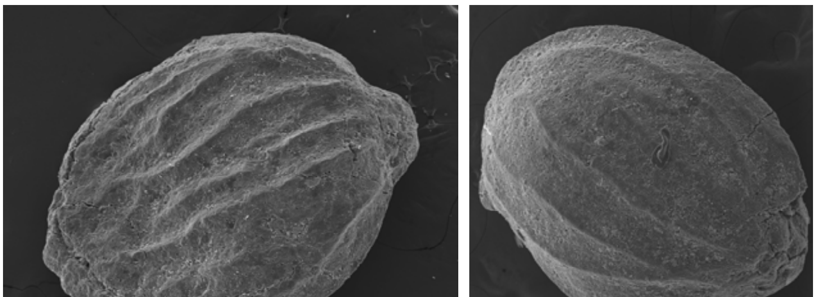

Figure 2. Morphotype described from Haţeg as "Taxon 1" by LINDFORS et al. (2010) in the Iharkút material (scalebar 1 mm)

The first sediment on the underlying unit shows the dominance of the *Padragkutia haasii* and the *Discosemen*, just one specimen of *Caryanthus* were found. In the upper layers *Discosemen* is the dominant (70%), but other forms also occur in the sediments: *Padragkutia haasii* (15%), *Caryanthus* (10%) and here is the first occurance of *Sphaeracostata barbackae*. Most of the mesofossils come from the bone bed (more than 1000 specimens), but this is due to sampling methods rather than the sedimentary environment. The washing material was collected for vertebrate fossils also, and bone bed type layer is promising for their remains. In that layer the dominance of as *Sphaeracostata barbackae* was detected, in all cases more than 50%, in most samples more than 70%. The second characteristic form is *Padragkutia haasii*, which was abundant in the underlying strata as well. *Caryanthus*, *Sabia menispermoides* and "Taxon 1" of Hateg are represented with a few specimens.

These differences in the stratigraphical column can be explained by the changes of plant associations near a fluvial system. The fluvial transport is evident from the channel fill depositional environment where vertebrate megafossils occur in abundance. The paleosoil levels should represent the flood plain units. These ecological differences could indicate the slight but clearly expressible differences between the sampled stratigraphic levels.

In the paleoecological reconstruction of terrigenous environments the study of plant mesofossils gained ground in the last decades enabling the comparison of Iharkút with other European Upper Cretaceous localities. The most important similarities appeared in the Ajka Coal Formation in the Santonian of Hungary. The *Caryanthus* is a well-known genus in Northern and Western Europe and also occurs in the Gosau Formation of Austria, but was not mentioned in the Hateg Basin. The "Taxon 1" of Hateg was not known from western parts of Europe. The *Sphaeracostata barbackae* is only known from Iharkút.

The archipelago reconstruction of the Upper Cretaceous of the region should explain the unique feature of the mesofossils, and suggest that Iharkút was in intermediate position where the plants of the eastern and western localities also occurred.

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ORAL

Stable isotope distribution in deep-sea hydrothermal barnacles, Manus Basin, Papua New Guinea: a key in understanding their ecology

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Keywords: stable isotopes, deep-sea, barnacles

One of the most extended and active hydrothermal fields of the Manus Spreading Center is the Hydrothermal field 1, Vienna Woods (Tufar, 1990). In this study we present around 60 stable isotope data on carbonates and shell structure investigations of barnacles collected during the Olga 2 expedition. The heterogenous faunal composition found as this site consists of gastropods, barnacles, bythograeid crabs, bresiliid shrimps, vestimentiferans, sea anemones as described by Galkin, 1997.

For this study, the investigated fauna include 5 exemplars of a hydrothermal vent barnacle, *Eochionelasmus ohtai manusensis* (Yamaguchi und Newman, 1990) collected at a depth of c. 2500 m.

Oxygen stable isotope data of *Eochionelasmus ohtai manusensis* were performed from the centre to the border of the calcitic shells, along profiles. Within one shell, the isotope values show variations of max. 0.6 ‰. The calculated temperatures from the stable isotope data, consistently indicate that *Echionelasmus* populated sites with low values, up to a few °C. The calculated temperatures from the isotope data are also in agreement with the reported habitat from the North Fiji and Lau Basins, where temperatures of max. 6°C were measured at sites populated by *Echionelasmus* (Desbruyeres et al., 1994). Both calculated and measured temperatures of a few degree indicate that at the sites where *Echionelasmus* lives, hydrothermal fluid input is present, as ambient temperature are around 1.5°C. Carbon stable isotope composition of *Echionelasmus* show lower $\delta^{13}C$ values than for litoral barnacles, supporting the input of a vent carbon source.

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ORAL

Holocene microfaunas and nannofloras of the W Black Sea

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Keywords: Black Sea, ostracods, calcareous nannoplankton, Late Holocene, Romanian inner shelf

Introduction

The shift from a lacustrine palaeoenvironment to a marine one in the Black Sea during Holocene times is a debate subject in the international scientific community. There are two main hypotheses regarding the Holocene Black Sea sea-level rising: catastrophic and gradual. The scenario concerning the catastrophic flooding of the Black Sea was advanced by Ryan et al. (1997), attracting the greatest attention and arousing a great deal of controversy and further research. Another scenario, based on a huge amount of collected data (for a synthesis see Yanko-Hombach et al., 2007), indicates that no catastrophic flooding of the Black Sea has occurred, and the Neoeuxinian Lake gradually transformed into a marine basin.

Methods

This work discusses fluctuation in planktonic organisms (i.e., foraminifers and nannofloras), as well as changes in benthic communities, which were observed in seven cores from the Black Sea Romanian inner shelf. The shallower core is situated at the 12 m water depth while the deepest one at 200 m water depth. From a lithological point of view, the investigated cores are mainly characterized by the deposition of a grey mud, alternating with thin cm sands and coquina layers; mainly broken shells of mollusks, such as *Modiolus* and *Mytilus*, together with small gastropods, are present. A detailed lithology of the investigated cores was published by Oaie & Melinte-Dobrinescu (2010).

Results

Two types of microfaunal associations were identified in the investigated Upper Holocene deposits. The oldest microfaunas contain fresh-brackish ostracod assemblages, corresponding to a low sea-level, coincident with the Black Sea isolation from Mediterranean. The youngest microfaunas is represented by marine ostracod and foraminifera assemblages, similar with those contemporaneously recorded in the Black Sea. The occurrence of this type of microfauanl association is indicative for the Late Holocene reconnection of the Black Sea with the Mediterranean.

The most frequent observed ostracods are those belonging to the *Cytheracea* group, such as: *Cyprideis littoralis* (Brady), *Leptocythere multipunctata* (Sequenza), *L. devexa* Schornikov, *L. histriana* Caraion, *Amnicythere striatocostata* (Schweyer), *A. quinquetuerculata* (Schveyer), *A. reticulata* (Schornikov), *A. cymbula* (Livental), *A. olivina* (Livental), *Callistocythere diffusa* (G.W. Müller), *Cythereiss rubra pontica* Dubovski, *Heterocythereiss amnicola* (G.O. Sars), *Loxoconcha granulata* G.O. Sars, *L. gibboides* (Livental), *L. aestuarii* Marinov, *Limnocythere inopinata* (Baird), *Cytherura euxinic*a Caraion, *Cytheroma variabilis* Müller, *Cytherois cepa*, *Paracytherois agigensis* Caraion, *Pontocythere bacescoi* (Caraion), *P. tchernjawskii* Dubowski, *Cytheroma variabili*s Müller, *Xestolebris decipiens* Müller, *X. corenelii* Caraion, *X. chanakovi* Livental. Common taxa recorded in the foraminiferal assemblages are the species of the *Ammonia* and *Elphidium* genera.

All the investigated cores yielded, above the fresh-water clays of Unit 3 (*sensu* Ross and Degens, 1974), which is the single lithological unit recognised both in shallow and deep marine environment of the Black Sea, a layer that contains fresh-water, brackish and marine molluscs. Above this level, blooms of the calcareous nannoplankton taxa *Braarudosphaera bigelowii*, followed by blooms of the *Emiliania huxleyi*, were recorded. Above, in the marine Units 2 and 1 of Ross & Degens (1974) as well as in the shallower correspondent (i.e., the Shallow Unit, *sensu* Giunta et al., 2007), the calcareous nannofloral assemblages contain almost exclusively (above 95 %) *Emiliania huxleyi* (Melinte-Dobrinescu & Briceag, 2011). The increasing abundance of *Emiliania huxleyi* (the dominant calcareous nannoplankton species in nowadays assemblages of the Black Sea) slightly preceded the occurrence of marine microfaunas on the Romanian Black Sea shelf.

Conclusion

The fluctuations in composition of the microfaunal assemblages, as well as of the calcareous nannoplankton ones, suggest a progressive salinity increased in the Black Sea during Holocene times, from a brackish setting to a marine one. This observation is true for open marine areas of the Black Sea (with water depth below 200 m), while in the shallow marine setting, a rapid salinity increasing could be assumed. In Late Holocene times, stable marine conditions established, with salinity close to nowadays, allowing the proliferation of marine microfaunal and nannofloral assemblages, cha-racterised by high abundance, but low diversity.

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POSTER

The ichnogenus *Thalassinoides* from the Kersonian deposits of Buleta (W Râmnicu Vâlcea, Romania)

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Keywords: Upper Miocene, Sarmatian, shallow marine deposits, ichnofaunas, SW Romania

The ichnogenus *Thalassinoides* was identified for the first time in sediments belonging to the Kersonian (substage of the Sarmatian, which is a regional Eastern Paratethyan stage with the age around 10 My) of Buleta Site, at 14 km SW of Râmnicu Vîlcea and 7 km SE of Govora, in the Vâlcea County.

In Pietrişului Hill situated N of Buleta (Cantuniari, 1916), the Kersonian deposits are composed by a 4 m thick basal sequence characterized by the presence of fine to medium yellow sands, with gravel lenses or disseminated elements (Papaianopol *et al.*, 1995). The same authors indicated that the basal sandy sequence is followed by alternating sandy and calcareous sandstones, 10 m in thickness, as well as limestones with coquina levels. The later ones contain rich mollusc assemblages, including species such as *Mactra (Sarmatimactra) balcica* MACAROVICI*, M. (Chersonimactra) caspia* EICHWALD*, Mactra (C.) crassicolis* SINZOW*, M. (C.) bulgarica* TOULA**,** *M.(C.) elongata* MACAROVICI and *M.(C.) intermedia* MACAROVICI.

Specimens of *Thalassinoides*, with an exceptional preservation (Fig. 1), occur abundantly in the sandy sequence of the investigated site, giving to the deposits a nodular feature. The system of endogene galleries, with typical ramifications in «T» and «Y», having significant dimensions (15-40 cm in length and 3-8 cm in diameter), marked the existence of producers represented by infaunal taxa (i.e., *Crustacea*) that are sediment consuming.

The presence of this ichnogenus in the Kersonian sandy sequence of the Buleta site indicates that the sands accumulated in a shallow marine environment, with normal salinity. Progressively, the salinity significantly decreased, once the instauration of the calcareous facies with *Mactra* taxa.

Fig. 1- *Thalassinoides* ichnogenus from the Buleta Site.

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ORAL

Lower Cretaceous calcareous algae from central Iran

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Keywords: Dasycladales, Bryopsidales, Taxonomy, Paleoenvironment

Knowledge on fossil calcareous algae from the Iranian Lower Cretaceous deposits could be found, essentially, in Gollestaneh (1979), Bucur et al. (2003), Hosseini & Conrad (2008), Taherpour et al. (2009), Taherpour et al. (2010). The present paper describes and illustrates the calcareous algal association from Aliabad region (close to Yazd, central Iran).

For the Iranian territory, three major geological structural units have been defined: a) the southern unit (Zagros); b) the central unit, also including Albroz, and 3) the northern unit, including the southern part of Caspian Sea and Kopet Dhag (see details in Taherpour et al., 2010). Central Iran is separated into several tectonic blocks; the area under study belongs to Yazd block (Aghanabati, 2004). The studied sections are located 59 km south-west from Yazd, close to Aliabad locality. In this area, the Cretaceous deposits are separated into three formation): Tagestan Formation (Hauterivian), Taft Formation (Barremian-Aptian), and Derreh-Zangir Formation (Albian).

The calcareous algae were mainly collected from three geological profiles of Taft Formation located south from Aliabad. Seven major microfacies types have been identified in the analysed samples: (1) bioclastic wackestone and wackestone-packstone, sometimes with intraclasts; (2) bioclastic (peloidal, intraclastic) packstone; (3) bioclastic packstone-grainstone or grainstone-packstone; (4) bioclastic (sometimes peloidal) grainstone; (5) bioclastic-ooidal grainstone (sometimes packstone with ooids); (6) bioclastic grainstone and grainstone-packstone with terrigenous quartz, and (7) packstone and packstone-wackestone with terrigenous quartz.

The organic rests identified in the thin sections consist of rare fragments of sclerospongia and corals, fragments of bivalves, gastropods, bryozoans, brachiopods, echinoderms and crab claws (*Carpathocancer* sp.). The microfossil association is dominated by dasycladalean and bryopsidalean calcareous algae and benthic foraminifera, accompanied by rare "solenoporaceans" (*Marinella lugeoni*), cyanophycean crusts, rare *Bacinella-Lithocodium* and the microproblematic *Carpathoporella occidentalis* Dragastan. The foraminiferal association contains, besides other benthic foraminifera, *Balkhania balkhanica*, *Charentia cuvillieri*, *Torremiroella hispanica* and numerous orbitolinids, including *Montseciella arabica* and *Palorbitolina lenticularis*. This association points to a Barremian-?Lower Aptian age for the studied samples.

The algal association identified in the limestones of the Taft Formation mainly consists of dasycladalean, udoteacean and gymnocodiacean green algae. Rare "solenoporacean" algae (*Marinella*) and possibly cyanophycean *Girvanella*-like algae also occur. A number of 31 taxa (of which 26 at species level: 13 dasycladaleans, 12 bryopsidales and one species of "solenoporaceans") were identified.

The calcareous algae assemblage consists of (1) Dasycladales: *Actinoporella iranica* n.sp., *Deloffrella quercifoliipora, Holosporella farsica* n. sp., *Griphoporella cretacea* n. sp., *Kopetdagaria sphaerica, Salpingoporella pygmaea, Salpingoporella hispanica, Salpingoporella* cf. *muehlbergii, Montiella*? *elitzae, Neomeris cretacea, Zittelina* sp., *Russoella radicicae, Terquemella* spp., *Arabicodium aegagrapilloides*, *Arabicodium* cf. *aninensis*, *Boueina* cf. *hochstetteri*, *Boueina* cf. *moncharmonti*, *Boueina* cf. *pygmaea*, *Boueina minima* n.sp., *Halimeda*? cf. *fluegeli*, *Juraella* cf. *bifurcata*, *Permocalculus minutus*, *Permocalculus ampullaceus*, *Permocalculus dragastani*, *Marinella lugeoni*.

The whole fossiliferous assemblage points to an open carbonate shelf (external platform) environment with some local terrigenous quartz input.

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ORAL

Giant birds from the Late Cretaceous of southern France: an update

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Introduction

The first specimen of a giant ground bird from the non-marine Late Cretaceous of southern France, an incomplete synsacrum, was described from a locality at Fox-Amphoux (Var, Provence) by Buffetaut *et al.* (1995). Subsequently, the taxon *Gargantuavis philoinos* was erected by Buffetaut and Le Loeuff (1998) on the basis of a synsacrum and pelvis from Campagne-sur-Aude (Aude, Languedoc), and an incomplete femur from Villespassans (Hérault, Languedoc) was referred to that taxon on the basis of size and compatible morphology. All specimens are of Late Campanian / Early Maastrichtian age.

Although the avian nature of *Gargantuavis* was accepted by various authors, Mayr (2009), on the basis of a remark by Worthy, has recently questioned that interpretation, suggesting that the material referred to it actually belongs to giant pterosaurs, possibly azhdarchids. This suggestion is discussed below, and a newly discovered, indisputably avian, specimen referable to *Gargantuavis* is briefly described.

Is *Gargantuavis* a pterosaur ?

The main argument put forward by Mayr and Worthy in support of a pterosaurian nature of *Gargantuavis* is the cranial position of its acetabular foramen. *Gargantuavis* does have a cranially located acetabulum, at the level of the 3rd and 4th synsacral transverse processes. However, pterosaurs in general do not show a cranially positioned acetabulum, and their pelvis is very different in its general structure from that of *Gargantuavis*. Moreover, the stout and relatively short femur of *Gargantuavis* differs considerably from the long and slender femora of pterosaurs, including azhdarchids. There is therefore no reason to suppose that the material originally referred to *Gargantuavis philoinos* actually belongs to pterosaurs (Buffetaut & Le Loeuff, 2011). All the characters observable on that material are compatible with an attribution to a bird.

Mayr (2009, p. 21) noted that "the wide pelvis of *Gargantuavis* is very unlike the narrow one typically found in large groundbirds (ratites, Gastornithidae, Phorusrhacidae)". The extinct phorusrhacids and living ratites do have a narrow pelvis, but gastornithids, as well as some extinct ratites (moas) had a broad pelvis, and so did the extinct dromornithids from Australia. The shape of the pelvis apparently reflects the different locomotory adaptations of large ground birds (Storer, 1960): cursorial forms such as phorusrhacids and living ratites have a narrow pelvis, whereas a broad pelvis is found in graviportal forms such as some moas, dromornithids and gastornithids. The broad pelvis of *Gargantuavis* therefore suggests a graviportal type of locomotion and cannot be considered as an argument against an avian nature.

New evidence of a large terrestrial bird from the Late Cretaceous of southern France

Although systematic excavations at various Late Cretaceous localities in southern France (and Spain, which was part of the same island in the Late Cretaceous) have yielded thousands of vertebrate specimens in the last twenty years, until recently only the three above-mentioned specimens of *Gargantuavis* had been reported. Either this bird apparently was a rare element of Late Cretaceous western European ecosystems, or its preferred habitat was not conducive to fossilisation.

In April 2011, however, a new specimen of a very large bird was found in the course of excavations at the Montplo-Nord locality, near the village of Cruzy (Hérault, Languedoc). The locality is of roughly the same age as those that have yielded *Gargantuavis* material and yields a rich vertebrate assemblage including turtles, crocodilians, pterosaurs and dinosaurs (ankylosaurs, ornithopods, theropods and sauropods). The new specimen is a well preserved anterior cervical vertebra showing the hetero-coelous condition which is typical of birds. Comparisons show that it is about the size of an anterior cervical vertebra of a cassowary (*Casuarius*). The dimensions of this vertebra are compatible with those of the type synsacrum of *Gargantuavis*, and it seems likely that it belongs to that taxon.

Fig. 1. Anterior cervical vertebra of a large bird from the Late Cretaceous Montplo-Nord locality at Cruy (Hérault, southern France), in cranial view. Musée de Cruzy, n° MN478. Scale bar: 10 mm.

Conclusion

Contrary to recently expressed doubts, *Gargantuavis philoinos* is clearly a bird, not a pterosaur. The presence of a very large terrestrial bird in the Late Cretaceous of southern France is confirmed by the recent find of a large typically avian cervical vertebra at Cruzy. This bird is uncommon in the Late Cretaceous vertebrate assemblages of southern France, but the reasons of this rarity are uncertain. Be that as it may, the existence of *Gargantuavis* shows that giant ground birds did evolve in at least some parts of the world before the extinction of the non-avian dinosaurs.

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ORAL

Tomognathus, a voracious halecomorph fish that roamed the Cretaceous seas

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Keywords: Actinopterygii, France, jaws, new taxon, palaeobiology

†*Tomognathus mordax* is a very curious fish described by Dixon (185) from the Cenomanian and Turonian (early Late Cretaceous) English Chalk. This species shows an unusual combination of characters, and was regarded first as a relative of the extinct Ichthyodectiformes, then as a member of the Stomiiformes (dragonfishes) (Woodward, 1901 and 1908), and finally was recently recognised as a halecomorph of uncertain affinities (Forey and Patterson, 2006). Halecomorph fishes were diversified in the Mesozoic then their diversity declined during the Late Cretaceous and the Tertiary (Grande and Bemis, 1998). The clade is represented today by a single species, *Amia calva*, which inhabits freshwaters from North America. During the Late Jurassic, Amiiformes lived mainly in marine environments, and then several lineages moved to freshwaters in the Early Cretaceous.

Here, we describe a new discovery near the city of Toulon, SE France, in Barremian deposits, thus aging the genus of ca. 30 millions years. The specimen is very fragmentary, comprising only the anterior extremity of the snout and of the mandible. However, it shows characters indicating that it belongs to †*Tomognathus*, as well as autamoporphies allowing the erection of a new species. In this fish, the coronoid dentition from the mandible and the palatine dentition (dermopalatines and entoperygoids) from the upper jaw constitute a well developed and striking internal jaw, redoubling the lateral dentition borne by the dentaries and maxillae/premaxillae. This peculiar 'double-jaw', together with the acute, sharp and proportionally very large teeth of this fish made it a voracious predator of the Cretaceous European seas.

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ORAL

The OAE 2 in the southern Eastern Carpathians, integrated biostratigraphy and paleoenvironmental changes reflected by the agglutinated foraminifera assemblages

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Keywords: Cenomanian/Turonian boundary, Dumbrăvioara Formation, calcareous nannofossils, foraminifera

The opening of the Holcim Quarry (Miriuţa Valley) in the Stoeneşti locality, near Câmpulung Muscel, provided the opportunity to sample the previously inaccessible upper Cenomanian – lowermost Turonian interval. The deposits exposed by the quarry consist of upper Cenomanian grey sandy marls and black clays and the lower Turonian green marls of the Dumbrăvioara Formation. The sedimentary succession is located at the westernmost point of the Ceahlău Nappe, Outer Dacides. The black clay interval (1.5 – 1.7m thick) represents an equivalent of the Bonarelli Level (first described by Arthur & Premoli-Silva, 1982 at Gubbio, Italy) deposited during the Oceanic Anoxic Event 2 that took place at the Cenomanian/Turonian boundary.

We realized an integrated biostratigraphic scheme based on calcareous nannofossils and planktic foraminifera that allowed us to document the precise timing of the changes in the benthic foraminiferal assemblages. Both diversity and abundance of benthic foraminifera are high in the late Cenomanian, the black layer is barren of microfauna while the earliest Turonian reveals a high abundance – low diversity assemblage characteristic of stressed paleoenvironments. Diversity recovers in the early Turonian but it never reaches the values recorded in the late Cenomanian.

The opportunistic species of agglutinated foraminifera are the first to return after the anoxic event, the first recolonizers are represented by species such as *Eobigenerina variabilis* (n. comb., Cetean et al., 2011), *Recurvoides* spp. and *Bulbobaculites problematicus*. Calcareous benthic foraminifera show a much lower recolonization potential only returning higher in the lower Turonian, but also some agglutinated species such as *Tritaxia gaultina carenata* show a similar behaviour.

Once with the rise of the sea-level in the latest Cenomanian important changes can be observed in the agglutinated foraminifera morphotypes. Usually, deep-water settings have a strong dominance of the tubular morphotype of agglutinated foraminifera which is also the case in this section, but towards the latest Cenomanian as the sea-level was increasing the dominant morphotype became the deep infauna most probably as a result of sluggish circulation and very low oxygen values. After the anoxic event, this morphotype also yields the highest values, followed by epifauna morphotypes that are comprised of mostly opportunistic genera such as *Recurvoides* and *Repmanina*. The tubular morphotype of agglutinated foraminifera attains significant values again only at the top of the section suggesting a very slow recovery of the agglutinated assemblages after the anoxic event.

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POSTER

Mânăstirea: a New Pliocene vertebrate locality in Moldova

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Keywords: Scythian Platform, Late Pliocene, vertebrates

On the Scythian Platform (Southern Moldova), apart the Miocene formations, the last sedimentary megasequence refers also to Pliocene and Quaternary deposits. Both Early and Late Pliocene concerns continental deposits, notorious for their vertebrate assemblages: Bereşti (MN 14; Rădulescu and Samson, 1995) and Măluşteni (MN 15a; Rădulescu et al., 2003) are localities already reported since the beginning of the 20th century by Athanasiu (1915) and Simionescu (1922, 1932).

We are pointing out here a new Pliocene locality next to Măluşteni, Mănăstirea (Vaslui district), and located 3 km southeast (Fig. 1). The Pliocene deposits are cropping out between Mânăstirea and Igeşti, as successive creeks, like Mărunţica, Chetrăriei and Izvoarele. It worth mentioning that these outcrops are located nearly at same altitude like the Romanian outcrop bearing vertebrates in Dealul Lacului of Măluşteni, all being parts of a Pliocene flat monocline dipping to southeast (Ionesi, 1994).

Fig. 1. Location of Mânăstirea on the map (Google Earth 2011 satellite imagery)

These two localities are shearing similar Pliocene lithology. At Mânâstirea, on the aforementioned creeks, one can follow from bottom to top, i. yellowish sands with sandstones (ca. 20 m); clayey sands (ca. 5 m); cross-bedded yellowish white sands with lens-like microconglomerates, and sandstone concretions (25-30 m). This sedimentation reflects a fluvial environment evolution (Fig. 2).

Only the top sands yielded until now some fossils vertebrates, Mânăstirea list including the following taxa: Chelonia – *Testudo* sp.; Perissodactyla – *Stephanorhinus megarhinus* (de Christol); Artiodactyla – Cervidae indet.; Lagomorpha – *Ochotona ursui* Simionescu. These few taxa does not allow a clear geological age assignation, as long as all of them are already recorded both in Bereşti and Măluşteni, but one should remind that these localities are close in time from one another and a clear age for Măluşteni is still a matter of debate (i.e. Late Dacian vs. Early Romanian; Rădulescu et al., 2003a). The presence of *Mimomys moldavicus* Kormos could probably makes the difference (this vole is absent in Bereşti, the first occurrence of this species being in Măluşteni), but for instance we did not find such fossils in Mânăstirea.

The taphonomy of the fossil vertebrates refers for instance only to isolated, disperse bones, devoid of any anatomical connection. Part of them (mostly the turtle bones) seems to be carried by water flows before their definitive burial. No lens-like accumulation was ever found in this locality. The fossils are rather rare, the most numerous belonging to lagomorphs.

In these circumstances, a geological age for Mânăstirea could be established rather on correlation with Măluşteni. This correlation is easy, due to the close vicinity of the localities and to simple geological structure, referring to the fore mentioned monocline, devoid of faults. Therefore, we consider that Mânăstirea is nothing else but the southeast extension of the Lower Romanian deposits from Măluşteni, sharing same age, belonging to the "lagomorphic complex" reported from southeast Europe and Aegean realm (Rădulescu et al., 2003).

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ORAL

Cytological and morphological features of the some fossil and present-day correspondent species from *Taxodiaceae* family

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Keywords: epidermal cells and stomata; *Taxodium dubium*, *Sequoia abietina*, actual species

Introduction

The researches performed in the last years, underlined the importance of the paleontological studies in the species diversification, adaptation and evolution. Actual species of sequoia are placed in the Pinopsida class (Coniferopsida), cone-bearing gymnosperms, dating from the Carboniferous period. They belong to the Order Pinales (Coniferales), in the *Taxodiaceae* family. In *Taxodiaceae*, the evolution takes place in three directions: (a) Cunninghamia with *Cunninghamia lanceolata* species (Chinese fir); (b) the *Sequoia* group; (c) the *Taxodium* group. The three extant species from *Sequoia* group, present at origin a common ancestor, from which evaluate three genera, every with a single species: (a) Metasequoia, with *Metasequoia glyptostroboides* (Dawn redwood); (b) Sequoia with *Sequoia sempervirens* (Giant redwood); (c) Sequoiadendron with *Sequoiadendrom giganteum* (Giant sequoia). More recently flow cytometry has been used to measure genome size in gymnosperms (Murray, 1998).

Methodology

Biological material. The investigations were performed in two fossil species and in four present-day correspondent species in order to establish the evolution in time of some features implied in the species characterization. The fossil species were: (a) *Taxodium dubium* (Sternberg 1823) Heer 1853, provenance from Petroşani Basin, Romania, Upper Oligocene – Miocene, and (b) *Sequoia abietina* (Brongniart 1922) Knobloch 1964, provenance from Chiuzbaia, Romania, Upper Miocene. The present-day correspondent species were harvested from the mature tree (at the flowering time): (a) *Taxodium distichum* (Linné 1753) L.C.M. Rich 1810 harvested from Craiova Botanical Garden; (b) *Metasequoia glyptostroboides* Hu & Cheng 1948, from Craiova Botanical Garden; (c) *Sequoia sempervirens* (Lamb. ex D. Don) Endl, from Macea Botanical Garden; (d) *Sequoiadendron giganteum* (Lindl.) J. Buchholz 1939 from Banat, Romania

Work methods. Both in the fossil species and in the present-day correspondent species, the shape and size of the epidermal cells (length and width) and stomata (length) were analyzed. In fossil species these values were placed at our disposal by Acad. Prof. Răzvan Givulescu. In present-day correspondent species, biometric observations (30, in generally) at the mature plants (at flowering) were performed. Reliable determination of DNA ploidy level and detection of small variation in nuclear DNA content was possible in the present-day correspondent species using the flow cytometry techniques as described in O'Brien *et al*. (1996) and Partec CyFlow flow cytometer.

Results

The size and shape of the epidermal cells and stomata. Previously researches performed in the *Taxodium dubium* (fossil species), and in the *Taxodium distichum* (the present-day correspondent species), pointed out that they present some common features. With regards to *Taxodium dubium* fossil species, depending on the criteria being analyzed (leaves or cones), either *Taxodium distichum* (based on the analysis of the leaves) or *Taxodium mucronatum* (based on the analysis of the cones) could be considered as present-day representative species. Thus, in the two species (*Taxodium dubium* and *Taxodium distichum*), the customary absence of the stomata on the ad-axial side of the leaf was noticed. A close analysis of the epidermal anatomy of the leaf has evidenced a difference between the fossil and the present-day species: in fact, with time the edge cells are enlarged in the latter. Also, the length of the epidermal cells in *Taxodium dubium* had lower values as compared to *Taxodium distichum*. But, the biometric data recorded in this experiment for cells epidermis and stomata in *Sequoia sempervirens* were similarly with those reported by Ma and Li at the tree from Oregon, U.S.A. (2002).

The somatic chromosome number and DNA amount. In *Coniferales*, the basic chromosome number is x = 11, 12. In the actual analyzed species from *Taxodiaceae* family, the basic chromosome number x=11, these species being diploids (*Taxodium distichum*, *Sequoiadendron giganteum* and *Metasequoia glyptostroboides*, 2n=2x=22), and hexaploid (*Sequoia sempervirens*, 2n=6x=66). The chromosome numbers in *Sequoia* group was reported by many researchers (Schlarbaum and Tsuchiya, 1984, a/o). The investigations performed with flow cytometry, underline these findings, significant differences were recorded between the nuclear volumes of *Sequoia sempervirens* and the other species.

Conclusions

The investigations performed in some fossil and actual species from *Taxodiaceae* family (*Taxodium* sp. and *Sequoia* sp. group), underlined the possibility of using some of the leaf morphological features (the size and shape of the epidermal cells and stomata) in the taxonomical purposes. Also, the presence of a species with polyploidy degree, underlined that tree speciation process and evolution took place since the previous geological eras. The fossil species and present-day correspondent species present both common and particularly features. Likewise, between *Taxodium* and *Sequoia* species, there are many common features regarding the leaf morphology.

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ORAL

A preliminary report on paleobiogeography of early human dispersal in Western Eurasia

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Keywords: *Homo* ex gr. *erectus*, human dispersal, paleobiogeography, Early - Middle Pleistocene

Paleobiogeography of early human dispersal in Western Eurasia is an interesting but little studied topic, which can shed light over human paleobiology, limiting environmental factors and human evolution. The earliest fossil remains of human beings in Europe are unearthed from Sima Del Elefante (Spain) dated 1.1-1.2 Ma (Carbonell et al., 2008). Archaeological evidences suggest even some-what earlier dispersal of *Homo* in Europe ca. 1.4 Ma (DeLumley et al., 2009). The well-documented paleontological and archaeological evidences reveal a still earlier presence of *Homo* in Transcaucasian region dated back to ca. 1.8 Ma (De Lumley et al. 2002). The dispersal of *Homo* in Europe occurred somewhat later than in Southern and South-East Asia (Moncel, 2010). The initial human dispersal from Africa is often regarded in the context of belonging of archaic *Homo* to the carnivore guild (as a scavenger) and ecological relationship of *Homo* with Early Pleistocene active predators (Marean, 1989; Arribas & Palmquist, 1999). It seems that scavenging ecologically is strongly dependant of ecosystem productivity: the higher annual ecosystem productivity, the larger niche capacity for scavengers (Croitor, 2008). The productivity of modern ecosystems is declining from low to high latitudes and, apparently, it was true also for Early Pleistocene ecosystems. Therefore, the scavenging hypothesis can not fully explain driving forces of the human dispersal. Unlike ubiquitous Early Pleistocene carnivores, the area of archaic *Homo* distribution in Eurasia was restricted to Mediterranean Europe, Near East, Southern and South-East Asia. Apparently, *Homo* did not behave as a member of carnivore guild from the biogeographic point of view.

All findings of hominine remains in Western Eurasia, with few exceptions, are located south of the Alpine-Himalayan Mountain Belt (AMB) (Moncel, 2010). Today AMB acts as a boundary between Palearctic and Indo-Malayan biogeographic realms in its eastern part and between several Palearctic biogeographic provinces in its western part. AMB also is suggested as an important abiotic factor that defined the paleobiogeography of Cervidae and limited the dispersal of deer southward for a long geological period until the end of Pliocene (Heintz et al., 1990). During Pliocene and Pleistocene, AMB was an important zoogeographic barrier for some southern systematic groups and species (Giraffidae, *Theropithecus sp*., *Ursus thibetanus*, etc.). Ancient *Homo*, apparently, takes part from this group of mammals. Since hominins were able to occupy relatively high elevations (Kuhn, 2010), AMB was rather an effective biogeographic border, than a simple geographic obstacle for human dispersal. Apparently, AMB in Western Eurasia was an effective geographic barrier for cold continental climate influence, but also created specific mild humid climate conditions under the Gulfstream influence. The sharp annual seasonality, which characterized the climate of Western Eurasia north of the mountain belt, may be regarded as a limiting factor for early human dispersal. Most probably, the seasonal drop in temperature was the critical limiting ecological factor that controlled the hominin dispersal in Western Europe during Early Pleistocene. The Caucasian land at that time was a large peninsula surrounded by Gurian Basin from the West and Apsheronian Basin from the East. Apparently, the climate of Caucasian paleopeninsula was mild enough and favored the dispersal of *Homo* on the both sides of the Greater Caucasus chain, representing, therefore, an exception in the early hominin dispersal.

The character of human dispersal in Western Eurasia changed after the dramatic climate shift ca. 1.0 Ma with the onset of high amplitude 100 kyr glacial cycles. The Movius Line (ML) may be regarded as an indirect evidence of the advancing human dispersal in Western Eurasia. ML, which demonstrates a technological difference between the early prehistoric tool technologies of the East and West of the Old World (Movius, 1944), indicates a new biogeographic boundary of ecumene. ML is a border of the northern distribution of the Acheulian industry and represents a geographic and cultural boundary between Acheulian (handaxe and cleaver) and non-Acheulian (chopper/chopping tool) technologies in the East and West of the Old World (Movius, 1944). The eastern part of ML is drawn along Tien Shan and Himalayas Mountains, Brahmaputra River until the Bay of Bengal and represents an effective biogeographic boundary (Schwartz, 1977). The western part of ML ranges from Thames River to Adriatic Sea. Southwest of this line, handaxes are abundant. Lithic technology was interpreted as increasing in complexity west of the ML, while east of this hypothetical line a record of conservative, unspecialised and "non-progressive" core artefacts was to be found (Movius, 1944). According to Lycett and Norton (2010), ML is a crossing of a demographic threshold, which delimited the area with lower density of human population that defined the level of social interconnectiveness and, as a result, influenced the effective transmission of the technological skills and practices. This hypothesis rises up the question on paleobiogeographic significance of ML. Western Europe, which is characterised by comparatively higher density of human population at that time, also acted as a "wet climate refugia" for some Villafranchian holdover cervid species and, possibly, saber-tooth predators (Croitor, 2008; Croitor & Brugal, 2007). The "wet climate refugia" was characterised by comparatively mild and humid climate due to the Gulfstream influence. At this point, early *Homo* was able to tolerate seasonal drop in temperatures. Nonetheless, the strong continental climate with sharp seasonal contrasts of Eurasian inland was the limiting ecological factor that shaped the western segment of ML.

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ORAL

Unexpected survival and wide distribution of *Theriosuchus* in the Late Cretaceous Europe

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Keywords: Santonian, Campanian, Maastrichtian, Mesoeucrocodylia, Europe, paleobiogeography

The atoposaurid *Theriosuchus* is a genus of small-sized mesoeucrocodylians known to be widespread in the Upper Jurassic and Lower Cretaceous of Europe (e.g., Schwartz & Salisbury, 2005), but recently reported to occur in the Lower Cretaceous of Asia as well (e.g., Lauprasert et al., 2011). Nevertheless, the genus was assumed to disappear before the Early-Late Cretaceous boundary, until the recent discovery of skull remains referable to *Theriosuchus* (as a new species, *T. sympiestodon*) in the uppermost Cretaceous (Maastrichtian) deposits of the Haţeg Basin, Romania (Martin et al., 2010). This occurrence suggested a surprisingly long chronostratigraphic range extension for the genus (and thus for the Atoposauridae as well), *T. sympiestodon* being separated from all other occurrences of the genus by a lengthy ghost-lineage. The duration of this ghost-lineage was estimated to range between 55 My and as much as 75 My (depending on the phylogenetic position of the Haţeg atoposaurid inside *Theriosuchus*), thus representing another case of survival of relictual taxa into the Late Cretaceous, a common phenomenon in the Maastrichtian Haţeg fauna (e.g., Weishampel et al., 2010).

Following the description of *T. sympiestodon*, survey of previously collected crocodilian remains from the Haţeg Basin allowed the identification of several new specimens (skull bones and isolated teeth) that are referable to this new taxon. These include two further maxillae, of different sizes, that allow identification of ontogenetic changes in *T. sympiestodon*. Identification of these new remains show that *T. sympiestodon* (or closely related forms) was a widespread, although not really abundant, member of the local fauna.

Moreover, discovery of new material and reassessment of previously collected specimens from several other Upper Cretaceous localities throughout Europe suggest that *Theriosuchus*-like mesoeucrocodylians were represented in these local assemblages with a previously undetected taxonomic diversity. Isolated teeth previously assigned to indeterminate alligatoroids (Martin & Buffetaut, 2005) aong with other, newly excavated remains, suggest the presence of *Theriosuchus* in the Upper Campanian-Lower Maastrichtian of southern France, both in Languedoc and in Provence. Isolated teeth might suggest the presence of *Theriosuchus*-like mesoeucrocodylians in the Lower Campanian of Austria. Finally, the oldest Late Cretaceous remains, including two maxillae with teeth, referable to this taxon were identified recently in the Santonian Iharkút locality, in Hungary; these show a different tooth morphology from that of *T. sympiestodon*.

The newly recognized paleogeographic and chronostratigraphic distribution of *Theriosuchus* in the Late Cretaceous allows a refinement of the conclusions reached by Martin et al. (2010). It appears that survival of *Theriosuchus* was not an isolated event, restricted to the Transylvanian island, but occurred on different landmasses stretching over the whole extent of southern Europe, including both cratonic and Alpine areas. Alternatively, an isolated survival event (whose location cannot be pinpointed for the present) was followed by dispersal onto other landmasses, thus suggesting at least limited paleobiogeographic connections between the different islands of the south European archipelago during the Late Cretaceous.

Moreover, the discovery of *Theriosuchus* remains in deposits older than those from Haţeg (i.e., Santonian of Hungary, Campanian of Austria and France) fills in a large gap in the atoposaurid fossil record, by documenting the presence of the genus in Europe for a large part of the Late Cretaceous and thus reducing the duration of the ghost lineage that leads to *T. sympiestodon* with about 15 My.

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ORAL

Evolutionary and paleobiogeographic significance of a new madtsoiid snake from the Maastrichtian of the Hațeg Basin

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Keywords: Madtsoiidae, Hațeg Basin, lifestyle, paleobiogeography, evolution

Snakes were relatively rare components of the Late Cretaceous Laurasian terrestrial communities, whereas these were relatively common, and moderately diversified, in contemporaneous southern, Gondwanan ecosystems (e.g., Evans, 2003); their origins are traced back to the late Early Cretaceous based on fossil remains (e.g., Rage & Werner, 1999) as well as on molecular phylogenetic studies (e.g., Vidal et al., 2009). Based on the paleogeographic distributions of the oldest fossil snakes, it was suggested that the southern landmasses (more specifically, Africa) played an important role in the early evolution and diversification of this clade (Rage and Werner, 1999).

Madtsoiids, a group of extinct snakes, are among the oldest known representatives of the Serpentes; their phylogenetic position was subject of discussions (see, e.g., Scanlon, 2006, Zaher et al., 2009), although there is an emerging wider consensus that regards them as basal alethinophidians (e.g., Wilson et al., 2010). These were widely distributed in the basal late Cretaceous (Cenomanian) to Pleistocene of some Gondwanan continents, but appear to be absent from most Laurasian landmasses (see review by LaDuke et al., 2010). One notable exception to this pattern is represented by the southern European archipelago, where madtsoiids are recorded during the later part of the Cretaceous, from the Campanian-Maastrichtian of Spain, France and Romania. The presence of these south European madtsoiids was explained historically by immigration from a southern source (e.g., Rage, 1999), although neither the exact timing, nor the route of dispersal was possible to identify.

The recent discovery of a partial and semi-articulated madtsoiid skeleton in the pedogenetically modified floodplain deposits of the Tuștea nesting site (Csiki & Vasile, 2010) represents an important new addition to the European fossil record of the madtsoiids. Ongoing detailed study of the specimen (Csiki, Vasile, Venczel, *in prep*.) shows that is represents a new madstoiid genus, closely related to some quasi-contemporaneous Spanish taxa. Inclusion of this new taxon into a wider-scale phylogenetic study of Madstoiidae placed all named European madstoiids as relatively basal forms within the clade, while also supporting the basal alethinophidian nature of the clade itself.

These results have important impact on our understanding of the habitual and paleobiogeographic correlates of the origin of madtsoiids, as well as on the larger aspect of snake origins. Mapping characters such as body size and potential lifestyle onto the cladogram it appears that small body size and semi-fossorial habit were primitive conditions for the Madtsoiidae, and probably also for other nodes such as basal snakes and basal alethinophidians. Mapping these characters further down and up in the cladogram, it can be suggested that the origin of snakes is traceable back to a squamate group with terrestrial, semi-fossorial lifestyle, instead of the aquatic mosasauroids as was suggested recently (e.g., Lee, 2005).

Survey of the phylogenetic relationships and paleobiogeographic distribution of the different Cretaceous madtsoiids suggests that early range extension of different madtsoiid subclades into southern Europe represents a plausible alternative hypothesis to that of the previously proposed late dispersal across the Tethys. Choosing between these alternative scenarios will depend on further discoveries of well-preserved madtsoiid remains in crucial areas such as different parts of the southern European archipelago, as well as Africa.

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ORAL

A large-sized (?)Late Maastrichtian titanosaur from Râpa Roşie, Sebeş

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Keywords: Sebeş, Râpa Roșie, Titanosauria, size

The red-coloured detritic continental deposits cropping out at Râpa Roşie, near Sebeş, were historically interpreted as representing the Upper Oligocene-Lower Miocene (e.g., Grigorescu, 1987, Codrea & Vremir, 1997). Nevertheless, the presence in these deposits, of dinosaur and other vertebrate remains, reminiscent of those commonly found in the Maastrichtian beds of the Haţeg Basin, represented a problematic issue. Consequently, the vertebrate fossils were interpreted as being reworked from underlying Upper Cretaceous continental deposits (see also Codrea et al., 2008), an idea also supported by their fragmentary nature. Nevertheless, more recently caution was expressed as to their purely allochthonous origin (e.g., Codrea et al., 2010), or this was rejected entirely, favouring an autochthonous setting of most vertebrate remains from the outcrop (e.g., Vremir et al., 2009).

Recent fieldwork in the Râpa Roşie outcrop led to the discovery of new vertebrate remains in the upper part of the local section, some of these of rather large dimensions and showing a remarkably good degree of preservation, including a partial cervical vertebra of a gigantic azhdarchid (Vremir et al., 2009). Accordingly, these occurrences suggested reassessment of the age of the Râpa Roşie redbeds, and their referral to the Maastrichtian (probably the upper Maastrichtian). The fossiliferous bed, represented by light grey, red-spotted coarse and poorly sorted sandstones with rip-up clasts and exotic peebles, is interpreted as a channel deposit laid down by shallow and wide meandering rivers. Besides azhdarchids, other vertebrates from the same bed include turtles (*Kallokibotion*), crocodilians (possibly *Doratodon*), and dinosaurs (*Telmatosaurus*, titanosaurs; Vremir, 2010).

One of the most complete remains from this taphocoenosis is represented by a well-preserved mid-posterior dorsal vertebra of a titanosaur, preliminarily described by Vremir (2010). This specimen is remarkable due to its relatively large size (centrum length over 148 mm), and moderately dorsoventrally compressed centrum (width to height ratio - 1.21), both features uncommon in other titanosaur dorsals known from the nearby Haţeg Basin. Moreover, despite its occurrence within a coarse channel sandstone, the dorsal vertebra is well preserved (although incomplete), showing several features poorly preserved or obscured in other titanosaur dorsals from Romania.

The centrum is markedly opisthocoelous, as common in titanosaurs, laterally excavated by deep, large and acuminate pleurocoels; it is rather short and moderately dorso-ventrally depressed. Both the centrum and the neural arch (including the prezygapophyses) show a somphospondylous internal texture. The prezygapophyses are short and robust, the parapophyses are dorsally displaced to lie slightly anterior and ventral to the (broken) diapophyses. The neural arch lamination (including the prsl, sprl, cprl, acpl, pcpl, pcdl, cpol, ppdl, spdl and spol; see Wilson, 1999) are relatively well developed, separating a series of fossae whose pneumatic nature is suggested by their smooth, crenulated, and shiny bone surface (Wilson et al., 2011). The vertebra shows a moderate amount of left-right assymmetry in the development of the postzygo-diapophyseal lamina (present on the left side, but apparently absent, or dorsally displaced, on the right side), and that of the prezygapophyseal parapodiapophyseal fossa (Wilson et al., 2011), antero-posteriorly narrower, slit-like, on the left side.

Additionally, three titanosaur caudal vertebral fragments were recovered from the same level and from within 1.5 to 5 m distance of the mid-posterior dorsal; only one, a middle-distal caudal, is complete enough to allow description. Its most prominent features are the weakly opisthocoelous centrum, with a small anterior condyle, as well as the dorso-ventrally compressed morphology, visible especially at the more completely preserved distal articular surface (compression ratio - 1.35). The second, smaller, more distal caudal is reminiscent of the former in the dorso-ventrally depressed centrum mid-section. The third specimen is a well-preserved, but fragmentary neural arch, bearing one almost complete pre-zygapophysis. They are commensurate in size with, and might belong to the same individual as the dorsal, although this appears contradicted by their different preservational features.

These titanosaur vertebrae are remarkable especially for their relatively large size, the dorsal being significantly larger (almost twice as long) than most dorsals from the Haţeg Basin, suggesting an individual about 11-12 m in legth; moreover, they are also different in being moderately dorso-ventrally compressed. The dorsal, especially, differs from those of the recently described *Paludititan* (Csiki et al., 2010), as well as those of the Spanish genus *Liranosaurus* (Sanz et al., 1999), and the French taxa *Ampelosaurus* (Le Loeuff, 2005) and *Atsinganosaurus* (Garcia et al., 2010), respectively, in combination of its characters.

A sauropod left femoral midshaft (256 mm preserved length, from the distal part of the fourth trochanter to the base of the supracondylar ridges) was also recovered from a slightly lower, conglomeratic bed. It shows several of the characteristics present in some titanosaur femora from the Haţeg Basin, such as the presence of an angular, longitudinal midline ridge dissecting the anterior face, the presence of a deep, double depression on the posterior face, just lateral to the distal part of the fourth trochanter, a wide, rounded parasagittal ridge bordering this double depression laterally, and the presence of a weaker, but still well-marked ridge extending disto-laterally on the posterior face of the shaft, from the base of the parasagittal ridge towards the lateral edge of the posterior face. The shaft cross-section is largely tranversely oval, with a definitively angular anterior face. Although it was discovered close to the vertebrae, the femur appears to be too slim and small as to belong to the same individual(s) as the vertebrae; this is also suggested by the slightly different levels at which the remains were encountered. Accordingly, remains of at least two different-sized titanosaur individuals are present in the upper levels of Râpa Roşie; whether these imply ontogenetic or taxonomic distinction is as yet unclear, pending on further, more complete discoveries.

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ORAL

Stretched between continents – the paleogeographic affinities of the Hațeg vertebrate fauna and a possible scenario for its evolutionary history

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Keywords: Europe, Hațeg, late Cretaceous, paleobiogeography, origin, evolution

In the Cretaceous, the area of present-day Europe underwent a large-scale flooding beginning in the Cenomanian, and most of its central and southern areas were transformed into islands; its paleo-geography was that of an archipelago of fluctuating geography largely controlled by plate tectonic, orogenic and eustatic events. Its Late Cretaceous continental paleogeography and paleobiogeography is still poorly understood in details (see reviews by Le Loeuff, 1991; Pereda-Suberbiola, 2009; Wei-shampel et al., 2010); the uncertainties concern especially the spatial extent, temporal duration, position and geographical connectedness of the different landmasses, as well as the phylogenetic relationships, origin and patterns of dispersal of the different vertebrate groups both between "Europe" and other landmasses, and within the European archipelago.

Lying at the eastern end of the European archipelago, Hațeg Island yielded a remarkably diverse vertebrate assemblage, unfortunately largely restricted to the latest part of the epoch, the Maastrichtian. The origin and affinities of its particular vertebrate assemblage have attracted a long-standing interest, starting with Nopcsa (1923), and the evolution if this assemblage was seen as influenced mainly by *in situ* endemic evolution of an Ealy Cretaceous Euramerican core assemblage (see Weishampel et al., 2010; also Martin et al., 2010), although connections to other landmasses were also proposed (e.g., Le Loeuff, 1991; Martin, 2010).

Discovery of several new vertebrate taxa within the Hațeg assemblage forces a reconsideration of previously proposed evolutionary scenarios, both at the level of the local assemblage, and at that of the wider, European vertebrate faunas. The presence of a late-surviving atoposaurid (Martin et al., 2010) fits rather well with the "endemic evolution" model, although it requires modest intra-European faunal mobility. Nevertheless, identification of a new madtsoiid snake suggests either southern, Gondwanan connections of the Hațeg assemblage in the Late Cretaceous, a similar scenario also suggested in the case of certain basal titanosaurs (e.g., Garcia et al., 2010) and derived, neobatrachian frogs (Szentesi & Venczel, 2010), or at least modest faunal interchanges with other south European landmasses; this latter scenario fits well with the identification of a widespread distribution of several taxa previously regarded as endemic to the Hațeg Island (such as *Allodaposuchus*, Martin, 2010, or *Kallokibotion*, Rabi et al., *in press*). Similarly, discovery of the derived velociraptorine *Balaur* (Csiki et al., 2010) suggests faunal connections between Asia and Europe late into the Late Cretaceous, a scenario also supported by other recently identified taxa such as basal hadrosauroids (Dalla Vecchia, 2009), basal lambeosaurines (Cruzado-Caballeros et al., 2010; Pereda-Suberbiola et al., 209; Prieto-Marquez & Wagner, 2009) or neoceratopsians (Godefroit and Lambert, 2007; Ősi et al., 2010). On the other hand, western European faunal connections to North America are upheld by the identification of marsupials (Martin et al., 2005) and crocodyloids (Puértolas et al., 2011) with Laramidian affinities.

Taken together, these discoveries suggest a more complex picture of latest Cretaceous European continental paleobiogeography. This is obvious at the level of the Hațeg Island, which appears to have had more profound faunal connections with both other South European emergent areas and possibly also with more distant continental landmasses (such as Asia); however, geological data that would explain such connections are still largely missing. The same paleobiogeographic complexity is also a part of the wider context of the European Archipelago, which was not as isolated as its first paleobiogeographer (Nopcsa, 1923) thought, but instead indicates different moments and directions of faunal exchanges with surrounding landmasses.

Acknowledgments

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ORAL

A new shark fauna from the Phu Kradung Formation (latest Jurassic – earliest Cretaceous) of Thailand

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Keywords: South-East Asia, Mesozoic, Khorat Group, Hybodontiformes, freshwater sharks

Freshwater hybodont sharks are abundant and diverse in the Khorat Group, but so far they were well known only from the Sao Khua and Khok Kruat formations (Cuny et al., 2006, 2007, 2008). Many fossil teeth were also recovered from the Phu Kradung Formation, but they were in general badly preserved and fragmented, making their identification rather difficult (Cuny et al., 2007). The recent discovery of a new shark assemblage at Phu Noi, near the village of Din Chi in Kalasin Province allows however a better understanding of the shark assemblages from the Phu Kradung Formation.

The study of this rich assemblage is an ongoing work, so the results presented here are preliminary. Some of the teeth could not be identified beyond Hybodontiformes indet., but at least four taxa can be recognized at the time of writing this abstract: *Hybodus* sp., aff. *Hybodus* sp., a new species of *Acrodus* and *Lonchidion* sp. Aff. *Hybodus* sp. most probably represents a genus different from *Hybodus,* but a revision of the latter genus is needed before it can be named. It is for the same reason that *Hybodus* sp. from Phu Noi cannot be named at species level.

The teeth from Phu Noi are better preserved than usual for teeth from the Phu Kradung Formation and are therefore of a great help to identify teeth from other sites in the same formation. For example, teeth of an Hybodontiformes as yet undetermined, but quite characteristic in possessing teeth with a double longitudinal crest are found in Phu Noi but also in Kham Phok (Mukdahan Province), although the teeth from this latter site are quite fragmented and would not have been identifiable on their own. Similarly, the same species of *Hybodus* can be found in Phu Noi, Kham Phok, Phu Nam Jun (Kalasin Province) and Chong Chat (Nong Bua Lamphu Province).

The most interesting find so far is that of a new species of *Acrodus* that appears to be also present at Kham Phok, Chong Chat and Wang Din So (Phitsanulok Province). *Acrodus caledonicus* from the Bathonian of Scotland*, A. biscrasseplicatus* from the Middle Jurassic of Northern China and the new species from Thailand have been recovered from freshwater environments (Rees and Underwood, 2006; Klug et al., 2010), supporting Rees and Underwood's theory that this genus shifted from a marine to a non-marine environment during the Jurassic (Rees and Underwood, 2006). In addition, the new species from Phu Noi may represent the youngest record of the genus.

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ORAL

A neoselachian elasmobranch fauna from the Late Cretaceous of Senegal

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Keywords: Africa, sharks, rays, skates, Mesozoic

A selachian fauna is described for the first time from the Late Cretaceous (Campanian-Maastrichtian) of the cliff of Cap de Naze in Senegal. So far, the Campanian Paki Formation has only yielded a single tooth of the stingray *Dasyatis* whereas the Cap de Naze Formation has yielded a richer fauna including juvenile *Cretalamna* cf. *C. biauriculata, Serratolamna serrata, Carcharias* cf. *C. heathi, ?Carcharias* sp., *Squalicorax pristodontus, Schizorhiza stromeri,* cf. *Parapaleobates* sp., *Rhombodus binkhorsti* and *R. andriesi.*

Except for the possible presence of *C. biauriculata,* which is normally restricted to the Lower Maastrichtian (Case & Cappetta, 1997), such an assemblage confirms a Late Maastrichtian age for the unit 3 of the Cap de Naze Formation. At that time, the area may have served as a nursery for *Cretalamna,*as all the teeth recovered from this genus show a small size and a remnant of a nutritive groove on the lingual side of their root. The assemblage, although composed of cosmopolitan taxa, is similar to the contemporaneous selachian assemblage from the phosphates of Morocco.

As all the fossils have been surface collected during prospective works, there is a good potential to find more selachian taxa in the Late Cretaceous of Senegal, all the more if screen-washing of sediment is implemented in order to retrieve smaller teeth.

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ORAL

The paleoecology analysis of Mio-Pliocene flora in Mehedinţi District, Romania

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Keywords: Mio-Pliocene, macroflora, paleoecology, Mehedinţi, Romania

Introduction

In this paper were analyzed from point the view of paleoecological the following sites: Iloviţa, Crăguieşti, Batoţi, Crivina, Dedoviţa - Balota, Husnicioara open pit, Bâcleş.

Methodology

Paleoecological studies based on the actualism principle consider that fossil plants have had approximately the same cenotic behaviour and ecological requirements as their actual correspondents.

Results

The Badenian flora, from Iloviţa, in Bahna-Orsova Basin, was identified by Diaconu (2009). These taxa are completing, after near a century, Macovei's (1909) list. At the same time, some taxa are confirmed in Badenian flora of Romania. The presence of some taxa as: *Osmunda* sp., *Liquidambar europaea* AL. BRAUN, *Populus populina* (BROGNIART) KNOBLOCH and possibly? *Persea* sp. are indicative for a eutrophic marsh environment. The presence of Lauracee marks a warm-humid climate, with average temperatures above 15^0 C.

The present stage of knowledge of the Pontian flora from Batoţi contains 50 taxa. Through the listed taxa the degree of confidence of the paleoecologycal and paleophytocenotical rendering grows. The high dominance of the North-American elements, followed by the East Asian represents a phytogeographical characteristic of the Upper Miocene flora from Romania. In this respect, even if the flora from Batoţi represents only 24% from the number of the floristic Upper Pontian species from Chiuzbaia (v. Givulescu, 1990), for the moment. Proportionally the two floras have the same characteristic: the prevalence of the North Atlantic American elements, and secondly the East Asian elements.

The paleoecological study of the flora from Crivina indicated the presence of two distinctive paleobiotopes: a mesophytic association characterized by the occurrence of an allochthonous flora dominated by *Fagus*, *Quercus*, *Castanea*, *Carya* and *Pterocarya* etc. and a marsh-type, coal-generating association with *Alnus cecropiaefolium*. Taking into account this phytocoenosis and the frequency of leaves of *Fagus silesiaca*, similar to that in the association of Batoţi (Ţicleanu et al., 2002:358), we assume the existence in the local vegetation of a "Mixed mesophytic forest region" type, associated with species of *Quercus*, *Pterocarya*, *Ulmus*, etc. Concerning climate parameters, the study of Petrescu et al. (2001) estimated an annual average temperature between 14-15º C, and precipitations exceeding 1200 mm/year.

In the Balota Hill, there were confirmed the following species: *Sequoia abietina* (BROGNIART) KNOBLOCH., *Glyptostrobus europaeus* (BROGNIART) Heer, *Liquidambar europaea* AL. BRAUN and point out: *Byttneriophyllum tiliaefolium* (AL. BRAUN) KNOBLOCH ET KVACEK and *Carpinus betulus* L. –bractee. After Givulescu (1992), coal-forming elements: *G. europaeus*, *B. tiliaefolium* and *A. cecropiaefolia* are typical of coal forming marshes (MCG) of the superior Miocene from Central Europe.

Referring to the forest with *Sequoia abietina*, even it is macrofloras documentary (Ţicleanu et al., 1982) as well as palynologic (Petrescu et. al., 1987), Givulescu (1996) consider that the species do not exist only solitary exemplary, without importance for the coal forming material. Our opinion, based on the leaf impressions, even if those are extremely rare, but especially on the existence of xylites (Husnicioara open pit) of *Sequoioxylon gypsaceum* (I. Petrescu), we consider that the Sequoia forests exist and, in some areas, their contributions to the forming of the parental vegetal material (MVP) of the coals could be significant.

Ticleanu (1992) and Diaconu (2005) confirmed the big frequency of the *G. europaeus* and *B. tiliaefolium* from Pliocene deposits observed by Givulescu later. Beside those two species, we added also the species *L. europaea,* which during the Dacian – Romanian period, should have the higher development. The site Balota represents a sequence from lithological succession, which comprises al least a level with *Viviparus* and *Hyriopsis,* fresh water molluscs. This fauna indicates the border of the lacustrine basin, where lives especially *Viviparus sp*., but there is not excluded that the limit between lacustrine domain and an estuary, or delta which provide sweet water of basin. Being terrestrial paleofflora and lacustrine fauna is explains by this fact.

Most of these taxa in the Husnicioara open pit are included in the dominant group of the coal swamps, but the presence of three *Pandanus* species is pointed out for the first time in Romania, this genus being an Oligo-Miocene relict. The same genus was mentioned by Palamarev & Uzunova (1969) from the Bulgarian Pliocene deposits. Our findings document the most northern area of this relict, proving that this species is a Carpathian relict, not only a Balkan one.

The paleoecological study of the flora from Bacles indicated the presence of two distinctive paleobiotopes: one lower floodplain forest with *Taxodium dubium* (Sternb.) Heer, *Quercus* cf *muehlenbergii* ENGELMAN, *Carya serraefolia* (GOEPPERT) KRÄUSEL, *Platanus platanifolia* (ETTINGHAUSEN), *Ulmus pyramidalis* GOEPPERT and *Salix* sp., and higher at high hills with coniferous forests of Sequoia. The presence *Quercus roburoides* GAUDIN and *Acer* cf. *campestre* L. species denotes of the existence and a lowland forest paleobiotop. The numerous imprints of *Acer* cf. *tricuspidatum* BRONN and *Salix* sp., that are plants from flooded permanently areas, together with Taxodium distichum Rich. well adapted to conditions of the flooded permanently almost swamp, suggests the possibility of a distant paleobiotop of carbogenerating swamp.

Conclusions

The paleoecological analysis of Mio-Pliocene flora in Mehedinţi District indicated the presence distinctive paleobiotopes: a mesophytic association characterized by the occurrence of an allochthonous flora, a marsh-type, coal-generating association, a lower floodplain forest, and higher at high hills with coniferous forests of *Sequoia*, a lowland forest paleobiotop.

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ORAL

Paleogene *Halimeda* algal biostratigraphy from Middle and Central High Atlas (Morocco): Paleoecology, paleogeography and some taxonomical considerations

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Keywords: *Halimeda*, green siphonous algae, Paleocene, Eocene, Morocco, stratigraphy, paleoecology

Halimeda deposits of the Middle Atlas Mts. and of the southern rim of the central High Atlas, bordering the Neogene Quarzazate Basin, east of Asseghmon (Morocco), were studied with regard to their lithostratigraphy, biostratiography, sequential stratigraphy and carbonate microfacies (Fig.1). The focus was on the biostratigraphy of *Halimeda*-rich Paleogene marine successions, first in the central High Atlas and now extended in the Middle Atlas, with the aim to compare and verify the stratigraphical value and range of *Halimeda* species and their associations.

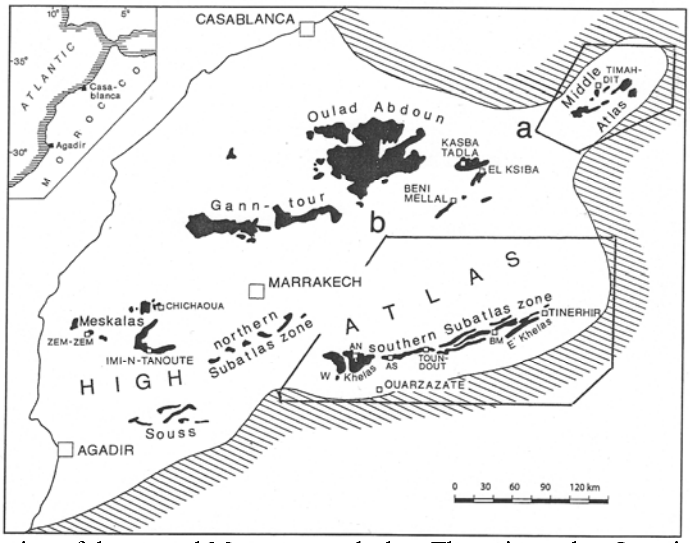

Fig. 1. Areal distribution of the central Moroccan early-late Thanetian to late Lutetian deposits (in black) on algal-shallow ramp and studied regions: a. Middle Atlas and b. central High Atlas.

For the Moroccan Paleogene deposits of the Atlas region, the following *Halimeda* biozones were identified and proposed:

Thanetian - The biostratigraphic interval for the **middle Thanetian** deposits was defined by the ***Halimeda nana*** **assemblage zone** (Hn 1). The zone can be recognized and established by the first appearance of the species *Halimeda nana* Pia which corresponds to the lower boundary or to the biohorizon of this stratigraphic unit. This assemblage zone also contains the species *Halimeda erikfluegeli* Dragastan & Herbig, *H. praeminima* n.sp., *H. praetaenicola* Dragastan & Herbig, *H. cylindracea* Decaisne and very rare *H. opuntia* (Linnaeus) Lamouroux. The assemblage is oligotypic, dominated only by the *Halimeda nana* marker species. In the type section of Timahdit, this species reaches in abundance over 40% of the total Thanetian *Halimeda* species microflora.

The **late Thanetian** included two biozones, a lower biozone with *Halimeda lacunosa* Dragastan & Herbig, and the second, upper zone with *H. unica* Dragastan & Herbig.

The ***Halimeda lacunosa*** **assemblage zone** (Hl 2) starts with the first appearance of this species, the lower part of the late Thanetian defining the lower boundary of the zone and, in the same time, it marks the upper limit of the *Halimeda nana bio*zone.

The ***Halimeda unica*** **assemblage zone** (Hu 3) had an upper position during the late Thanetian and it begins with the first appearance of this index species.

Thanetian/Ypresian boundary - In both regions of the Moroccan Atlas, this boundary is difficult to establish using only lithostratigraphic units. In the central High Atlas, the **Jbel Ta´louit Formation** crossed this boundary, while in the Middle Atlas this boundary can be traced in the middle part of the undifferentiated **Bekrit-Timahdit Formation**.

The Jbel Ta´louit Formation corresponds to a regressive cycle composed of greenish-grey, red silstones and some sandstones interlayered with marine limestone rich in algae, as a short transgressive pulse during the uppermost Thanetian and lowermost Ypresian (Herbig, 1991; Kuss & Herbig, 1993). The limestones along this boundary are rich in green algae, dominated by Dasycladaleans and rare Halimedaceans. The Dasycladalean species are important markers for this boundary and a biozone (*Das 4*) was defined, coverind the uppermost Thanetian and lowermost Ypresian.

In the *uppermost Thanetian* is important a subzone, with abundant thalli of *Neomeris plagnenis* Deloffre *(Subzone Das 4a*, *Acicularia eocaenica* Morellet and *Ovulites* sp). Another subzone (*Subzone Das 4b)* was identified in the *lowermost Ypresian* starting with the first appearance of the Dasyclad species *Holosporella subglobosa* (Dragastan et Soliman) Dragastan, *Acicularia* sp. aff. *eocaenica* with many thalli and also abundant in limestones during this time interval. Unfortunately, the Halimedaceans in this limestones also occur, but only as unidentifiable bioclasts at species level.

Early Ypresian - This substage is marked by *Halimeda tuna* assemblage zone *(Ht5)* disposed in the basal part of **Ait Quarhitane Formation** in the central High Atlas. The lower limit of this zone can be traced by the first appearance of *Halimeda tuna* (Ellis & Solander) Lamouroux. This index species reached 31% in abundance of the total Ypresian microflora only in the central High Atlas.

Middle Ypresian is marked by the index species *Halimeda gracilis* Harvey ex Agardh - *(Hg 6)*. The first appearance of this species marks the lower limit of the zone.

Late Ypresian - early Lutetian contains a distinctive assemblage zone, based on the index species *Halimeda fragilis* Taylor *(Hf 7)*.This assemblage crossed the Ypresian-Lutetian boundary, the index species having the first appearance during the late Ypresian, respectively to the upper part of **Bekrit-Timahdit Formation** from the Middle Atlas region and to the early Lutetian in the **Jbel Tagount Formation** from the central High Atlas.

Middle Lutetian is characterized by the *Halimeda praecuneata* Dragastan & Herbig *zone, (Hp 8)* species found also in the **Jbel Tagount Formation** from the central High Atlas. The lower limit of the zone corresponds to the first appearance of the index species.

Late Lutetian - Bartonian? - This stratigraphic interval is marked by the *Halimeda praegoreauii* Dragastan & Herbig *assemblage zone (Hpr 9)*. The lower limit is indicated by the first appearance of the index species.

The middle to late Lutetian and possible Bartonian zones with *Halimeda praecuneata (Hp 8)* and *H.praegoreaui (Hpr 9*) were not found to the terminal part of Bekrit-Timahdit Formation from the Middle Atlas, as the bioclasts with *Halimeda* were not conclusive for a correct identification.

In conclusion, the *Halimeda* species from the middle – upper Thanetian-Ypresian-Lutetian-Bartonian? deposits of the Moroccan Atlas (central High Atlas and Middle Atlas) provided the index biostratigraphical value of some species, thus making possible to recognize 8 assemblage zones based on Halimedaceans (***Halimeda nana, H. lacunosa, H. unica, H. praecuneata, H. praegoreaui*** only fossil species and ***H. tuna, H. gracilis, H. fragilis as fossil and Recent species*)**, and one assemblage zone based on Dasycladaleans (***Neomeris plagnensis*** and ***Holosporella subglobosa***). The defined *Halimeda* bizones from the central High Atlas were very useful to correlate and to differentiate the Paleogene deposits of Bekrit-Timahdit Formation on stages and substages for middle-late Thanetian and Ypresian. Only the Lutetian - Bartonian? interval still remains not so clear in this region.The green siphonous species of the genus *Halimeda* showed their potential as biostratigraphic markers, allowing the identification of assemblage zones for the Paleogene deposits from Moroccan Atlas.

ORAL

A fresh look at the famous bird and pterosaur fossils from the Cornet bauxite

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Keywords: *Archaeopteryx*, Neornithes, *Palaeocursornis*, *Eurolimnornis*, pterodactyloids, dsungaripterids, azhdarchids

In this presentation, we review our recent work on a small but extremely significant collection of bird and pterosaur bones from the Lower Cretaceous (Berriasian) of western Romania. These fossils were collected in the late 1970s and early 1980s from a Lower Cretaceous (Berriasian) conglomerate lens deep in a bauxite mine at Cornet, close to Oradea (Nagyvárad) and caused a sensation when first described. This is because some of the Cornet fossils were initially ascribed to the early bird genus *Archaeopteryx* as well as to the extant clade Neornithes (modern birds), an astonishing avian assemblage if correct. All the other known *Archaeopteryx* specimens are Jurassic in age, while the oldest confirmed occurrences for modern birds are from the latest Cretaceous.

Confirmed records of pterosaurs from the Cornet mine include dsungaripterids and a cervical vertebra that is likely the oldest azhdarchid pterosaur known from Europe, perhaps the world. Not only does the Cornet azhdarchid support an Eurasian origin for this clade, it is also significant because of its size: it is one of the smallest representatives of this pterosaurian lineage yet reported.

Aside from their phylogenetic affinities, these unique Transylvanian fossils are important because of their age; in particular, very few birds are known globally from the earliest Cretaceous but there are several sites in the Carpathian Basin that fill in this temporal hole. Our re-examination of the Cornet collections in Oradea confirms the presence of both birds and pterosaurs in the bauxite mine: although the fragmentary bird remains are mostly indeterminate, one record of a hesperornithiform is confirmed. Sadly, there is no evidence for *Archaeopteryx* at the Cornet site while the two supposed neornithines (*Palaeocursornis biharicus* Kessler and Jurcsák and *Eurolimnornis corneti* Kessler and Jurcsák) are based on undiagnostic remains and are here regarded as *nomina dubia*.

ORAL

A drowned Mesozoic bird breeding colony

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Keywods: Romania, Maastrichtian, Enantiornithes, paleoethology

Despite a rapidly improving fossil record, the reproductive biology of Mesozoic birds remains poorly known: only a handful of undisputed, isolated Cretaceous eggs (some containing embryonic remains) are known. We report here the first fossil evidence for a breeding colony of Mesozoic birds, preserved at the Upper Cretaceous (Maastrichtian) Oarda de Jos (Od) site in the Sebeş area of Transylvania, Romania. The assemblage, preserved as a single, massive, lens-like accumulation deposited by flood-water, includes the bones of adult enantiornithine birds, neonate skeletal elements, near-complete eggs, and a huge accumulation of eggshell fragments. Non-avialian fossils are absent. Based on the abundance of eggshells (we estimate more than 46 eggs per 100 cm3 of sediment in the lower layer) our interpretation is of a large enantiornithine breeding colony that was swamped by rising water, washed a short distance and deposited in a shallow, low-energy pond. The same fate often befalls modern bird colonies. Such a large concentration of breeding birds indicates aquatic feeding and implies both the ability to disperse widely on foraging expeditions, and a seasonally abundant food resource. This new data augments our understanding of enantiornithine biology and shows that colonial nesting was far from unique to crown-birds.

ORAL

Middle Miocene-Quaternary evolution of the westernmost part of the Dacian Basin

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Key words: Central Paratethys, Danube Formation, terraces dating and correlation

Geological Background. Due to the general SW-to-NE movement of the South-Western Carpathians (SWC) starting with the New-Styric tectogenetic Phase (16 Ma) and to the corner effect at their contact with cratonic (rigid) Moesian Platform, the history of the Middle Miocene-Quaternary cover within the westernmost area of the Dacic Basin is driven by the predominant SSW-NNE (directionally) dextral shearing process associated with slow tilting of the Lower Danubian, Severin and Getic Units. On the eastern rim, these units are broken and half-buried along the W-E Gura Văii, Brza Palanka, Jasiko-Prahovo a. o. faults (Krstić et al., 1997; Enciu, 2005a, b).

The mainly strike-slip character of SWC Chain, with a minor orthogonal (W-E) compression, has little effect of the topographic growth and implicitly on the erosion. The true onset of the mountain range formation (and thus, erosion) was therefore most probably Late Badenian (15-13 Ma) to Sarmatian (13-11 Ma; Sanders, 1999). As a result, the thickness of the post-tectonic sedimentary cover ranges from few hundreds meters in Miroć Tableland till 1500 m in northernmost part of the Lom – Băilești – Filiași Depression (as part of the Dacic Basin).

Geological Evolution. During the Middle-Late Miocene, at the beginning of the last sedimentation cycle of the Central Paratethys, on the eastern flank of SWC, one pile of alluvial fans (few tens of meters thick), continuing with mini-deltas (sandy) deposits, had been accumulated (Krstić et al, 1997). During the Meotian, the same lithofacies is changing from deltas to offshore sandy deposits. The complete infilling of the westernmost part of Central Carpathian Basin is reported to 5.5 Ma BP: with the commonly marly Upper Miocene (Pontian) offshore, grades to the sands near the edges.

Starting with the Early Dacian (5,3 Ma BP), due to the general cooling, the communication between the Western and Central Paratethys was reduced to a system of channels and strights. The last one became a gulf of the Black Sea with three marks of ingressions in the eastern corner of Dacian Basin).

Returning to the westernmost corner, between 5.3 and 4.8 Ma BP, the Lom, Timok, Danube and other radial-converging rivers built the sandy littoral-lacustrine *Berbești Formation*. One of Danube's distributaries lob, having 15 km in length and comprising over 60 m thickness of bedded sands, was identified near Vânju Mare – Rogova localities, by the dense network of wells for coal. Its apex portion was pointed out west of Turnu Severin (Petkovic, 1948). This paleogeographic phase was followed, in the Late Dacian-Middle Romanian (4.8-2.6 Ma), by the large Deltaic Plain construction represented by the *Jiu-Motru Formation*: clays, sands and till 18 coal seams. Connected to the general lowering of the Dacic Basin, along the western and southern edges the Danube River Network (especially the right tributaries) elongated towards the east, step by step. Some thick deltas were identified in Boian and Vlasia plains (the last in the proximity of the Intra-Moesian Fault).

Danube Formation (DF) Content. Based on its origin and area of occurrence, the DF had been defined in the Western Paratethys (Szádecky-Kardoss, 1938; Jánossy, 1968; Halouzka, 1977), for own (Danube) fluvial, Early Pleistocene-Holocene in age. Within the westernmost corner of the studied area (Miroć Tableland), we reported to the Lower Member of the DF the small mapped surfaces with Pliocene-aged coarse alluvium (N_2) and to the Upper Member the fluvial-lacustrine (Qp), fluvial (qp) and the $t_4 \ldots t_1$ terraces deposits (Rakič, 1977; Bogdanovič et al., 1978a, 1978b; Rakič & Simonovič, 1997). On the same right bank, in Timok-Ogosta inter-stream of the Pre-Balkan Tableland, one erosive - accumulative formation (N_2^2), mainly made by Danube right-hand tributaries was identified (Nikolov and Filipov, 1996). Far away to the east (Iskar-Jantra), at 150-170 m elevation, the right Danube tributaries built one extended pebbly-sandy sheet (Evloghiev and Enciu, 2001). On the left side of the river, the Danube Formation has two members. The Lower Member (qp_1) is made up by a flat alluvial fan (Bălăciţa High Plain) continuing to the east with braided stream deposits (Sălcuţa, Romanaţi Plains) and with buried and stacked up fining sequences (Boian, Burdea, Vlasia and Burnas Plains). Subsequently, the Danube River cut into the Dacian-Lower Pleistocene sedimentary pile, ranging between 160 m depth in the proximity of Drobeta Tr. Severin, to 65 m in the Turnu Măgurele sector. As a result, the higher relief of the Oltenia Plain, ensued repeated down-cutting of the stairway-like seven terraces and the meadow (*Upper Member of the Danube Formation*).

Based upon the isotopic (Th/U, C_{14}) and luminiscence dating methods on Middle Danube terraces (Halouska, 1975; Pecsi et al. 1985), on Prut and Dnister Terraces respectively (Musinschi, 1999), the t_7 had been reported to ca 900-750 ka BP, the t_6 to 670-550 ka BP, the t_5 to 500-480 ka BP, the t_4 to 450-420 ka BP, the t_{3b} to 250-200 ka BP, the t_{3a} to 220-130 ka BP, the t_2 to 70-60 ka BP and the last (t_1) to 45-21 ka BP.

Conclusion. After the deltaic (Badenian-Lower Dacian) and delta-plain (Upper Dacian-Romanian) settings, starting with the Early Pleistocene (2.5 Ma), the Danube River and tributaries built the so-called Danube Formation on top of the sinked South Carpathians Units and their connection with the Moesian Platform. This contains a Lower Member: storey channel fills in the Iron Gate Gorge proximity (Miroč Tableland), braided channel deposits in distal one (Getic Tableland) and alluvial-proluvial sheets in the foothills of the Balkan Mts., and the Upper Member, respectively: 7 mature alluvial beds pertaining to the Danube's terraces (900 to 21 ka BP) and Holocene floodplains of main rivers.

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ORAL

Revision and calibration of some foraminifera biozones in the marine Miocene from Romania

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Keywords: foraminifera, Miocene, biozonation, Romania, Paratethys

Recent investigations on several Miocene marine sections from Romania reveal several possibilities to emend and callibrate the existing foraminifera biozones.

Traditional Early Miocene zonation has a low resolution due to the limited occurrence of typical open marine assemblages. The first Miocene zones can be inferred by the presence of *Globigerinoides primordius* in the Pucioasa Formation and by the foraminifera (Popescu, 1975) and calcareous nannoplankton in the north-western Transylvanian Basin. Several cycles of planktonic foraminifera invasions in the lower Miocene of Transylvania give new opportunities for a higher resolution biostratigraphy (e.g. *Streptochilus pristinum* Biozone - Beldean et al., 2010)

The Early-Middle Miocene transition exposed by several sections in the Transylvanian Basin offer a good potential for the calibration of several biozones to radio-isotopic ages and magnetostratigraphy. The age of the volcanic ash (Dej Tuff) sampled at Ciceu-Giurgesti in the *Orbulina suturalis* Biozone is dated at 14.38 Ma (40Ar/39Ar). The equivalent interval sampled at Paglisa is exclusively of normal polarity and was deposited during chron C5ADn.

The middle/late Badenian boundary corresponds to the end of the salinity crisis and was dated at 13.36 Ma (De Leeuw et al., in prep).

The Badenian / Sarmatian boundary has been dated at 12.8 Ma by using the position of the *Anomalinoides dividens* Biozone in relation to the age estimations based on the rate of sedimentation between of the evaporites and the 'middle Sarmatian tuff complex'. In our opinion, the *Anomalinoides dividens* Biozone should be traced between the Apahida and Hadareni tuffs (the latter dated at 12.38-12.35 Ma), based on the particular paleoecological conditions.

Zonation in the deep water sections of the Transylvanian Basin becomes more problematic above the MSTC due to the high paleoenvironmental control, and therefore the age estimates for the *Articulina sarmatica, Dogielina sarmatica* and the base of the *Porosononion aragviensis* biozones have to be revised. Only the upper part of *Porosononion aragviensis* Biozone can be estimated by the age of the Oarba Tuff (11.62 Ma) and the Sarmatian-Pannonian boundary (11.3 Ma – Vasiliev et al., 2010). Sea-level fluctuations and rare planktonic input in the Sarmatian (Filipescu & Silye, 2008) and above (Stoica et al., 2009) have to be considered for regional correlations because the gradual paleogeographic changes across the Alpine-Carpathian orogen and the facies control made the benthic events heterochronous. Further correlations with radio-isotopic and magnetostratigtraphic data are necessary in order to adopt the standard chronostratigraphic nomenclature.

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ORAL

The Maeotian / Pontian boundary in the Buzău Area (Dacian Basin) – Paleoenvironmental implications

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Keywords: Ostracods, Upper Miocene, Maeotian, Pontian, Slănic Valley

The paleogeographical and geological evolution of the Dacian Basin (and of the Eastern Paratethys, in general) during the Late Meotian-Pontian time interval is frequently discussed on the geological literature, because these stages correspond to the onset of the so-called Messinian Salinity Crisis (MSC) in the Mediterranean area. Many authors consider that this event had more or less dramatical effects in adjacent basins of Paratethys as well, including the Dacian Basin.

The Upper Meotian deposits from the Slănic Valley section are represented by cycles of deltaic and littoral sediments. The microfauna is relatively poor, being represented by few species of freshwater ostracodes, that can populate unstable aquatic environments (lakes and rivers with temporary existence): *Candoniella* sp., *Candona albicans* (Brady), *C.* sp. and *Ilyocypris bradyi* Sars. The Meotian sequence ends with a succession of dark-gray silts, clays and few intercalations of thin sandstones rich in *Congeria (Andrussoviconcha) amygdaloides novorossica* (Sinzow) bivalve shells and a well represented association of benthic, agglutinated and calcareous foraminifera (including *Streptochillus* spp.) (Stoica et al., in prep.). This is a marker level encountered in the Dacian Basin, as well as over the whole area of the Eastern Paratethys (Krijgsman et al., 2010), representing an important transgressive event into the basin.

Following this marine ingression at the Maeotian-Pontian boundary, the Lower Pontian (Odessian) sequence develops into a more pelitic facies represented by fine-bedded or massive marls with rare thin intercalations of silts and sandstones. This succession is very rich in brackish mollusk and ostracod species: *Candona (Caspiocypris) alta, C. (C.) pontica, C. (Camptocypria) ossoinaensis, C. (Zalanyiella) venusta, C. (Hastacandona) hysterica, C. (Fabeaformiscandona)* sp., *C. (Typhlocyprella) ankae, Pontoniella (Zalanyiella) acuminta, P. (Z) quadrata, P. (Z) striata, Cypria tocorjescui, Bakunella dorsoarcuata, Cytherissa* sp., *Cyprideis pannonica, Tyrrhenocythere pannonicum, Leptocythere cymbula, L. costata, L. blanda* and *Amnicythere andrusovi.*

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ORAL

Integrated foraminiferal and conodont biostratigraphy from the Rhaetian strata of the Slovenian Basin (Southern Alps)

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Keywords: Slovenia, Slatnik Formation, Upper Triassic, biozone, Triassic-Jurassic boundary

Without its GSSP, the base of the Rhaetian has been variously defined in the studied sections according to researchers' own judgment and belief. Since the Steinbergkogel section has been proposed for the type section (Krystyn et al. 2007), a unified concept of the Norian-Rhaetian Boundary (NRB) has been emerging and the First Appearance Datum (FAD) of the conodont *Misikella posthernsteini* is being accepted as the boundary marker by an increasing number of scientists (Lucas 2010). Gathering data on conodont, ammonoid and monotid distributions has resulted in well established and correlated biozonation schemes for the Rhaetian, applicable in deep water environments (Lucas 2010). However, shallow water biozones, namely benthic foraminifera and green algae zones, have not been subjected to this revision due to the lack of correlations with the deep water fauna.

Simultaneous distribution of Rhaetian conodonts and shallow water benthic foraminifera has been studied in the Slatnik Formation in the Mt Kobla and Mt Slatnik sections (W Slovenia). The Slatnik Formation consists of alternating hemipelagic limestones and calciturbidites, deposited on the slope, the toe-of-slope and the basin plain environment (Rožič et al. 2009). Both sections were palaeogeographically situated in the northern part of the Slovenian Basin, which was an intraplatform trough, situated on the southern passive continental margin of the Neotethys Ocean. Studied successions are today preserved in the Tolmin Nappe (eastern Southern Alps).

The correlation between the foraminiferal and the conodont zones was established from the Mt Kobla section, where data on the later group is better. A new conodont species found in the Mt. Kobla section, *Misikella buseri*, has been recently described by Kolar-Jurkovšek (2011). Two new foraminiferal zones have been established, which are applicable in reef and fore-reef settings (Fig. 1). The ***Galeanella tollmanni* – "*Sigmoilina*" *schaeferae* Assemblage Zone** is confined between the first and the last occurrence (FO and LO) of one of the nominate species. It comprises the *Epigondolella bidentata* Zone, the *Parvigondolella andrusovi – Misikella hernsteini* Zone, the *Misikella posthernsteini* Zone and an unnamed conodont zone in the uppermost Rhaetian. The lower boundary of the *G. tollmanni* – "*S.*" *schaeferae* Zone is thus of the Norian age, while its upper boundary corresponds to the Triassic-Jurassic Boundary (TJB). The ***Trocholina turris* Concurrent Range Zone** is defined with the LO of duostominids at the TJB. It corresponds to the part or the entire *M. posthernsteini* Zone and the unnamed uppermost Rhaetian zone. It is surely of Rhaetian age, though its lower boundary is probably somewhat above the conodont NRB. The TJB is clearly reflected in both groups, while the conodont NRB cannot be satisfactorily approached with foraminifera. *Triasina oberhauseri* was found well above the FAD of *M. posthernsteini*. That this species ranges also into the Rhaetian was already argued by Gaździcki (1983) and Abate et al. (1984).

The Mt Slatnik section shows a more proximal development. It contains fewer hemipelagic limestones and the conodont data is scarcer than in the Mt Kobla section. In contrast, its foraminiferal assemblage provides some rare, but in older biostratigraphic schemes used species, namely *Triasina hantkeni* and *Involutina turgida*, which were not found in the Mt Kobla section. The sole specimen of *T. hantkeni* was found in the upper part of the *Tr. turris* zone. The FO of *I. turgida* is far below the FO of *Tr. turris*. According to data from Gaździcki & Michalik (1980) and Martini et al. (1995), the FO of *T. hantkeni* is cotemporal or younger than that of *M. posthernsteini*. *Involutina turgida* has been described from the Rhaetian Zlambach beds by Kristan (1957). Its low abundance makes it unsuitable for biozonation, but its FO approaches the conodont NRB (as placed by Rožič et al. 2009) closer than the FO of *Tr. turris*. The LO of *T. oberhauseri* in the Mt Slatnik section is inside the *Tr. turris* Zone and above the FO of *I. turgida*.

A significant demise among foraminifera is observed at the TJB in both sections, as all of the reef-dwelling, most of the platform-dwelling foraminifera and all duostominids disappear. While the disappearance of conodonts is in accordance with their gradual demise during the Late Triassic, the sudden change in foraminiferal assemblage calls for: 1) a sudden drop in relative sea level, or 2) a biocalcification crisis.

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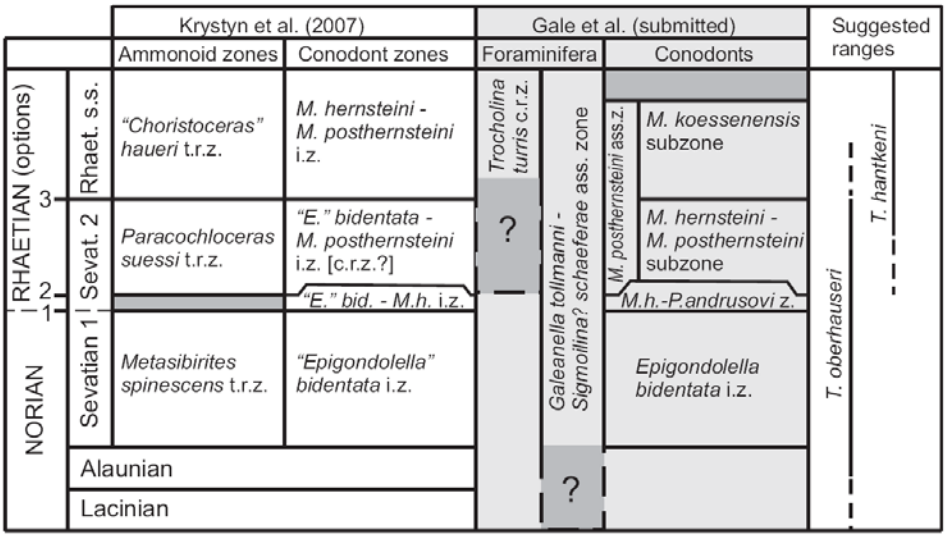

Fig. 1: Foraminiferal and conodont zones from the Mt Kobla section compared to biozonation for the Steinberg-kogel section, a candidate GSSP for the Rhaetian (Krystyn et al. 2007). Ranges of *Triasina oberhauseri* and *Triasina hantkeni* are drawn according to critical revision of the literature data. Abbrevations: t.r.z. – Total Range Zone, c.r.z. – Concurrent Range Zone, i.z. – Interval Zone, ass.z. – Assemblage Zone (modified after Gale et al., submitted).

POSTER

The Turonian-Coniacian macrofaunal distribution in the Babadag Syncline (Northern Dobrogea, SE Romania) revisited. First results

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Keywords: Cretaceous, biostratigraphy, ammonites, inoceramids, echinoids, North Dobrogea Orogen

Introduction

The Babadag Syncline represents the post-tectonic sedimentary cover of the southern parts (Tulcea Nappe) of the North Dobrogea Orogen (Dinu et al., 2005). Previous exhaustive taxonomic and biostratigraphic studies dealing with Upper Cretaceous macrofaunas from this area (Mirăuţă & Mirăuţă, 1964; Szasz, 1979 and 1985; Szasz & Ion, 1988; Ion et al., 1998; Ion & Szasz, 1994; Ion et al., 2004) have been the starting point for our research focused on the detailed correlation of different Turonian and Coniacian biozones and events.

Fieldwork campaigns in 2008 and 2010 have included recognizing localities described in former literature as well as newly describing, measuring and sampling bed-by-bed some of the sections and visiting old and new outcrops and quarries around Babadag. This includes Jurilovca, Slava Rusă (Coşarul Mic Quarry), Visterna and Baia (Baia North Quarry and Bal Bair Hill). All of them are representatives of the Dolojman Formation members: the basal Harada Mb., the partially overlying Caugagia Mb., and the topmost Jurilovca Mb. (*sensu* Ion&Szasz, 1994).

Type and figured inoceramids studied by Szasz (1985) and housed at the palaeontological collections of the University of Bucharest are currently being revised in order to set the differences between characters of taxonomic value and morphologies just reflecting strong palaeoecological adaptations.

Biostratigraphy

The recognized species at each locality follow. Inoceramid zonal index species are identified with the acronym [IZ].

Jurilovca

Few *Mytiloides hattini* Elder, 1991 [IZ] occur at the base while *Mytiloides kossmati* (Heinz, 1930) [IZ], *Mytiloides* cf. *kossmati* (Heinz, 1930) and *Mytiloides mytiloides* (Mantell, 1822) have been identified in the middle part of the section, all indicating the lowermost Turonian. Topmost part of the section has yielded the upper Lower Turonian *Mytiloides* cf. *labiatus* (Schlotheim, 1813) [IZ] and *Mytiloides* sp.

Coşarul Mic Quarry (Slava Rusă)

In the lower part of the section *Mytiloides herbichi* (Atabekian, 1969), *Cremnoceramus transilvanicus* (Simionescu, 1899), *Cremnoceramus denselamellatus* (Kociubynskij, 1965), *Cremnoceramus globosus* (Simionescu, 1899) and *Inoceramus lusatiae* Andert, 1911, all representative of the *Mytiloides scupini* Zone (middle Upper Turonian), are found. Over them, *Cremnoceramus waltersdorfensis waltersdorfensis* (Andert, 1911) [IZ] (topmost Turonian) occurs together with the ammonite *Pachydesmoceras* sp.

In the upper part, the lowermost Coniacian is recognized by the occurrence of *Cremnoceramus deformis erectus* (Meek, 1877) [IZ]. Finally, some loose specimens of *Cremnoceramus crassus inconstans* (Woods, 1912) [IZ] coming from the top of the section date the Lower Coniacian.

Visterna

As in the former locality, *Cremnoceramus transilvanicus* (Simionescu, 1899), *Cremnoceramus dense-lamellatus* (Kociubynskij, 1965) and *Cremnoceramus globosus* (Simionescu 1899), all belonging to the *Mytiloides scupini* Zone (middle Upper Turonian), are well represented here. An ammonite from this locality is under study.

Baia North Quarry

At the base of this section the Lower Coniacian *Cremnoceramus crassus inconstans* (Woods, 1912) [IZ] occurs; in the middle, the uppermost Lower Coniacian *Cremnoceramus deformis deformis* (Meek, 1871) [IZ] has been identified. The echinoid *Rispolia subtrigonata* (Catullo, 1827) is recorded from the base to almost the top of this section; ammonites are currently under study.

Bal Bair Hill (Caugagia)

This is the type locality of the Caugagia Member. Big specimens of the reputed uppermost Lower Coniacian *Cremnoceramus crassus crassus* (Petrascheck, 1903) [IZ] are abundant; this zone might have a similar range than the *Cremnoceramus deformis deformis* Zone in what some authors call the *Cremnoceramus crassus crassus*/*C. deformis deformis* Zone. Some ammonites and a few holasteroid echinoids are still under study.

Conclusions

The first results on the taxonomy and biostratigraphy of Lower Turonian and Upper Turonian to Lower Coniacian inoceramids, ammonites and echinoids from selected sections in the Babadag Basin are presented. While the section of Coşarul Mic shows a complete uppermost Turonian/lowermost Coniacian inoceramid sequence, Bal Bair Hill has an excellent record of Lower Coniacian cremnoceramids. Developing this still basic biostratigraphic framework to become a useful tool at both regional and global scale, needs further research in the next years.

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POSTER

Albian to Coniacian macrofaunal distribution around Ostrov and Medgidia (Southern Dobrogea, SE Romania). Preliminary results

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Keywords: Cretaceous, biostratigraphy, ammonites, inoceramids, echinoids, Moesian Platform

Introduction

The cretaceous macrofaunas of Southern Dobrogea (Moesian Platform) have been the object of several monographs (Chiriac 1956 and 1981) as well as the lithostratigraphic units in wich they occur (Avram et al., 1988); this last work was more recently reviewed and summarised by Dragastan et al. (1998).

Field work developed by our team during 2008 and 2009 in selected outcrops of this area by means of sections and detailed sampling of each level have resulted in the identification of many species belonging to faunal groups interesting by both their biostratigraphical potential or by being good palaeoenvironmental indicators. Since work is still in progress, only preliminary (and provisional) data on ammonoids, inoceramids, echinoids, rudists and chondrichthyans are presented here; belemnites and brachiopods will join the future definitive results. This project includes the revision of former collections of the above mentioned groups collected in Southern Dobrogea and housed in the Department of Geology and Palaeontology at the University of Bucharest.

Studied localities can be geographically grouped around Ostrov (Bugeac Lake W and N) and Medgidia (Peştera Quarry, La Porcărie, Amzalia Hills, Remus Opreanu, Gara and Cazemate). Lithostratigraphic formations involved are, at least, Glogoveanu Fm., Peştera Fm., Cuza Vodă Fm. and Murfatlar Fm.; our sections may have also interested the Satu Nou Fm.

Biostratigraphy

The recognized species at each locality follow. Inoceramid zonal index species are identified with the acronym [IZ].

Bugeac Lake W

Inoceramids *Actinoceramus concentricus* (Parkinson, 1819), *Inoceramus anglicus* (Woods, 1911) and *Actinoceramus* cf. *gryphoides* (Goldfuss, 1864) have been identified here, dating these levels as late Albian.

Bugeac Lake N

A lowermost Turonian age is supported by the inoceramids *Mytiloides kossmati* (Heinz, 1930) [IZ] and *Mytiloides mytiloides* (Mantell, 1822).

Peştera Quarry

Echinoids as *Conulus subrotundus* Mantell, 1822 and *Discoides minimus* (Desor, 1842) are common and would indicate a Middle or Upper Turonian age. Shark teeth as *Scapanorhynchus* sp., *Paranomotodon* sp., *Squalicorax* sp., *Cretoxyrhina*? sp. and *Ptychodus* aff. *mammillaris* Agassiz, 1835 are abundant and point to the same age although the last species has been also identified in the early Coniacian of Texas. A fragment of a big Radiolitidae was also collected here. Towards the top of this section, *Cremnoceramus deformis erectus* (Meek, 1877) [IZ], indicating the lowermost Coniacian has been identified.

La Porcărie (Peştera)

Conulus subrotundus Mantell, 1822, *Discoides minimus* (Desor, 1842) and terebratulids are common near the base, in a microconglomeratic layer containing phosphatic pebbles that has also provided *Protocardiaster cotteauanus* (d'Orbigny, 1855). Up in the section, *Inoceramus* cf. *apicalis* (Woods, 1912) [IZ] indicating the lower Middle Turonian and the upper Middle Turonian *Inoceramus* cf. *cuvieri* [IZ] occur.

Amzalia Hill

In the basal part of this locality, *Mytilodies scupini* (Heinz, 1930) [IZ] and *Mytiloides herbichi* (Atabekian, 1969) indicate the middle part of the upper Turonian and occur together with *Epiaster* echinoid species and belemnites. In the middle part of the section, a well developed level of microconglomerate with phosphatic nodules is found.

Such nodules include not only pebbles but also gastropods, bivalves, solitary corals (*Micrabacia*-like) and, specially, ammonoids: *Beudanticeras* sp., *Puzosia subplanulata* (Schlüter, 1871), *Anahoplites planus* (Mantell, 1822), *Discohoplites transitorius* Spath, 1930, *Stoliczkaia (S.) clavigera* (Neumayr, 1875), *Mortoniceras (Durnovarites) subquadratum* (Spath, 1931), *M. (D.) postinflatum* Spath, 1930, *Anisoceras perarmatum* Pictet & Campiche 1861, *Ostlingoceras puzosianum* (d'Orbigny, 1842), *O. sublaevigatum* Wiedmann & Dieni 1968, and *Mariella (M.)* sp. This association fits well in the Upper Albian *Stoliczkaia (S.) dispar* zone and its position in the section clearly points to its transport and resedimentation.

Over this level, *Conulus subrotundus* and *Camerogalerus minimus* occur, followed by *Cremnoceramus waltersdorfensis waltersdorfensis* (Andert, 1911) [IZ] (uppermost Turonian) and *Micraster* sp.

Remus Opreanu

Specimens of *Mantelliceras saxbii* (Sharpe, 1857) indicating the Lower Cenomanian together with badly preserved *Inoceramus* cf. *crippsi* Mantell, 1892 have been identified; over them, the upper Middle Turonian *Inoceramus cuvieri* [IZ] and *Micraster* sp. occur. have been identified

Cazemate

The base is similar to that of Amzalia Hill and contains *Epiaster* sp. and belemnites.

Conclusions

Even if these are only preliminary results, a new biostratigraphic framework for the Cretaceous of Southern Dobrogea begins to appear. We expect to keep building it in the next future.

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ORAL

The revelation of the modern ocean iron release experiment for the study of palaeoceanography: Causative mechanism of the CORBs

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Keywords: Cretaceous, Anoxic, Black Shale, Oceanic Red Beds, Oxic process

The upper Cretaceous oceanic red beds (CORBs), represented mainly by deep-sea red shales and marls, occurred during Late Cretaceous and Early Paleogene. It is a new field, which put forward by Chinese scientists. CORBs are found in a broad geographic belt extending from the Caribbean through central North Atlantic, Southern and Eastern Europe to Asia. The cause of formation was suggested that might be an oxic process. In other words, CORBs imply it might occur in a highly oxidized marine environment. However, what caused the marine dissolved oxygen content?

By the end of last century, a series of experiments such as "iron hypothesis" were put forward. The "iron hypothesis" is a new concept**.** The fundamental concept is that iron controls the growth of phytoplankton in much of the world's oceans, and could control atmospheric carbon dioxide levels. It was formally postulated with supporting data in the late 1980's. During 1990's to 2002, these experiments, ranging from bench-scale assays to large-scale fertilizations of 100-square kilometer patches of ocean from the North Pacific to Antarctica, have been conducted to test the "iron hypothesis". The results of these experiments have confirmed the initial hypothesis. For example, 1995 IronEx II - This experiment successfully triggered a bloom with tenfold increases in phytoplankton concentrations, by applying iron in the same general area as the IronEx- I (1993) experiment. This "biblical" bloom changed the color of water from blue to green and provided the most vivid proof of the validity of the iron hypothesis. All of these experiments proved when iron is added to HNLC (high nitrate low chlorophyll) waters, phytoplankton grow rapidly. The operation described above, a 5,000 square mile application over one month, would sequester 100,000~200,000 tons CO_2 equivalent. This is roughly equivalent to what scientists would expect a 1000-acre forest to sequester over a period of roughly 40 years. It gives us a significant revelation: Iron is a very important factor in decrease of atmospheric carbon dioxide levels.

Nevertheless, where the iron came from in the Cretaceous ocean?

Another modern experiment might answer the question. Modern marine geological and geochemical studies demonstrate that some active hot springs and submarine ore deposits are related to the seawater-basalt interaction occurring in the ocean ridge area. An experiment was held at 250~500□ and 100 Mpa. The result showed that iron concentration was 531 times than normal sea-water sample when the seawater-basalt interaction occurred at 500□ and 100 Mpa. There have been sufficient reasons that consider the role of iron in the Cretaceous ocean. The volcanism can enhance the seawater-basalt exchange. The erosion of basalt can release amount of iron element. The observations at ODP 504B and an estimated flux from the 0.5 km underlying gabbro suggest that the global hydrothermal flux is at least 8×10^9 mol/yr, compatible with geophysical thermal models.

Cretaceous is a special period in geologic history, which is punctuated by volcanic events, and come into being oceanic plateaus, ocean basin flood basalts, submarine ridges, ocean islands and seamount chains. The large volumes of mafic magmas were generated. When they were eroded, a great deal of iron released into seawater, and spurred phytoplankton blooming. Million tons of CO_2 were consumed no matter what they were in air or in ocean. The Latte Cretaceous oxic processes can be interpreted in terms of the causative chain: Large igneous activity → mafic magmas generating→ seawater-basalt exchange → iron releasing → phytoplankton blooming → CO_2 sequestrating → oxic environment occurring.

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POSTER

Santonian Albanerpetontids from Hungary

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Keywords: Albanerpetontidae, Cretaceous, Iharkút, Laurasia, Lissamphibia

The Albanerpetontidae are a Middle Jurassic–Pliocene clade of salamander-like lissamphibians known mostly by isolated and rare articulated bones from Europe, the North American Western Interior, central Asia, and northern Africa. They are a typical component of non-marine vertebrate assemblages, particularly from the latter part of the Mesozoic in North America and Europe.

Santonian age exposures in the middle part of the Csehbánya Formation at Iharkút, Hungary, have yielded a taxonomically diverse assemblage of non-marine vertebrates. The fossils originate from two distinct layers: a lower, finer-grained, amber-rich layer and an upper, coarser-grained, bonebed layer. In the last few years, a modest number fragmentary albanerpetontid jaws (premaxillae, maxillae and dentaries) have been recovered from both layers. Although fragmentary, the available specimens are diagnostic for Albanerpetontidae and exhibit at least two autapomorphies: symphyseal prongs on dentaries and non-pedicellate teeth bearing labiolingually, tricuspid crowns.

Numerous other features are also characteristic for albanerpetontids – e.g., premaxilla with well-developed pars dorsalis, labial surface has scattered external nutritive foramina, suprapalatal pit present, parallel ridges and grooves along medial surface of bone; maxilla low, becoming shallower posteriorly, triangular nasal process, pars palatinum indented for internal narial margin; and dentary with high dental parapet, subdental shelf low and gutter like anteriorly becoming deeper and narrower posterior, opening for Meckelian canal located posteriorly, row of external nutritive foramina, ridge ventrolabially for muscle attachment. Generic level assignment of the remains is problematic, because the highly diagnostic frontals are lacking. Nevertheless, for the premaxillae three features of the suprapalatal pit (moderate in size, located low on pars dorsalis and faces lingually) support assigning at least those specimens to *Albanerpeton*.

The presence of Albanerpetontidae during the Santonian at the Iharkút locality (which at that time was part of the Adriatic microplate), indicates that the Iharkút lissamphibian assemblage contains both Laurasian (albanerpetontids and discoglossid frogs) and Gondwanan (the neobatrachian frog *Hungarobatrachus szukacsi*) components. Additionally, this is the only Santonian occurrence outside of the North American Western Interior for albanerpetontids.

ORAL

Evolutionary classification of some Late Cretaceous (Coniacian-Maastrichtian) coiled planktic foraminifera

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Keywords: globotruncanids, Cretaceous, taxonomy, classification, evolution

The extensive use of the scanning electron microscope (SEM) and environmental scanning electron microscope (ESEM) significantly improved the observation resolution on the Cretaceous planktic foraminiferal test morphological features. As a result, it is possible to consider the test wall ultrastructure, test ornamentation, perforation size and pore distribution major features in taxon definition at species and genus level.

Following these high resolution features in the stratigraphical record results in a better understanding of the species morphological variability. It became possible to develop a new species concept, in which the species are defined function of the data in the fossil record rather than by applying a system of rigid taxonomical criteria to the evolutionary continuum. The concept of *composite paleontological species* was defined by Georgescu and Huber (2009) to recognize natural units rather than morphospecies, which involve a high degree of subjectivity.

It was observed in a number of studies (Georgescu, 2007a, 2007b, 2010a) that it is possible to follow and describe with high accuracy the evolutionary changes within a succession of species linked by direct ancestor-descendant relationships by using the SEM-based observations throughout the stratigraphical range of a species succession. This represented the basis for defining a new type of taxonomical units at supraspecific level, namely the *lineage* (Georgescu 2009): "…a taxonomic unit with significance in evolutionary classification, situated immediately above the species level, representing a grouping of species based on the monophyletic phylogenetical relationships between them, having a distinct evolutionary history in space and time that can be reconstructed from the fossil and stratigraphic record and separated by morphological gaps from other similar units." Lineage definition represented a significant leap in developing the principles of an evolutionary classification, because they are fundamentally different from the Linnaean classification units. For example, the Linnaean classification units are grouped into higher units based only on morphological resemblances. By contrast, a lineage is a grouping of species based on a combination of morphological resemblances resulted from the common ancestry, and differences given by the developments in the course of the evolution process.

The advances at concept level continued when Georgescu (2010b) recognized two kinds of lineages: directional and branched. "A *directional lineage* is characterized by the continuous evolution of two or more features in one direction and in a monophyletic-linear succession of species. In contrast, at least one feature shows divergent evolution in a *branched lineage*, resulting in a monophyletic-branched succession of species" (Georgescu, 2010b). This separation of one classification level (i.e., lineage) into two categories demonstrates the true scientific nature of the evolutionary classification; additional kinds of lineages can be defined as the scientific knowledge advances.

Evolutionary classification was developed in more than twenty articles during 2007-2010; it is probably the project with the highest development rate in Cretaceous planktic foraminiferal taxonomy today. It was developed until today in the planktic foraminifers with serial chamber arrangement (superfamily Heterohelicacea Cushman, 1927) and hedbergellid taxa (superfamily Rotaliporacea Sigal, 1958).

This is the first study in which the principles of the newly developed evolutionary classification are applied to the globotruncanids group (superfamily Globotruncanacea Brotzen, 1942). The group is known from the Turonian-Maastrichtian stratigraphical interval; its evolutionary occurrence is in the early Turonian and became extinct at the Maastrichtian/Paleocene boundary. There are circa sixty species included within the globotruncanids group. The following species are considered in this study, and these are (original designation is followed):

- *Archaeoglobigerina blowi* Pessagno, 1967;
- *Globigerina cretacea* d'Orbigny, 1840;
- *Globotruncana* (*Rugoglobigerina*) *circumnodifer subcircumnodifer* Gandolfi, 1955;
- *Globotruncana gagnebini* Tilev, 1951;
- *Globotruncana* (*Rugoglobigerina*) *pennyi subpennyi* Gandolfi, 1955;
- *Bucherina sandidgei* Brönnimann and Brown, 1956.

The study is based on a vast material collected from the Coniacian-Maastrichtian sediments from nine Deep Sea Drilling Project/Ocean Drilling Program holes drilled around the world.

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ORAL

Occurrence of the Bivalvia *Monotis (Monotis) salinaria-haueri* group in the Upper Norian (Upper Triassic) of Tulcea Unit, North Dobrogean Orogen

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Keywords: *Monotis (Monotis) salinaria-haueri* group, Bivalvia, Upper Norian, Tulcea Unit, North Dobrogean Orogen

The occurrence of the Bivalvia *Monotis (Monotis) salinaria-haueri* group in the western area of the Tulcea Unit, i.e. in the area located between Izvoarele and Poşta villages, has a two-fold importance: (1) is documenting the Late Norian age of the bearing coquinoid shell beds which are represented by grayish to grayish red limestones; (2) is documenting the overthrust of the Niculiţel Unit upon the Tulcea Unit.

The *Monotis (Monotis) salinaria-haueri* group includes the only known monotids in the Upper Norian of the Tethyan regions. In terms of the actual standard Triassic time scale the Upper Norian is equivalent to the Sevatian 1, that corresponds to the *Sagenites quinquepunctatus* Zone (Krystyn, 2008; Grădinaru & Sobolev, 2011). The ammonoid index of this zone is co-occurring within the *Monotis*-bearing coquinoid limestones in the studied area.

The world-wide distribution of the various forms of *Monotis* was paleobiogeographically controlled and it was related to paleoecologic constraints. It is accepted that most *Monotis* were pseudoplanktonic sessile, filter feeders that lived attached to floating objects, such as sea-weeds (e.g., Tozer, 1982; Silberling, 1985). The inferred pseudoplanktonic, near-surface mode of life implies that water temperature, and thus paleolatitude, was a primary factor in controlling the worldwide distribution of different kinds of *Monotis* (Silberling et al., 1997).

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ORAL

The water vapor conductance of Cretaceous neosauropod eggs from Sanagasta, La Rioja, Argentina, with paleobiological implications for neosauropod eggs and nesting environments

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Keywords: egg functional morphology, evolutionary adaptation, neosauropod, species survival

The structural and functional properties of eggshells coupled with nesting environments and parental nesting behaviors are species specific and greatly influence the success of embryogenesis and hatching. In that regard, the water vapor conductance of the newly discovered eggs from the Sanagasta nesting site in La Rioja province (Grellet-Tinner and Fiorelli, 2010), Argentina, was examined and compared with other oological material. The 2900 $mgH_2O/day \cdot Torr$ water vapor conductance (G_{H2O}) of the Sanagasta eggshells confirms an extremely moist nesting environment, which is consistent with previous field observations of dug out nests in a geothermal setting. The thinning of the outer eggshell surfaces by erosive geothermal fluids coupled with an internal calcium resorbtion by the developing embryos reduced the eggshell thickness from 7.9 mm to 1.3 mm (Grellet-Tinner and Fiorelli, 2010). Therefore, it increases gas conductance and concomitantly decreases eggshell mechanical resistance during the late ontogenetic stages, thus facilitating embryonic development and hatching. The results show that the Sanagasta, Entre Ríos and Río Negro eggs (Casadio et al., 2002), classified as “faveoloolithid”, display the highest and comparable G_{H2O} values and share several morphological and diagenetic characters. This, in turn, indicates that these neosauropods may have adopted a comparable nesting strategy in geothermal settings to avoid thermally heterogeneous nesting environments. The “faveoloolithid” Yaminué and La Pampa specimens cluster together with lower G_{H2O} values closer to the megaloolithid eggs and suggests different nesting strategies, yet still in moisture saturated nests. Among all the megaloolithids, *Megaloolithus patagonicus* with a previously calculated 341 $mgH_2O/day \cdot Torr$ departs tremendously from the 1300 $mgH_2O/day \cdot Torr$ mean (Jackson et al., 2008) for this parataxonomic egg family. Present observations bring to light two previous inaccurate observations that may have contributed to these extreme erratic results. Unlike prior accounts, the *Megaloolithus patagonicus* have ubiquitous Y-shaped pore canals that abut in a secondary pore canal system located at and above the level of the membrana testacea that surrounds the embryo (Grellet-Tinner et al., 2004).

We hypothesize that given a determined egg mass and eggshell thickness, Y-shaped pore canals, which upper sections reach only the top third or half eggshell thickness and their lower sections abut in an internal secondary pore canal at the level of the membrana testacea would not compromise the overall egg mechanical resistance unlike an equal concentration of vertical pores connecting directly the outer to the inner eggshell surfaces. Therefore, such pore spatial arrangement and geometry would allow coping with elevated moisture contents without compromising the egg mechanical integrity. Moreover, this internal pore configuration would enhance a greater G_{H2O}, G_{O2} and G_{CO2} through the shell and facilitate embryonic development in high moisture nesting contents (Birchard and Kilgore, 1980; Board, 1982; Booth and Seymour, 1987; Bond et al., 1988; Birchard and Deeming, 2009). Therefore and contrary to previous suggestions all megaloolithid eggs would have been incubated in moist nesting environments, yet not as elevated as those for modern crocodilians.

It is now clear that neosauropod nesting and brooding behaviors were overall dependent on elevated moisture nesting environments and their nesting strategies could have been as diversified as those of modern crocodilians. Moreover, some groups were oportunistic nesters by utilizing geothermal settings to avoid thermally heterogeneous nesting environments.

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ORAL

Ataxioceratidae species from "Acanthicum Beds" of Ghilcoş (East Carpathians – Romania)

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Keywords: ***Ataxioceratidae*, Kimmeridgian, Early Tithonian, Hăghimaș, East Carpathians**

Introduction

Ammonites fauna described here comes from kimmeridgiene deposits and early tithonian from Hăghimaș Massif (Eastern Carpathians) - especially from outcrops of Ghilcoș Mountain (Grigore, 2011).

Methodology

In the systematic description was taken into account the classification of Atrops (1982) and the amendments made by Sarti (1983) and Oloriz (1978). Determination of species was also based on the comparison of ontogenetic evolution of ribbing (ribbing curve).

Results

In paper are described 32 taxa of the genera / subgenres: *Orthosphinctes* SCHINDEWOLF, 1925 emended ATROPS 1982; *Ardescia* ATROPS 1982; *Ataxioceras* (*Schneidia*) ATROPS 1982; *Progeronia* ARKELL, 1953; *Lithacosphinctes* OLORIZ, 1978; *Virgalithacoceras* OLORIZ, 1978; *Pseudodiscosphinctes* OLORIZ, 1978; *Crussoliceras* ENAY, 1959 emended OLORIZ, 1978; *Lithacoceras* HYATT, 1900 emended OLORIZ, 1978; *Subplanites* SPATH, 1925 emended OLORIZ, 1978; *Biplisphinctes* OLORIZ, 1978 and *Torquatisphinctes* SPATH, 1924 emended OLORIZ, 1978.

Are reviewed here and species described by previous authors: Neumayr (1873), Herbich (1878) and Preda (1973), being analyzed the specimens from collections of Cluj, Bucharest or Piatra Neamt. The species *P. metamorphus*, *P. plebejus*, *P. oxipleurus, P. siculicus* are confirmed as *Progeronia metamorpha* (NEUMAYR, 1873), *Torquatisphinctes plebejus* (NEUMAYR, 1873), *D.* (*Pseudodiscosphinctoides*) *oxiplerus* (HERBICH, 1878), *Subplanites siculicus* (HERBICH, 1878), and the *P. subpunctatus* NEUMAYR, 1873 is synonymous with *Orthosphictes polygyratus* (REINECKE, 1818).

Conclusions

This ataxioceratides fauna from East Carpathians is dominated by representatives of the group *Progeronia* ARKELL. New to the region are species of subgenres *Ardescia* ATROPS, 1982 and *Schneidia* ATROPS, 1982.

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ORAL

Geoconservation in Romania: urgent measures and actions required

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Keywords: geodiversity, geotope, geopark, geotope assessment, geotope protection, geotope valorization

In spite of the increasing popularity of the *geodiversity concept* and related terms manifested through papers presented in specialized thematic national and international symposia and conferences, the concrete measures and actions for geoconservation in Romania are lagging far behind the theoretical approaches. The County Environment Protection Agencies (APMs) hold inventory lists of geotopes, but in most of the cases their real state in field is not known, the anthropic and natural destructive impact is not monitored, nor are the responsibilities clearly delegated. The chaotic post-revolution retrocession of land areas to private owners, without any concern on the existing geotopes, raised new and great difficulties in Romanian geoconservation. The Ministry of Environment and Forestry, respectively the Romanian Academy, as the main authorized institutions for ensuring the protection of the geological heritage, just as the Romanian Geological Survey, are only formally involved in this matter, without developing coherent strategies for short- and long-term impact.

Most of the NGOs, except several speleological ones, are not active in geoconservation at the national level, and thus not influential in Romania; nevertheless, it should be noted that local initiatives concerning geotope conservation are more frequent (e.g., the Kogaion Association in Vânturarița, the Perșani Geopark Association in Perșani). Under such circumstances it is not surprising that the deterioration of the geotopes prevails on their protection and conservancy. Some of the renowned Romanian "geological monuments" (e.g. Albeşti and Suslăneşti – Muscel, Ormeniş – Perşani, Chiuzbaia – Maramureş, Lăpugiu – Hunedoara, Soceni – Caraş Severin) are either completely destroyed, or else are open to unauthorized collectors.

Due to some individual actions, Romania is, however, among the first European countries which adhered to the relatively new structures which promote geoconservation: the The European Association for the Conservation of the Geological Heritage – ProGEO and European Geoparks Network, a fact that creates favourable premises for surpassing the present situation.

The reasons for an active and efficient geoconservation system, as well as the neccessary measures for achieving this aim, are discussed in the contribution, based on international standards in geoconservation and on our experience achieved in the management of the Haţeg Country Dinosaurs Geopark. The foreseen measures involve:

- The inventory of paleontological sites, and geotopes in general, followed by reports on the present condition of the individual sites together with concrete measures for its conservation;
- Assessment of geodiversity in national and natural parks as part of their management plans and professional interpretation approach for education and tourism;
- Assessment of the geotopes' importance from scientific, educational and touristic viewpoints, based on the SSSIs (Sites of Special Scientific Interest) and RIGs (Regionally Important Geodiversity sites); this will allow the enforcement of protection activities to be scheduled based on the importance, specific threats and state of vulnerability of the different geotopes.
- Development of plans for protection, monitoring and valorization of the geotopes in regional frames; this should include contractual commitments among the regional authorities for environment (APMs) and custodians (these, in most cases, have only a very basic training), as well as scientific support from universities or research institutes;

- Increased visibility of the geotopes in the society, as an essential measure in promoting the scientific, economic and cultural values of geology;
- A holistic approach to the nature conservation in which the biodiversity and geodiversity are closely interlinked.

The development of geoconservation requires that specialists and universities react to this demand, by offering education and training in this new field of Geosciences. The departments of Geology from the traditional university centres (Bucharest, Iaşi, Cluj-Napoca, Petroşani, Baia Mare), but also from other, more recent ones (Timişoara, Constanţa) can and should cooperate in ensuring a coherent strategy for geoconservation, based on assumed responsibilities within the regions in which they are located. All these activities should lead to the development of unified policies and procedures for geodiversity conservation in Romania.

It should not be ignored that the protection and conservancy of the geotopes is only a part of the geodiversity management which, among other connections, is closely involved in the European Landscape Convention, known as Florence Convention, the first international treaty to be exclusively concerned with all dimensions of European landscape a major issue of the Nature conservancy in the XXIst century, a convention also adopted by Romania (Law 451/8/10/2002).

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POSTER

Fossil woods from Rhodopes, Bulgaria

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Keywords: Miocene, petrified wood, gymnosperms, palaeoclimate

The paper presents the palaeoxylotomical study of a material coming from Kardjali region, from Nanovitsa depression, eastern Rhodopes Mts. The Petrified Forest (locally named Vkamenenata Gora), extends on an area of about 7.5 hectares in a deep gorge, called by locals "Gabaz gulch", close to Raven, Tatul and Nanovitsa villages. (east of Momchilgrad). The petrified trees appear on both sides of the gorge with over 120 m length. They represent twenty stumps of petrified trees or carbonized by fire, of 1 to 1.5 m tall and variable thickness. In the cross section of trunks are clearly distinct annual rings. This Petrified Forest is hosted by an Oligocene volcano-sedimentary formation. The site was declared a protected site, category "landmark" in 1970, and it is located in the maintained reserve Borovets. The 31 Ma-old tuffs in the Nanovitsa depression preserve a series of pyroclastic rocks of large acidic Oligocene eruptions. Intra-depression acid tuffs overlie Zvezdel, Dambalak and Sveti Ilia intermediate lava flows, as well pyroclastic rocks from the Borovitsa volcanic area dated at 31.8 Ma. The pyroclastic sequence consists of two ignimbrite units (Raven and Sapdere type) and one mixed unit comprising air-fall tuffs and epiclastic rocks. Air-fall deposits buried a forest with giant trees, sometimes of more than 4 m in diameter. Numerous *in situ* or subvertical silicified stumps and also smaller petrified wood fragments present well-preserved wood structure. Numerous sub-horizontal carbonized branches appear in the transitional level between the air-fall tuffs and the ignimbrites, as well as the well developed radial cracks and gas-escape structures above the branches, suggest a quick deposition of both the air-fall tuffs and the ignimbrites from an eruption column (Harkovska et al., 1992; Georgiev, S. & Marchev, P., 2005). Studied by paleoxylotomic methodology, some samples collected from this area were identified as forms of oaks. A systematic research of the area is necessary in order to identify the taxonomic composition of the Nanovitsa Petrified Forest. Otherwise few papers on the Bulgarian petrified woods were written till now, and the name as Hadziev must be remembered (Hadziev P. & Madel Erica, 1962). The scientific significance of these first paleoxylotomic research in this site and first taxonomic identifications of the trees of this Oligocene forest consist in the possibility of the palaeoclimatic and paleoenvironmental reconstruction of that times, using their extant equivalents. Also the growth of the knowing degree of the Bulgarian fossil Flora must be considered.

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ORAL

Petrified wood from Căprioara Valley, Feleacu Hill, Cluj

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Keywords: Early Sarmatian, Feleac Flora, petrified wood, paleoclimatic significance

The paper presents the palaeoxylotomical study of a material collected by Prof. Petrescu and partially by one of the authors, both from the area of Feleacu Hill, close to Cluj-Napoca, from a sedimentary formation of Early Sarmatian age. Its relative age was established by micropalaeontologic studies of foraminifers (Popescu, 1995; Suciu, 2005). Otherwise the fossiliferous area of origin is well known from previous papers (Staub (1883, 1891; Givulescu, 1997). There were described a small Early Sarmatian Flora with *Pinus felekiensis, Sequoia abietina, Quercus mediterranea, Daphnogene polymorpha*, and some species of *Platanus, Palaeocarya, Phragmites, Cyperites* indicating a mesophytic forested riverside growing in a warm temperate climate. The here studied material was collected from a sedimentary formation comprising gravels, sands, sandstones, clay, indicating a continental fluvio-deltaic environment to a littoral one. It is represented by fragments of petrified trunks. Petrescu (2003) quote some lignotaxa as *Sequoioxylon, Pinuxylon*, *Quercoxylon, Laurinoxylon, Ebenoxylon, Rhisocaryoxylon, without descriptions* and recently a new lignotaxon (*Tetraclinoxylon*) was described from the same site (Iamandei et al, 2011). The adequate methodology of study was the paleoxylotomy, followed by microscopical observations and a comparative study with similar structures published in the specialty literature in order to identify the original trees and their extant equivalents. Some species of Conifers, walnuts, oaks were identified, growing the number of lignotaxa of Feleac Flora (Givulescu, 1997) and the possibility of the palaeoclimatic and paleoenvironmental reconstruction.

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ORAL

New Liassic woods from Holbav, Romania

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Keywords: Early Jurassic, Liassic coals, Carpathian Liassic Flora, petrified wood, Gymnosperms

The paper presents the palaeoxylotomical study of some material coming from Carpathians, from Holbav area, from a geologic formation or Early Jurassic age. The Carpathian Jurassic is dominated by limestone's platforms which are now either buried under newer deposits, or lifted during orogeneses up to the mountains and exposed. They were intensely studied by numerous scientists, from Hauer and Stache in the 19th century to the present days by Gradinaru, Dragastan, Neagu, Bucur and others. Representing the terrestrial biota, the Romanian Jurassic Flora is relatively less and unequally known, especially by the study of vegetal adpressions found in the sedimentary formations associated to important Liasic coal-deposits from South Carpathians (Ettinghausen, 1852; Stur, 1860, 1872; Humml, 1957; Semaka, 1967, a.o.), and some newer from Apuseni Mts. (Givulescu 1991-2002; Givulescu & Czier, 1990). This was also the subject of new studies and reevaluations comprehended in some more recently published papers (Popa, 1998; Popa & Van Konijnenburg-Van Cittert, 2006). The till now identified Mesozoic Flora by macroremains studies belongs to: Bryophytes, Pteridophytes, Pteridosperms, Cycads, Gymnosperms. Based on the rich and very diversified Liasic Fossil Flora in Carpathians, there was even an attempt of phytostratigraphy of the Liasic Coal Formation (Semaka, 1970). However none systematic palaeoxylotomical study on the coalified trunks from those coal deposits was done and, today, the underground mining is closed. Rediscovering petrified woods within almost identical Liasic formation in Holbav area, with a volcano-sedimentary character, with pyroclastics and sandstones, in a continental, fluvio-deltaic facies. It is represented not only by small samples but even by large petrified trunks. This kind of fossil imposed an adequate methodology of sampling, of preparation and of study. The palaeoxylotomy implies the realization of strictly oriented thin sections of petrographic type followed by their microscopic study in transmitted light for their scientific description, and capture of selected images of specific details with taxonomic value. It is followed by a comparative study with similar structures published in the specialty literature. The results of this complex palaeoxylotomical study were materialized in the following gymnospermous identifications which, however, hardly can be considered as equivalents of some extant tree types. Some of them were identified as species of *Agatoxylon, Brachyoxylon*, *Protocupressinoxylon*, *Baieroxylon,* and *Ginkgoxylon*. The scientific significance of these new taxonomic identifications in relation to the previous known palaeobiologic image includes the possibility of the palaeoclimatic and paleoenvironmental reconstruction, using their extant equivalents. Also the growth of the knowing degree of the fossil Flora must be considered.

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ORAL

Age and depositional environment of Aliki Limestone, NE Greece

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Keywords: Stratigraphy, Sedimentology, Lower Cretaceous, Makri unit, Thrace region, Eastern Circum-Rhodope belt

The Alpine belt in the northern Aegean region amalgamates various tectonic units related to the complex subduction-accretion and collisional Mesozoic-Tertiary geodynamic evolution of the Neotethyan Vardar Ocean (Stampfli & Hochard, 2009), which is now represented by ophiolite decorated suture zone that limits to the south the Serbo-Macedonian and Rhodope high-grade crystalline massifs at the former margins of that ocean. Both massifs are separated by the Circum-Rhodope belt, which in turn, is considered to constitute either the northernmost Vardar suture zone, or a separate unit.

In the Thrace region, the eastern Circum-Rhodope belt is subdivided into Makri unit and the overlying Drimos-Melia unit (Papadopoulos et al., 1989). Both units occur as distinct inliers below the Tertiary cover sequences or form tectonic slices juxtaposed through thrust and extensional faults against the Rhodope high-grade metamorphic basement (Bonev & Stampfli, 2011).

Field observations were conducted in the area of exposure of the Aliki limestone aiming to study its structural features and relationships with the underlying low-grade lithologies in the easternmost part of the Makri unit. The Aliki limestone has covered unconformably the already deformed and metamorphosed rocks of the metavolcanic-sedimentary series of the Makri unit (Kopp, 1969). Middle Eocene (Lutetian) breccias and breccia-conglomerates plus Late Eocene-Oligocene nummulitic limestones, sandstones, and marls overlie with unconformable boundary the Makri unit and the Aliki limestones as well (Papadopoulos, 1982).

Benthic foraminiferal assemblages seem to be the best biostratigraphic tool for age determination of the Aliki limestone. The absence of stratigraphically important benthic foraminiferal taxa (especially orbitolinids) does not allow more precise stratigraphic resolution. Barremian-Aptian age of the Aliki limestone is suggested herein on the basis of a newly discovered benthic foraminifera association: *Debarina hahounerensis* Fourcade, Raoult & Vila, *Daxia minima* Laug & Peybernes, *Haplophragmoides globosus* Lozo, *Tritaxia plummerae* Cushman, *Arenobulimina meltae* Kovatcheva, *Pseudocyclammina lituus* (Yokoyama), *Neotrocholina friburgensis* Guillaume & Reichel, *Vercorsella cf. scarsellai* De Castro, *Pfenderina* sp., *Glomospira* sp., *Bolivinopsis* sp., *Gaudryinopsis* sp., *Trocholina* sp., *Istriloculina* sp.

The accomplished sedimentological study allows to distinguish five microfacies types: intraclastic packstone/grainstone, peloidal packstone/grainstone, ooid-peloidal packstone/grainstone, bioclastic wackestone/packstone, and bioclastic mudstone. The textural characteristics of these limestones and the nature of the constituent allochems help to outline some general parameters of the depositional setting (shallow depth, moderate hydrodynamic regime, normal marine salinity, high oxygen level, subtropical conditions, low rate of siliciclastic input). Although conditionally the depositional environment can be interpreted either as a back-reef zone of rimmed carbonate platform, or more probably as a semi-restricted sector (lagoon) of carbonate shelf which was presumably marked by the occurrence of small, isolated rudist-dominated buildups (with rhodoliths and microencrusters as binding organisms). This setting was characterized by lime mud deposition, peloid formation, development of relatively rich benthic communities, and intermittent water agitation by waves and currents (plus possible weak storms). The temporal evolution of sedimentation had a relatively monotonous pattern in terms of the mentioned depositional parameters and environment. The primary lime sediments were deposited presumably on a large carbonate platform in the framework of the central province of the Mediterranean Tethys realm (Philip, 1988).

The obtained results therefore represent strong stratigraphic argument for the pre-Albian termination of the tectono-metamorphic evolution of the Makri unit related to the Late Jurassic-Early Cretaceous Balkan orogenic event, which in the case for this unit, was sealed by Early Cretaceous carbonate sedimentation. The new data further elucidate the geological evolution of the Makri Unit in Mesozoic time and enable future regional correlation between the studied limestones and other isochronic carbonate rocks which are exposed in adjacent areas from the territories of Greece, Turkey, and Bulgaria.

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ORAL

Stratigraphy of the Early Jurassic sediments of the Central Fore Balkan, Bulgaria

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Keywords: Ozirovo Formation, Hettangian-Aalenian, mapping, Teteven-Troyan region, Bulgaria

The Lower Jurassic sediments of the Teteven-Troyan region (Central Fore-Balkan Mts, Bulgaria) have long been notorious for their various lithologies, abundant and diverse fossils. This particularly concerns the exposures that occur between the Vit and the Beli Osam Rivers valleys, which have attracted much attention since the earliest times (Zlatarski, 1908). In terms of its structural position, these outcrops are considered to be a part of the Teteven Arch, the Ribaritsa Syncline and the Central Balkan Anticline, which are prominent structures of the Balkan Zone of the Balkan orogenic system (Bonchev, 1971). Regionally, the Balkan orogenic system represents the northernmost part of the Alpine orogenic belt in Bulgaria that was generated after multiphase collisional and extensional tectonic events from the late Paleozoic- to mid-Eocene times (Zagorchev et al., 2009). The basement of the main structures recognized in Teteven-Troyan area is composed of Hercynian granodiorites of the Vezhen Pluton and older high-grade metamorphic rocks to the south, and widespread Permian polymictic clastic sediments, associated with volcanoclastic rocks and acid tuffs to the north (Bonchev, 1971). These are overlaid by thick Triassic and Jurassic successions. The Triassic strata represent a development from polymictic clastic rocks (Lower Triassic Petrohan Group), followed from above by the transgressive carbonates of the Middle Triassic Iskar Group, and completed with the regressive carbonates of the Upper Triassic Moesian Group. The Jurassic sediments cover unconformably all the older rocks and the Mesozoic successions continue up to the Lower Cretaceous.

The Lower Jurassic strata of the Teteven-Troyan region are exposed generally in four narrow and parallel strips with W-E trends, which are composed of mixed carbonate and siliciclastic sediments of shallow-water to medium-deep-water origin that were accumulated during an expanding marine transgression. There are already a number of publications on the litho- and biostratigraphy, and depositional settings of the Lower Jurassic exposures from this area (e.g. Sapunov et al., 1971, and references cited therein). The Lower Jurassic successions correspond mainly to the Ozirovo Formation straddling from the Early Sinemurian to the Late Aalenian age. The very base of the Lower Jurassic is represented either by thin initial transgressive deposits of Hettangian to the earliest Sinemurian age (varigrained quartz sandstones of the Kostina Formation), or quite locally by some fine continental kaolinite weathering crusts and coal-bearing clays of Hettangian age. Oftentimes, the Ozirovo Formation directly covers the pre-Jurassic basement as post-transgressive sediments.

In this stratigraphic setting, the Ozirovo Formation of the Teteven-Troyan region is characterized by two main types of development. The northernmost and the westernmost exposures are represented usually by very thinly developed to hyper condensed sequences of ferruginized sandy bioclastic limestones, to ooidal ironstones, which were deposited during a slow sedimentation in a high energy environment. To the east, the successions of the Ozirovo Formation are represented by similar lithologies but they are more complete and thicker. In the central and southern parts of the area outlined, the Ozirovo Formation reaches tangibly bigger thicknesses and became more heterogeneous. There, it is subdivided into 3 members that grade in superposition: the *Teteven*, the *Dolni Loukovit* and the *Boukorovtsi* Members. The *Teteven Member* is regionally extended shallow-marine sequence of Early Sinemurian to Early Pliensbachian age which is composed of 10 to 30 m thick alternation of sandy bioclastic limestones, calcareous sandstones and silty marls with abundant fossils (Sapunov et al., 1971). The *Dolni Loukovit Member* displays much wider occurrence and it is represented by 30 to 80 m thick ferruginized and highly fossiliferous, sandy bioclastic limestones of Early Sinemurian to Late Pliensbachian age (Sapunov et al., 1971). Following upwards is the *Boukorovtsi* Member, which is represented by 20 to 40 m thick hemipelagic, irregular shale-marl-limestone alternation, spanning Late Pliensbachian to end–Aalenian age. It is fossil-bearing (ammonites and belemnites) just in its basement which is assigned to the Uppermost Pliensbachian and the Toarcian. The ammonite occurrences allowed 9 Toarcian ammonite zones to be established (Metodiev, 2008). The rest of the *Boukorovtsi* Member is remarkable to be too monotonous, and of poor fossil record largely referred to the *Zoophycos* ichnofacies. On the base of the stratigraphic range and the changes of the taxonomic composition of the foraminifers, four zones have been divided into the Ozirovo Formation (Ivanova, 1999).

The Ozirovo Formation is covered by thick deeper water argillaceous and siltstone sediments of the Etropole Formation, extending in age from the Late Aalenian onwards to the end of the Middle Bajocian (Sapunov et al., 1971).

This study results from the new evidences, appeared after the new mapping of the area (M 1:50 000). Six sections of the Ozirovo Formation of Early Sinemurian to Early Aalenian age are the main subject of investigation. These sections (previously examined and newly discovered) enabled us to make a bed-by-bed biostratigraphic and lithological study. On this basis, a reinterpretation of the forgoing data was performed, in order to determine in more details the depositional history and environments of the Lower Jurassic in the studied region.

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ORAL

Bioencrustation and bioerosion of the Middle Jurassic hardgrounds from SE Carpathians (Bucegi Mountains, Dâmbovicioara Basin, Romania)

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Keywords: encrustation, bioerosion, hardgrounds, Middle Jurassic, Southern Carpathians, Romania

The condensed Middle Jurassic (Bathonian – Callovian) sequence from Bucegi Mountains and Dâmbovicioara Basin is well known in the paleontological literature for its richness in ammonites. Numerous previous authors discussed the biostratigraphy of these heterochronous condensed horizons and the lithostratigraphy of the Middle Jurassic sequence, in general (e.g. Patrulius, 1969; Lazăr, 2006; Dragastan, 2010). However, this is one of the first detailed studies concerning the hard substrate communities of these condensed horizons, communities formed by a multitude of organisms that were adhering to and/or excavating the substrate they inhabited (according to Taylor and Wilson, 2003).

Five stratigraphic sections from the Bucegi Mountains (Gaura Valley, Grohotişu Peak, Strunga Pass, Tătarului Gorges) and Dambovicioara Basin (Purcăretelui Valley) have been investigated. Detailed sampling of the condensed levels and the adjacent beds has been accomplished during the fieldwork. Besides sampling, the field study also included measurement of the stratigraphic profiles and macroscopic examination of lithologic textures and structures. Rock specimens were prepared for both petrographic and isotopic analyses. About 250 thin-sections and polished slabs were studied petrographically by polarized light microscopy, UV fluorescence microscopy and by cold cathodoluminescence microscopy (CITL). Small polished slabs, mainly of the ferruginous crusts and cement-rich parts, were etched by dilute acetic acid and studied with a scanning electron microscope (SEM).

The studied heterochronous condensed horizon is delimited by two types of discontinuities: hardgrounds and inherited rock grounds. The main microfacies present in the studied succesions are: bioclastic grainstone/packstone, ooidal grainstone, bioturbated wackestone/ packstone and stromatolitic bindstones.

Successive firmgrounds and hardgrounds have been strongly bioeroded and bioencrusted by successive generations of different benthic organisms during the accumulation of the condensed horizon. The bioerosion was produced by endolithic microbes, fungi, sponges, "worm" borings (*Trypanites*), but also by bivalves (*Gastrochaenolites*) and probably by phoronids (?*Talpina*). Sponge and fungal perforations (microborings) filled with hematite are frequent in molluscs shells and show very diverse morphologies.

The bioencrustation was produced by microbes (different types of BMC benthic microbial communities), encrusting foraminifera (mainly *Nubecularia* and *Bullopora*), serpulids (*Dorsoserpula, Cycloserpula, Tetraserpula*), and cyclostome bryozoans from the so-called "*Berenicea* group". Different types of microbial macrofabrics have been differentiated: stromatolites, thrombolites and leiolites (sensu Oloriz et al., 2003) with different structural morphologies: concentric/planar/columnar encrustations, laminated fabrics, respectively massive fabrics (sensu Reolid et al., 2005).

Petrographical microscopy studies and scanning electron microscope (SEM) investigations revealed several types of ferruginous microbial filaments and micro-organisms of different sizes and shapes in almost all the ferruginous coatings, microstromatolites and microbialites.

The activity of the endolitic organisms produced important bioerosion and particle micritisation, while bacterial activity promoted the encrustations, frequently clotted and stromatolitic structures, as well as the mineralization. High degree of bioerosion and bioencrustation represent important features of the studied condensed horizon and of the associated discontinuities (HG, IRG), that have been generated in a setting corresponding to a low-energy subtidal environment, situated below wave base, and characterized by low sedimentation rates as well as intervals of non-deposition with a gradual transition to a hemipelagic setting.

Acknowledgements

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ORAL

Sauropod diversity in the Late Cretaceous of Southern Europe

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Keywords: Dinosaurs, Campanian, Maastrichtian, France, Spain

For almost one century the hypothesis of Depéret (1900) and Lapparent (1947) that two sauropods (namely *Hypselosaurus priscus* Matheron 1869 and *Titanosaurus indicus* Lydekker 1877) coexisted in the Late Cretaceous of Southern France has been accepted. Both species are now considered as *nomina dubia* (Le Loeuff, 1993; Wilson & Upchurch, 2003). In the last fifteen years three new species have been described: *Ampelosaurus atacis* Le Loeuff, 1995 from the Upper Aude Valley in southwestern France, *Lirainosaurus astibiai* Sanz *et al*., 1999 from the Contado de Treviño (northwestern Spain) and *Atsinganosaurus velauciensis* Garcia *et al*., 2010 from the Aix Basin in Provence (southeastern France). A fourth species is being described from the locality of Cruzy in Southern France. These four species come from roughly contemporaneous strata of the Late Campanian-Early Maastrichtian transition.

Recent investigations in Southern France and Spain suggest an even higher diversity. An odontological survey shows that all studied localities have yielded so far a single morphotype of sauropod tooth. The four well defined species show indeed different tooth morphologies and at least two more morphotypes are yet unnamed. Other approaches (i.e. Vila *et al*., 2009) recognize up to eight different forms between the Late Campanian and the Late Maastrichtian.

Sauropod diversity in the Late Cretaceous of southwestern Europe was thus much higher than what was previously thought. However these recent works also raise new questions, including that of a possible sexual dimorphism in some titanosaurs such as *Ampelosaurus atacis*.

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POSTER

Pontian mollusc faunas in the Eastern Dacic Basin (Romania)

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Keywords: Late Miocene-Early Pliocene interval, limnocardiids, Carpathian Bend Area

The start of the Pontian stage is marked by the appearance of brackish limnocardiid faunas, giving a distinct note, compared to those from the Maeotian stage. In this way, we face one of the most important paleontological turnovers of Late Miocene times in the Dacic Basin.

In the Pontian deposits from the area between the Buzău and Dâmboviţa valleys (Romanian Carpathian bend area), the biofacies reflect the general features of all Pontian mollusc faunas that could be found in the Dacic Basin (Figure 1). Even if from a facial point of view, there are not considerable differences from one sector to another belonging to the Dacic Basin, especially during the Lower Pontian sedimentation, from a faunal point of view there are significant variations, mirrored in the character of the assemblages.

The clayey facies, with significant development between the Buzău and Dâmboviţa valleys, contains, at the Lower Pontian (Odessian) level, a fauna dominated by *Paradacna* genera. Associations characterizing these deposits consist of *Paradacna abichi, P. abichiformis, P. minor, P. tutovana, P. okrugici,* as well as *Congeria (Rhombocongeria) rumana, Valenciennius ellipticus* and *Limnocardium zagrabiense*.

Although the *Valenciennius* genus is constantly present in the Odessian (i.e., Lower Pontian) deposits, there are relatively few cases when it is present in a greater number of specimens. In the second litofacies that characterizes the Lower Pontian, with a greater development at the extremities of the investigated area, the whole recorded fauna is composed of the following taxa: *Pseudoprosodacna semisulcatoides, Prosodacnomya rostrata, Pseudocatillus pseudocatillus, Pontalmyra*, as well as other genera such as *Euxinicardium, Dreissena* and *Viviparus* having a subordinate role in the assemblages.

The macrofaunal association of the Middle Pontian (i.e., the Portaferrian substage) shows an explosive enrichment in both new species and genera. During this period, the first representatives of the following subgenera (bivalves), appear: *Tauricardium, Bosphoricardium, Arpadicardium*, *Plagiodacna, Phyllocardium, Caladacna, Zamphiridacna, Chartoconcha* and *Bulimus, Pyrgula, Zagrabica* among gastropods. Also, the number of species of *Euxinicardium, Pseudocatillus Pontalmyra* genera is much larger in the Middle Pontian than in the Lower Pontian.

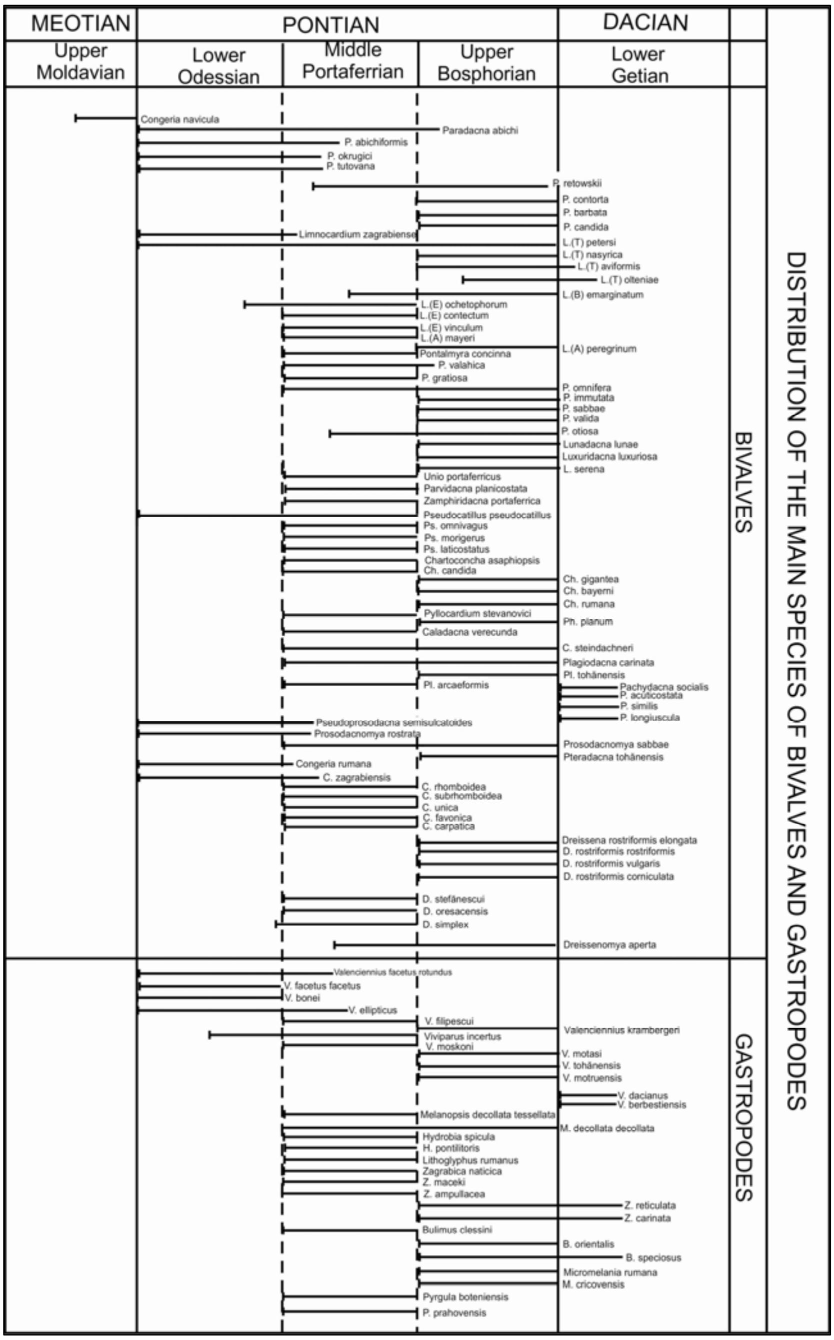
The lithofacial diversification of the Middle Pontian deposits has direct implications in the macrofaunal complexity that are poorer or richer, more diversified or uniform, depending on the lithology.

In pelitical facies, the faunal associations are characterized by the presence of taxa such as *Congeria (Rhombocongeria) rhomboidea, C. (Rh.) subrhomboidea, C. (Rh.) rumana, Paradacna abichi, P. abichiformis, Valenciennius ellipticus* and *V. filipescui.*

In the sandy facies, the *Rhombocongeria* and *Paradacna* sub-genera as well as the genus *Valenciennius* are absent, whereas the genera *Tauricardium, Euxinicardium, Plagiodacna, Pontalmyra, Chartoconcha, Pseudocatillus, Dreissena, Lithoglyphus, Melanopsis* and *Viviparus* proliferated.

The Upper Pontian (i.e., the Bosphorian), the youngest substage of the Pontian regional stage, can be characterized from a macrofaunal point of view by a stabilization of the faunas, as well as by the emergence of new genera such as *Stylodacna, Parapachydacna* and *Psilodon*, showing a large scale development in the Pliocene (i.e., during the Dacian stage).

Figure 1- Distribution of the main species of bivalves and gastropods from the study area



From the Pontian deposits new faunas were described (Papaianopol, Macaleţ,1996-1997, 2006).

The above mentioned stage is also characterized by genera yielding a short range, with a strict development only in this stratigraphic interval, i.e. *Lunadacna*, *Pteradacna* and *Luxuridacna*. Taking into account the location of the investigated area, situated in the eastern part of the Dacic Basin, the identified Pontian faunas show affinities and are even comparable with Pontian faunas from the Euxinic Basin, especially with those that could be found in the North-Western Black Sea.

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ORAL

Cretaceous anoxic events in the Romanian Carpathians: state of the art

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Keywords: Valanginian Weissert Event, OAE1, OAE2, Horseshoe Bay Event, Santonian-Campanian boundary Event, Eastern and Southern Carpathians

Introduction

An important feature of Cretaceous times is related to the occurrence of global Oceanic Anoxic Events (OAEs), (Jenkyns, 1980; Arthur & Premoli Silva, 1982; Weissert, 1989, Paul et al., 1999, among many others), which represents one of the most intriguing geological aspects of the Cretaceous period. The overprints of these events are black shale deposition, as well as significant excursion of the isotope $\delta^{13}C$, accompanied by considerable biotical turnover (Jenkyns, 1980; Erba, 2004; Mutterlose, 2005; Jarvis et al., 2006).

Early Cretaceous OAEs in the Romanian Carpathians

The Weissert Event, placed within Valanginian-Hauterivian boundary interval, is the oldest Cretaceous oceanic anoxic event observed so far, and it is characterised by a a global positive carbon isotope excursion (Weissert, 1989) and by a drastic Tethyan nannofloral shift, mainly reflected in the decrease abundance of the nannoconids, event related to a biocalcification crisis, due to the excess in CO_2 (Erba, 2004). In Romania, this event was pointed out based only on palaeobiological evidences (Barbu and Melinte-Dobrinescu, 2008), in the bend area of the Romanian Carpathians (i.e., Bucegi Mts.). That is why the event was described in the Romanian Carpathians as 'the Valanginian Nutrification Event", most probably corresponding to the Weissert OAE.

Concerning other Early Cretaceous OAEs (OAE 1a of the Early Aptian, as well as OAE 1b, OAE 1c and OAE 1d, produced during the Albian stage), their presence is argued in the Romanian Carpathians based on lithological evidences (Melinte-Dobrinescu et al., 2009). Several black shales levels were observed so far, in the outer nappes of the Eastern Carpathians.

Late Cretaceous OAEs in the Romanian Carpathians

The OAE2 (i.e., the Cenomanian/Turonian boundary event) is one of the most studied Cretaceous anoxic events, characterised by significant increasing in $\delta^{13}C$ isotope values (Jenkyns, 1980; Paul et al., 1999, among many others), accompanied by prominent black shale deposition and paleobiological turnover of marine planktonic organisms. So far, in Romania, the OAE2 was evidenced in the Southern Carpathians (SE Haţeg region), where the positive excursion of $\delta^{13}C$ isotope values was observed in the Upper Cenomanian-Lower Turonian marlstones of the Ohaba-Ponor site (Melinte-Dobrinescu & Bojar, 2008). No lithological overprint (i.e., black shale deposition was observed in the section), but the shift of $\delta^{13}C$ isotope is accompanied by a significant turnover in calcareous nannoplankton taxa. High fertility nannofossils, such as *Biscutum constans* and *Zeugrhabdotus erectus* show high fluctuation, including specific blooms below and coincident with the OAE2, but almost disappearing towards the end of OAE2. These modifications are indicative for a shift in the primary productivity of the oceans, significantly increasing in initial stages of OAE2, but showing at its end almost a collapse linked to the excess in atmospheric and dissolved CO_2.

The Middle Santonian Event, also known as the Horseshoe Bay Event (Jarvis et al., 2006) is one of the most prominent of the Late Cretaceous, characterised by a 0.4‰ $\delta^{13}C$ positive excursion (up to 2.7‰.), placed towards the top of the Micraster coranguinum Echinoid Zone. In the Fizeşti section (SW Haţeg region, Southern Carpathians), the Santonian red marine marlstones and claystones show an increasing of $\delta^{13}C$ values from 2.15 ‰ up to 2.44 ‰, decreasing afterwards to 2.19‰. The $\delta^{13}C$ positive excursion observed in Haţeg is placed between the successive last occurrence of the nannofossils *Lithastrinus septenarius* and *Eprolithus floralis*, in a similar stratigraphical position as previously described from other sites of the Tethys and the Boreal domains.

The Santonian/Campanian Boundary Event is globally characterized by a positive $\delta^{13}C$ isotope excursion of 0.3 ‰ up to 2.9 ‰, placed within the Marsupites testudinarius crinoid zone, situated between the successive first occurrences of the nannofossils *Arkhangelskiella cymbiformis* and *Broinsonia parca parca* (Jarvis et al., 2006). In SW Haţeg (Southern Carpathians) an increasing of the $\delta^{13}C$ values (from 2.38 ‰ up to 2.58 ‰) was observed in the red marlstones of the Fizeşti Formation (Melinte-Dobrinescu & Bojar, 2010), a geochemical event coincident with the first occurrence of the nannofossil *Arkhangelskiella cymbiformis*. Afterwards, in the Fizeşti section, the carbon isotope decreases, but at the level coincident with the first occurrence of the crinoid *Marsupites testudinarius* shows a new shift to 2.59‰. The level where the crinoid *Marsupites testudinarius* became extinct is coeval with the maximum $\delta^{13}C$ positive excursion, 2.65‰.

Conclusions

So far, several OAEs were identified in the Romanian Carpathians, based on geochemical fluctuations and palaeobiological turnover. There are also lithological evidences of OAEs deposition in the Eastern Carpathian outer nappes, where prominent black shale levels occur, mainly as intercalation in red marine beds. Their occurrence is possibly linked to palaeoenvironmental changes, from oxic to an anoxic depositional regime.

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ORAL

Late Cretaceous marine fossil assemblages of the Haţeg Country

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Keywords: marine Cenomanian-Campanian sediments, macrofaunas, nannofloras, Southern Carpathians, Romania

Introduction

The Haţeg Country is a region world wide famous for its continental Maastrichtian deposits, containing rich macrofaunas that include also endemic dinosaur species (Grigorescu et al., 1985, 1999; Csiki et al., 2010; Bojar et al., 2010). Besides the intensively studied continental fossils, the Haţeg region comprises significant macro- and microfaunal assemblages, as well as nannofossil ones (Lupu, 1966; Pop et al., 1973; Szasz, 1976; Grigorescu and Melinte, 2001; Neagu, 2006; Melinte-Dobrinescu, 2010).

Methodology

Marine successions from the NW and SE parts of the Haţeg country were investigated from lithological and sedimentological point of view, as well for their macropalaeontological content. Additionally, a detailed sampling was performed, in order to realise qualitative and quantitative calcareous nannofloral assemblages, which also allowed an accurate dating of the studied marine sediments.

Results

Both in NW (i.e., Răchitova-Stei-Densuş area) and SE (i.e., Pui - Fizeşti - Ohaba-Ponor) regions of Haţeg, rich calcareous nannoplankton associations were encountered. The nannofloral assemblages, which are dominated by Tethyan taxa, but also contain a significant number of cosmopolitan nannofossils, are indicative for the Cenomanian-Late Campanian interval (Fig. 1). Notably, the top of the marine deposits of the Haţeg region is placed in the Late Campanian, as proved by the identification of assemblages containing *Uniplanarius trifidum*, *U. sissinghi* and *Ceratolithoides aculeus*.

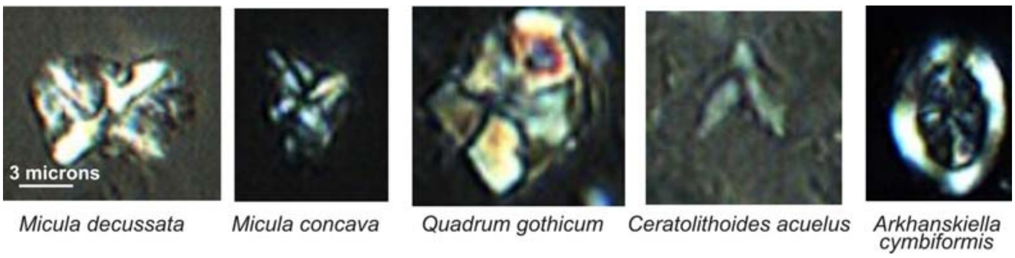

Fig. 1 – Nannofossils commonly encounterd in the Upper Cretaceous marine sediments of Haţeg.

The Upper Cretaceous marine deposits of SE Haţeg yielded rich ammonite faunas (mostly identified by Szasz, 1976 in the Ohaba-Ponor area), mainly Cenomanian in age, such as *Mantelliceras mantelli*, *Acanthoceras rhotomagense*, *Acanthoceras jukes-brownei*, *Eucalycoceras pentagonum*,. *Calycoceras naviculare* and *Pseudocalycoceras thomelli*. Younger ammonite taxa, belonging to the genus *Tex-*

anites, were recorded in the Santonian red marlstones from Fizeşti area, associated with crinoid faunas with *Marsupites testudinarius*. The macrofaunas of SE Haţeg also comprise inoceramids, the most significant biostratigraphical point of view being *Inoceramus pictus* (Cenomanian of Dealul cu Melci Site, Ohaba-Ponor) and *Inoceramus balticus* (Campanian of Pui).

In SE Haţeg, rich rudist assemblages were identified, mainly located in the Cenomanian of Dealul cu Melci Site, Ohaba-Ponor (Lupu, 1966), such as *Durania conectens*, *Eoradiolites triangularis*, *Neocaprina gigantea*, *Sauvagesia praesharpei*, *Praeradiolites fleuriaui*, *Sphaerulites foliaceus* and *Sphaerulites astrei*. The same site contains one of the richest gastropod fauna in the Romanian Carpathians, mainly represented by taxa of *Actaeonella*, *Itruvia* and *Vernedia* genera. Other Cenomanian taxa, commonly found in SE Haţeg (Ohaba-Ponor area) are *Nerinea parva*, *N. caucasica N. incavata*, *Pecten acuminatus*, *Exogyra columba*, *E. conica*, *Modiola polygona*, *Lopha carinata* and *Puzosia sp*. A site containing an unique macrofaunal assemblage in the Haţeg basin, mainly enclosing the species *Hippurites gosaviensis* and *Actaeonella gigantean*, is located also in the SE part of the region (in the area of Pui locality). This is the youngest Cretaceous marine faunas in the whole region.

Conclusions

Rich macrofaunal assemblages are present in SE Haţeg area, mostly in the Cenomanian-Early Turonian interval. Another interval that contains, in SE Haţeg, significant macrofaunal assemblages is the Santonian. In the NW Haţeg, the macrofaunal assemblages are almost absent. The dating of the Upper Cretaceous marine deposits could be achieved based on micropalaeontological studies (i.e., foraminifera – Pop et al., 1973; Neagu, 2006) and nannofloras (Grigorescu and Melinte, 2001; Melinte-Dobrinescu, 2010 and herein). The micropalaeontological data argue that the marine sedimentation ends in the whole Haţeg area within the Late Campanian interval.

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POSTER

A general view of the Sarmatian stage from the Republic of Moldova

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Keywords: Volhinian, Bassarabian, Hersonian, alluvial, lagoon, lake

The Sarmatian is a stratigraphical unit of Neogene from Cenral and South-East Europe. The deposits of the Sarmatian have been accumulated during the period of 12.7 – 9 Ma. The term was introduced in geological literature in 1865 by Eduard Suess, a famous geologist from Vienna, who followed the suggestion of Russian colleague N. Barbot-de-Marny to designate by this term marine-brackish water deposits from Vienna Area and Southern Russia.

The Sarmatian level is divided into three sublevels named after the regions or localities in which were described: the Volhinian (Lower Sarmatian) for deposits with Ervilia described in Volhynia; the Bessarabien (Middle Sarmatian) for middle beds with Nubecularia described from Bessarabia; and the Hersonian (Upper Sarmatian) for upper beds with Mactra caspia. These terms where introduced by I. Simionescu (1903).

The Sarmarian deposits from the Republic of Moldova are represented by all three above mentioned sublevels. The Lower Sarmatian (Volhinian) are recorded on the all territory of the Republic of Moldova with exception of South-West part. They are mainly composed of various limestone and partly of marl, clays, sands, and sandstone. The thickness of these deposits usually ranges from 20 to 50 meters, attaining in some parts up to 100 m. The Lower Sarmatian formations in natural outcrops are scattered from North to the latitude of Orhei, while to the south the deposits are below the river erosion level.

The Middle Sarmatian deposits (Bassarabian) are widespread throughout the Republic of Moldova. They are represented by different limestones (predominantly organogenous), diatomo-spongolitice rocks, clays, and sands. Unlike the Lower Sarmatian, the Middle Sarmatian beds are predominated by terrigenous deposits. The outcrops of these deposits are recorded in the North and Center parts of the country, while South of Bender they are below the level of river erosion. The Middle Sarmatian average thickness increases from east to west and peaks of 340 meters around Corneşti village (the Precarpathian depression).

The Upper Sarmatian deposits (Hersonian) are spread over an area much smaller than that of the Middle Sarmatian deposits. The Upper Sarmatian is represented by marine-brackish, avandeltic, and continental (alluvial, lagoon, and lake) facies. The total thickness of the Upper Sarmatian in southwestern part of the country reaches 200 meters.

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ORAL

The agglutinated foraminifera *Uvigerinammina* MAJZON 1943 - morpho-systematic considerations

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Keywords: agglutinated foraminifera, flysch facies, Upper Cretaceous, Southern Carpathians

The Hungarian micropaleontologist L. Majzon described, in 1943 (Majzon, 1943) *Uvigerinammina*, a new genus of agglutinated foraminifera, with *U. jankoi* as its type species. However, the nature and affinities of the taxon remained poorly understood.

New data about the structure of the early growth stage, the presence of the apertural tub to connect between succesive chambers, together with the general morphology of the test, confirm the affiliation of the genus *Uvigerinammina* MAJZON 1943 to the Family Prolixoplectidae, instead to that to the Verneuilinidae, as was considered by, e.g., Loeblich & Tappan (1988).

Two new species of the genus *Uvigerinammina*: *U. mysaiosi* and *U. carpathica*, are also described in the present contribution.

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ORAL

The position of the faunal asembledge from the Stolniceni formation, in chronology of *Hipparion* fauna of Eastern Parathetys

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Keywords: Late Turolian, MN 13, Lower Pontian, faunal migrations

The Stolniceni Formatian is situated on the highest watershed parts of the Codru Highland. These deposits overlie the eroded surface of the Codru Formatian and are represented by medium and fine-grained sands containing fragments of Carpathian rocks. The mineralogical and lithological composition of the Stolniceni Formation is quite different from that of the underlying rocks and corresponds to the alluvial deposits of Prut and Dniester terraces (Bukatchuk et al., 1968, Hubka, 1981). The fossil fauna-rich Stolniceni outcrops are found in the Leordoaia, Veveriţa-2, and Bălăneşti fossiliferous sites. The faunal assemblage from those sites corresponds to Late Turolian, or biozone MN13 of the continental scale, which is correlated with Lower Pontian deposits of Eastern Paratethys (Nicoara & Lungu, 2008).

The regarded faunal assemblage emerged on the Moldavian plateau during the early stage of Pontian. This peculiar teriocomplex indicates specific environmental conditions of that remote time. The faunas from Leordoaia, Veveriţa-2 and Bălăneşti represent a link between older Turolian and younger Ruscinian faunas. One can note an affinity of the Moldavian fauna with the paleobioprovinces of Central Asia, respectively Central and Southern Europe, expressed by the presence of similar faunal elements. Such a diverse faunal association is explained by effective biogeographical contacts with the mentioned bioprovinces and by migration routes that passed through the Moldavian plateau, that is quite similar to the modern biogeographical situation of the area under study (Nicoara, 2009).

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ORAL

New palaeomagnetic data from the Haţeg Basin, Romania

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Keywords: Maastrichtian, volcanic source, DRM, paleogeography, Sânpetru Formation, Râul Mare

The Haţeg Basin is a Late Cretaceous syn-orogenic sedimentary basin located in the South Carpathians. From Albian until the Early Campanian time, it evolved as a piggy-back basin, with important tectonic subsidence events. This extensional tectonics was replaced during Maastrichtian time by a regional uplift, due to Laramian phase, that marked the beginning of continental sedimentation (Willingshofer et al., 2001).

Maastrichtian continental deposits exposed in the Haţeg Basin are famous for their unique assemblage of amphibians, turtles, crocodilians, pterosaurs, dinosaurs and multituberculates (e.g., Therrien, 2006). The best studied section crops out along Sibişel Valley and is known as the Sânpetru Formation. Other time-equivalent sections occur along Râul Mare Valley, and according to Itterbeeck et al. (2004), these sedimentary sections were referred to the Sânpetru Formation, using as main argument the absence of volcanic material. However, during field and laboratory work, several beds very rich in volcanic material, and even pyroclastic rock intercalations, have been described, making the affiliation of the Râul Mare continental deposits to Sânpetru Formation to be more questioned. The present study reports new palaeomagnetic results from the Râul Mare Valley sections and it aims to highlight a possible correlation between these and the Sânpetru Formation from Sibişel Valley.

Methodology

During field-work, three outcropping sections along Râul Mare Valley have been measured and sampled: Nălaţ-Vad, Toteşti-Baraj and Unciuc. Showing several sedimentological similarities with the type Sânpetru Formation (especially its upper part), the Râul Mare Valley deposits have a general fining-upward trend and reflect deposition in a fluvial environment with coarse-grained channel deposits passing gradually to fine-grained floodplain deposits containing calcrete nodules and palaeosoils, with strike and dip of the bedding around 305/55.

Palaeomagnetic measurements have been performed on 74 oriented cylindrical cores sampled from the finer-grained mudstone strata. The samples have been investigated for natural remanent magnetization, using alternating demagnetizations and thermal demagnetizations. To identify the magnetic carriers, rock magnetism measurements have been also carried out, such as: the anisotropy of magnetic susceptibility, the acquisition of an isothermal remanent magnetization and the variation of susceptibility with temperature and the applied magnetic field.

Results

In correlation with the petrographic analyses, the magnetic susceptibility and palaeomagnetic data confirm the presence of large amounts of magnetic minerals in the fine-grained fraction. The natural remanent magnetization shows only normal polarity in all the samples and is of primary origin, being acquired during sediment deposition (depositional detrital remanent magnetism – dDRM). The arguments for the primary remanence directions are based on a positive local inclination fold test and a positive regional fold test that are similar for the Râul Mare Valley, and the Sibișel Valley (where, however, the type Sânpetru Formation also includes a polarity reversal - Panaiotu & Panaiotu, 2010).

The rock magnetism properties were used to define the main magnetic minerals. The composition consists of a slight variation between magnetite (mainly at Unciuc, due to the pyroclastic rocks) and titanomagnetite; the hematite is also present, having either a volcanic source, similar to the magnetite, or else represents the alteration result of magnetite and/or mafic minerals (Nălaţ-Vad, Toteşti).

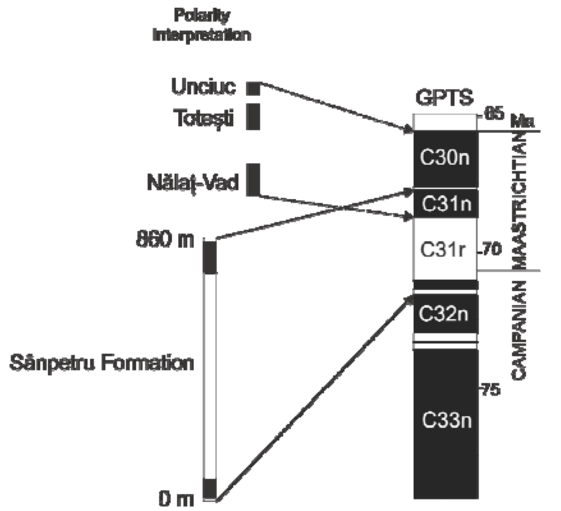

Fig. 1. *Magnetostratigraphy and geochronology of sedimentary formations from the Haţeg Basin. Sânpetru Formation after Panaiotu & Panaiotu (2010). Black = normal polarity; white = reversed polarity. Global polarity time scale (GPTS)*

Discussions and conclusions

Magnetic susceptibility and palaeomagnetic data indicate a high content of magnetic minerals, dominated by titanomagnetite, although small amounts of hematite also occur. These magnetic minerals have a volcanic origin and contribute to the acquisition of the depositional, detrital remanent magnetization (DRM). Sedimentation of these fine-grained deposits is marked out by the anisotropy of magnetic susceptibility and it seems to have taken place mainly in a moderate flow, from uniform suspensions.

Given the presence of volcanic material and very good palaeomagnetic results we suggest a better compositional correlation of the Râul Mare sections to the Densuş – Ciula Formation than to the Sânpetru Formation to which these were previously attributed by Itterbeeck et al. (2004).

All studied samples reveal only normal polarities and in correlation with palynomorph data and previous palaeomagnetic data from Sibişel Valley, the age of Râul Mare deposits can be constrained to 68.7-65.5 M.y. (Chron C31n or C30n; see Fig. 1), with a 26°N (±2°N) palaeolatitude during the Late Maastrichtian. The paleogeographic results also substantiate the arguments that the Haţeg Basin had a subtropical climate, which is in agreement with the type of paleosoil and calcrete nodules identified by sedimentological logging. The mean palaeomagnetic direction is consistent with a post-Late Cretaceous 70°–80° clockwise rotation which affected the western part of the Southern Carpathians.

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ORAL

Fossil disseminules from the Middle Miocene deposits of Oltenia

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Keywords: fossil seeds, wind dispersal, Ciocadia, Slătioara, Morilor Valley

We have re-examined seeds of fossil Cupressaceae, Pinaceae, Platanaceae, Betulaceae, Juglandaceae, Tiliaceae, Ulmaceae, Fabaceae, Aceraceae, Rutaceae, Hydrangeaceae, Apocynaceae and Oleaceae, as a basis for reevaluating the identification of the Forecarpathian Basin fossils. One rare kind of fossil seed of *Tetraclinis* with papery wing on each side is described. Numerous morphotypes of *Pinus* and *Picea* seeds are the subject of statistic size measurement in order to separate several fossil species. Achenes of *Platanus* with stiff hairs which aid wind dispersal are discovered on fine grey marlstones of Ciocadia site. *Betula* tiny seeds and fruit scales and *Carpinus* involucres are often found in the Miocene deposits of Morilor Valley, Ciocadia Valley and Slătioara. Juglandacean nuts and involucres with a considerable variety of wing form are described. A new species of *Tilia* floral pedunculate bract is confirmed. At least two different seed morphotypes with features diagnostic of Ulmaceae (huge dimensions for the endocarpus and wing, stigmatic area) are present. Fabacean pods of different sizes and structures are investigated. Means of dispersal are significant when we are examing the radiation patterns of a taxon. Some possible explanation for the phenomenon of relictualism in the Forecarpathian Basin are provided.

POSTER

Fossil flora and microfossils from Morilor Valley, Mehedinți County

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Keywords: fossil leaves, foraminifera assemblage, Forecarpathian Basin, Romania

The paleofloristic assemblage of Sarmatian (Volhynian-Lower Basarabian) deposits from Morilor Valley (south-western part of the Forecarpathian Basin) is characterized by specifically differentiated taxons belonging to mixed mesophytic forests of deciduous trees and shrubs (*Fagus, Quercus, Betula, Ulmus, Carpinus, Alnus, Acer, Populus, Salix, Robinia*), with herbaceous undercanopy layers (Pteridophyta, *Lygodium, Hydrangea, Rosa, Rhamnus, Berchemia*) and rich evergreen shrub layers with *Daphnogene, Laurophyllum*. In order to reconstruct the paleoenvironmental conditions in which the plant macroremains are preserved, seriated microfossil samples were taken. The fine-grained siltic clays with plant imprints are rich in tests of foraminifers. The foraminifera assemblage of the siltic clays include *Siphotextularia flexua*, *Siphotextularia inopinata*, *Neobulimina aculeata*, *Valvulineria complanata*, *Hanzawaia crassidentata*, *Globigerina quinquelobata*, *Lagnea bellissima* etc.

ORAL

The Maastrichtian macroflora of the Haţeg and Rusca Montana basins

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Keywords: macroflora, Maastrichtian, Haţeg Basin, Rusca Montană Basin

The Haţeg and Rusca Montană basins (South Carpathians, Romania) yielded a rich Maastrichtian flora recorded in several localities and studied since the beginning of the 20th century. The Maastrichtian flora of these basins is a typical compressive flora, having a coal generating character in the Rusca Montană Basin, and a clastic character in the Haţeg Basin. The degree of preservation of the plant material is rather poor, the fragments usually lacking cuticles and being represented mainly by impressions of leaves, stems and branches, although in Rusca Montană the degree of preservation is better than in the Haţeg area.

The first paleobotanical studies were published by Schafarzik (1906, 1907), Tuzson (1913, 1914) and Papp (1915), with isolated plant occurences also mentioned by Nopcsa (1905). These early records were followed by the works of Givulescu (1966, 1968), Mărgărit and Mărgărit (1967), Petrescu and Duşa (1970, 1980, 1982), Grigorescu (1983), and Pop and Petrescu (1983), respectively. Recently, mesofloral elements from Budurone were described by May Lindfors et al. (2010). The coals of the Rusca Montană Basin, along with their associated coal-generating flora, were studied by Biţoianu (1970), Duşa (1970, 1974), Duşa and Barila (1974). Based on these previous studies, plant occurrences in Rusca Montană include outcrops along the Cătămarului, Ciocanului, Ciotorogului, Ciotorogul Mic, Baia, Nocea, Rusca and Teiului valleys, while occurrences in Haţeg are restricted to a few sites at Densuş, Sânpetru, Sântămăria Orlea, Pui and Vălioara-Budurone.

The Rusca Montană and Haţeg Maastrichtian flora, as recorded by the previous authors, is represented by representatives of Filicales (Gleicheniaceae, Polypodiaceae, Hymenophyllaceae), Coniferales (Araucariaceae, Cupressaceae), Monocotyledonates (Pandanaceae) and Dicotyledonates (Fagaceae, Platanaceae, Sterculiaceae, Araliaceae, Celastraceae and Rhamnaceae). In both basins, the flora is dominated by angiosperms, while the conifers and the ferns are subordinated.

Impressions and compressions curated in Bucharest (University of Bucharest, Geological Museum) and Cluj-Napoca (Babeş-Bolyai University) were revised, together with new material collected from Rusca Montană and Haţeg, in order to update their macrofloral record. However, a series of problematic issues arose during the revision of the flora, mainly related to the absence of the type material figured in the majority of previous works, material not yet identified in these collections.

New results, based on former collections and on newly collected material, show diverse assemblages in the Rusca Montană Basin, with Gleicheniaceae (*Gleichenia* cf. *zippei*), Incertae sedis (*Cladophlebis* sp.), conifers incertae sedis (*Geinitzia* sp.), Pandanaceae (*Pandanites trinervis*, *Sabalites longirachis*) and various dicots (*Credneria* sp., ?*Aralia* sp., ?*Platanus* sp.). The revised flora of the Haţeg Basin includes mainly Pandanaceae (*Sabalites longirachis*) and various dicots. This work discusses the state of the previous collections, the nomenclatorial status of the previously published taxa, including the new taxa formerly described from both basins, and that of the taxa recorded from the newly collected material.

Acknowledgments

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POSTER

Miocene gastropods from the Borod Basin (Apuseni Mountains, Romania). Cerithioidea Superfamily

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Keywords: gastropods, Cerithioidea Superfamily, Borod Basin, Romania

The Neogene Borod Basin is situated in the western part of the Apuseni Mountains. Besides Zarand and Beius basins, it represents one of the eastern gulfs of the Pannonic Basin. In the eastern part of the basin the Borod Formation was recorded in borehole samples (Popa, 2000).

The associate mollusks fauna has been assigned to four assemblages: *Crassostrea*, *Granulolabium-Agapilia-Tympanotonos*, *Turritella-Anadara*, and *Alvania-Ringicula-Pyramidella* (Popa, in Popa & Chira, 2000 and Filipescu & Popa, 2002). Within these assemblages, the very well-preserved gastropods prevail.

In this paper eight genera of gastropods (*Bittium*, *Cerithium*, *Granulolabium*, *Gibborissoa*, *Melanopsis*, *Terebralia*, *Tympanotonos*, *Turritella*) are described. They belong to six families: Cerithiidae, Batillariidae, Dialidae, Melanopsidae, Potamididae, and Turritellidae, from the Cerithioidea Superfamily. The identified taxa show different ontogenetic stages. *Granulolabium* genus are the most frequent.

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ORAL

Mineralogical characterisation of clay mineral assemblages from the Maastrichtian continental deposits of Râul Mare valley, Haţeg Basin – Paleoenvironmental implications

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Keywords: clay minerals, X-ray powder diffraction, paleoenvironments, Haţeg Basin

Dinosaur-bearing Maastrichtian deposits are known in the western part and central parts of the Haţeg Basin, a small intermontane basin; these deposits are grouped into the Sânpetru and Densuş-Ciula formations, and formed within fluvial-dominated depositional systems. The present study focuses on the Maastrichtian continental deposits cropping out along the Râul Mare valley with an extensive and richly fossiliferous stratigraphic profile divided between three sites: Nălaţ – Vad, Toteşti and Unciuc (e.g., Codrea et al., 2002; Smith et al., 2002; Godefroit et al., 2009; Csiki et al., 2010), aiming to the determination of the mineralogical composition of the fine fraction. The purpose of this study is to use the clay minerals as paleoenvironmental markers, as these suffer no to insignificant chemical or mineralogical transformations during transport, deposition and burial and are thus prone to reflect conditions of the former depositional settings, as well as wider paleoclimatic or paleotectonic conditions prevailing in the time of deposition (e.g., Chamley, 1989).

A total of 18 samples were collected and analyzed (10 from Nălaţ-Vad, 3 from Toteşti and 5 from Unciuc), mainly from the major fine-grained lithotype of the section, dark grey micaceous silty mudstones; for the separation and analysis of the fine fraction, samples were subjected to chemical-physical treatments aiming the clay mineral identification using XRD diffraction. The treatments are standard for clay minerals identification (Rabenhorst & Wilding, 1984; Kunze & Dixon, 1986; Moore & Reynolds, 1997) and the diffractometer used was a PANalytical X'Pert PRO CuK_{α} (Bragg – Brentano geometry) equipend with X'Celerator detector in the folowing parameters: 2-120° scaning interval, 0.01° step size and step time 30'/step.

In all three local sections, clay mineral assemblages are dominated by smectites, with subordinated proportions of illite (with the exception of a few samples completely devoid of illite); these results largely agree with those of Van Itterbeeck et al. (2004), although a wider variability in composition is recorded. Some of the samples are neatly dominated by smectites, suggesting a major material source represented by volcanic ash, while in other samples smectites are associated with illite, and more rarely with chlorite and/or kaolinite. Levels yielding these later samples have a paleotectonic significance, probably corresponding to activation moments of different metamorphic source areas. On the other hand, variations in clay minaralogy also yield a paleoclimatic signal, suggesting deposition under short-term paleoclimatic fluctuations between slightly more arid and more humid periods, respectively, within a subtropical setting with alternating wet and dry seasons.

Our results suggest that deposition of the Râul Mare succession took place under a regime of dominant material supply from a volcanic source area with periodic increases in activity, supplemented by detritic material influx resulted from the erosion of a metamorphic hinterland. The major influence of volcanic activity on the sediment accumulation is reminiscent of the Densuş-Ciula Formation, the hallmark feature of which is represented by the occurrence of volcanoclastic material. Such a similarity either suggests a possible correlation between this formation and the Râul Mare deposits, or else calls for a reassessment of the classical two-fold lithostratigraphic unit scheme of the continental Maastrichtian from the Haţeg Basin.

Acknowledgments

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POSTER

Anisian (Middle Triassic) carbonate microfacies from Murighiol area, North Dobrogean Orogen

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Key words: Tulcea Unit, inner carbonate platform, carbonate microfacies, oncoids, algae, forams

The Triassic System of the Tulcea Unit, having herein the largest and most spectacular development in comparison with the other tectonic units of the North Dobrogean Orogen, includes lithostratigraphic units of differing facies which show complex lateral and vertical intergradings. These are grouped in several distinct major facies zones, showing gradual transitions from the shallow-water carbonate platform facies occurring in the easternmost part of Tulcea Unit, within the Murighiol area – including the interest area of the present study, towards the deeper water carbonate platform facies in the central part of Tulcea Unit, and further towards the basinal facies in the westernmost part of the same unit.

A 175 m thick section was sampled and measured in the Duna Hill, partially exposing the Anisian Murighiol Formation. The investigated carbonate deposits are generally grey thin-bedded limestones which alternate with thick-bedded limestones.

The present study aimed: (1) to separate the main carbonate microfacies occurring in the Murighiol area; to establish the specific depositional setting and (3) to define the diagenetic processes.

As methods, there were applied microfacies analysis on thin sections and polished samples, also fluorescence and cathodoluminescence investigations to identify the microstructures and diagenetic features. The chemical composition of micrites, cements or skeletal elements have been determined using a microXRF device (Horiba XGT 7000).

The main lithobiofacies types identified according to the frequence and abundance of certain non-skeletal grains and bioclasts are grainstone and wackestone facies.

The main lithobiofacies subtypes include: (1) oncoid bioclastic, peloidal grainstones, oncoidal grainstones partially dolomitised; (2) bioclastic wackestones with algae and benthic foraminifera, bioclastic wackestones with various biota, peloidal bioclastic wackestones with oncoids; (3) fine granular peloidal packstones, bioclastic packstones with oncoids and poorly sorted peloidal packstones, and (4) bioclastic wackstone/packstone and peloidal wackstone/packstone.

Biota includes algae, foraminifera, gastropods, ostracods, echinoderms, bivalves, calcimicrobes and various microbial structures. Algae and foraminifera assemblages prove the Pelsonian – Illyrian age for the carbonate rocks from the Murighiol area.

According to microfacies data, the depositional environment typifies an inner carbonate platform, in the Murighiol area occuring the shallowest Anisian Triassic carbonate facies of the Tulcea Unit.

Some diagenetic processes that affected the investigated carbonate rocks are selective and include pressure dissolution, cementation and dolomitisation. Taking into account the intensity of these processes, the burial depth can be estimated around 1000 m, as neomorphic recrystalization and ductile deformation under the influence of tectonic stress have not been observed.

ORAL

Oligocene and Lower Miocene planktonic foraminifera from Transsylvania

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Keywords: planktonic foraminifera, Oligocene, Lower Miocene, Transylvania

This paper is an attempt of an inventory of the planktonic foraminifera from the Oligocene and Lower Miocene deposits from the northern, north-western and southern Transylvania.

Some of the best sections are described, where the Oligocene Brebi Formation, Oligocene-Lower Miocene Vima Formation and the Lower Miocene Chechiș Formation were sampled. Some observations regarding the Lower Miocene from the Muntenia Subcarpathians (between Buzău Valley and Ialomița Valley) are also made.

POSTER

The microbiostratigraphy of the Upper Cretaceous deposits belonging to Macla Formation (Macla Nappe) from the Buzău Valley – Zabratau Valley – Bota Mare Valley area (Intorsura Buzăului zone)

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Keywords: flysch deposits, type deep water micropaleonthological association, microbiostratigraphy, new biozone

The paper presents the microbiostratigraphy, based on the agglutinated foraminifera, of the Upper Cretaceous deposits belonging to Macla Formation (Macla Nappe) from a area (Buzău valley – Zăbrătău valley – Bota Mare valley) situated close of the contact between this tectonic unit and Audia Nappe.

From lithological point of view, the Macla Formation deposits are developed under a typical shale – sandstone and sandstone – argillaceous flysch facies, consisting of an alternance of grey sandstones, curbicortical sandstones, siltites, grey shales, black shales, subordinated red shales and green shales.

The micropaleontological analysis emphasized an interesting "deep water" type micropaleontological association, exclusively made from agglutinated foraminifera.

The age of Macla Formation deposits from the study area, based on the determinated agglutinated foraminifera association, is Vraconian – Lower Turonian.

The microbiostratigraphy of the Upper Cretaceous deposits was made on the basis of the determinated foraminifera associations, as well as according to the agglutinated foraminifera-based biozonation proposed by Geroch and Nowak (1983) for the flysch deposits of the Polish Carpathians and by Neagu et al. (1992), for the flysch deposits from the Eastern Carpathians. For the general correlation with the planktonic foraminifera biozones the biozonation proposed by Caron (1985) was used.

Several biozones were indentified, with emphasize on the following ones: the *Haplophragmoides falcatosuturalis* zone (Vraconian-Lower Cenomanian), the *Bulbobaculites problematicus and Haplophragmoides falcatosuturalis* zone (Middle Cenomanian) - a new biozone defined for the first time in this paper –, and the *Bulbobaculites problematicus* zone (Upper Cenomanian – Lower Turonian).

ORAL

Sedimentary facies analysis of the *Cryptomactra* Formation (Moldavian Platform – Backbulge depozone)

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Keywords: ripple cross lamination, unidirectional flow, storm basal lags, inner shelf, shoreface

The foreland basin system of Eastern Carpathians during Miocene is a result of interplay between vertical and horizontal movements of crust, on one hand, and sedimentary processes controlled by peculiar climatic conditions (Grasu et al.2002). These controls are manifested on different temporal and spatial scales although sometimes they manifested coeval. From west to east, four depozones have been identified: wedge-top, foredeep depozone, forebulge and backbulge.The types of sediments in the backbulge depozone is generally fine because of the large distance from its principal source in the orogenic belt. Local accumulations of coarse-grained sediment may be on the flank of the uplifted forebulge area (DeCelles&Giles,1996).

The outcrops analysed are from Vlădeni – Alexandru cel bun and from Vlădiceni Quarry (Iasi County). Based on our detailed sedimentological study, a number of characteristic sedimentary packages have been distinguished, referred to as lithofacies associations. For an easier reference in the text, the associations have been given letter codes (following Nemec 1995). Mixed symbols are introduced (e.g.SF for silty sand) to make the textural descriptions moreaccurate. Were established a total of 6 lithofacies types, 9 architectural elements (table 1), and 5 facies associations.

Facies Codes	Lithofacies	Sedimentary Structures	Interpretation
SFpp	Veryfine sand	Parallel stratification (PP)	Traction current, upper flow regime – plane bed
SFla	Very fine sand	Low Angle Cross Stratification (LACS)	Upper flow regime, plane bed
SFt	Medium sand	Through cross stratification (TCS)	High-energy, unidirectional traction sedimentation
***SF*ra**	Very fine sand	Asymmetrical ripple cross lamintaion (RCL)	Oscillatory flow , lower flow regime
SFrs	Very fine sand	Symmetrical ripple cross lamination RCL	Unidirectional flow, lower flow energy
Ssf	Silty sand	Flame structures	Soft sediment deformation structures – water escape structure
SFc	Fine sand	Convolute lamination	
Ml	Mudstone	Orizontal lamination	Suspension settling, periodic sedimentation
SCb	Coarse bioclastic sand	Storm basal lags	Storm deposits – high energy

Table 1 Sedimentary facies identified in the *Cryptomactra* Formation

The recognition of architectural elements, their characteristics, and relationship permit us to understand depositional settings and the probable processes that may have influenced the development of the marine systems. The architectural elements are defined on the basis of sets of large-scale stratal characteristics or by groups of genetically related strata sets, grain sizes, constituent lithofacies, and vertical and lateral relationships of each element. This architectural elements have been interpreted in terms of sedimentary environments, parts of depositional systems, according to criteria and models proposed by Allen (1982,1985), Collinson&Thompson (1993), Miclăuş (2006). The interpretation of the facies associations revealed a shallow water depositional system (< 200m) from the upper shore-face tot the inner shelf.

Acknowledgments

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ORAL

The Cretaceous Audia Formation from the Eastern Carpathians, Romania: palaeosedimentary environments

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Keywords: black shales, abyssal plain, Early Cretaceous, anoxic palaeoenvironment, Romanian Carpathians

Introduction

This paper is focussed on the investigation of the Audia Formation (formerly described as ' the Black Shale Series') that crops out in the Eastern Carpathians, having as main goal the identification of palaeoenvironmental setting. Hypothesis concerning the genesis of the identified lithofacies in the Audia Formation are also advanced herein.

Methodology

The studied area is situated in the central part of the Eastern Carpathians. There, successions of the Audia Formation (Tarcău Nappe) exposed in the Largu anticline, have been investigated. Several sections were detailed logged and sampled. The collected samples were analysed from micropalaeontological (calcareous nannofossil), petrographical and geochemical points of view,

Results

The exposed Audia Formation (at around 120 m thick) is composed of three members (Fig. 1): (1) The Lower Member is composed of black shales and siderites, with thin intercalations of sands. The age of this unit is Barremian (interval that is covered the calcareous nannoplankton zone NC5). (2) The Middle Member contains mainly black shales, and subordinately grey shales and thin sandstones and siliceous nodules. The age of this unit is Late Barremian-Early Albian (interval covered by the calcareous nannoplankton zones NC6-NC8 – lower part). (3) The Upper Member is predominantly composed of sandstones, withy thin intercalations of black and grey shales. The age of this unit is Albian *pro parte* (interval covered y the calcareous nannoplankton zones NC8 – upper part, NC9 and NC10 – lower part). The Upper Member of the Audia Formation is followed by the variegated (red and green) shales of the Lupchianu Formation. The calcareous nannoplankton analysis performed by us indicated that the base of Lupchianu Formation is placed towards the top of the NC10 calcareous nannoplankton zone, being latest Albian age.

Based on sedimentological, petrographical and geochemical criteria, we have separated in the studied deposits 3 distinct litofacies, including 12 sublithofacies that also enclosed the transition from one lithofacies to another. The *siliciclastic lithofacies* is composed of sublithic sandstones, lithic sandstones, lithic graywackes, quartzous graywackes, sandstones and graywackes with glauconite, as well as graywackes with carbonates. The *muddy lithofacies* is made by black shales, grey shales and carbonate shales. The *carbonate lithofacies* contains marls, siderites, limestones (biosparites) with terigenous material as well as siliceous spicules and nodules.

Conclusions

The Late Albian interval is mainly characterised by the *sandstone lithofacies* of the Upper Member (Audia Formation). Such lithofacies is related to high-density turbidite flow, which took place in the domain of sandy lobes. By contrast, the lithofacies of Lower and Middle members, as described above, suggest as palaeosedimentary environment low density turbidite flow, leading to the accumulation from turbidite, pelagic and hemipelagic suspensions in the domain of marginal turbidite lobs and basinal plain. We consider that the source of the detritic material of Audia Formation exposed in the Outer Moldavides (i.e., the Tarcău Nappe) is mainly the East-European Platform. The quartzous material was concentrated and reworked in the coastal domain, than resedimented in the deep-sea palaeoenvironment. During the Aptian, the high carbonate and siliceous productivity from the shelf domain led to the accumulation of a biogenic detritus, reworked in the deep-sea palaeoenvironment, which substituted, in several intervals, the siliciclastic deposition. The glauconite of the sandstones could be regarded as authigenic, being intrabasinal resedimented. Concerning the black shales of the Audia Formation, these are mainly composed of a clayey and siltic material and yielded an average TOC of 0.50%. The black shale is the results of the organic matter accumulation and of iron pigment (i.e, hydrotroilite) and manganese as well. The preservation of the organic matter is due to the anoxic palaeoenvironment of the Moldavian Trough, where our studied area is located, being related to the restricted circulation in the basin and water stratification. The marls, siderites and siliceous nodules were formed in the early diagenesis.

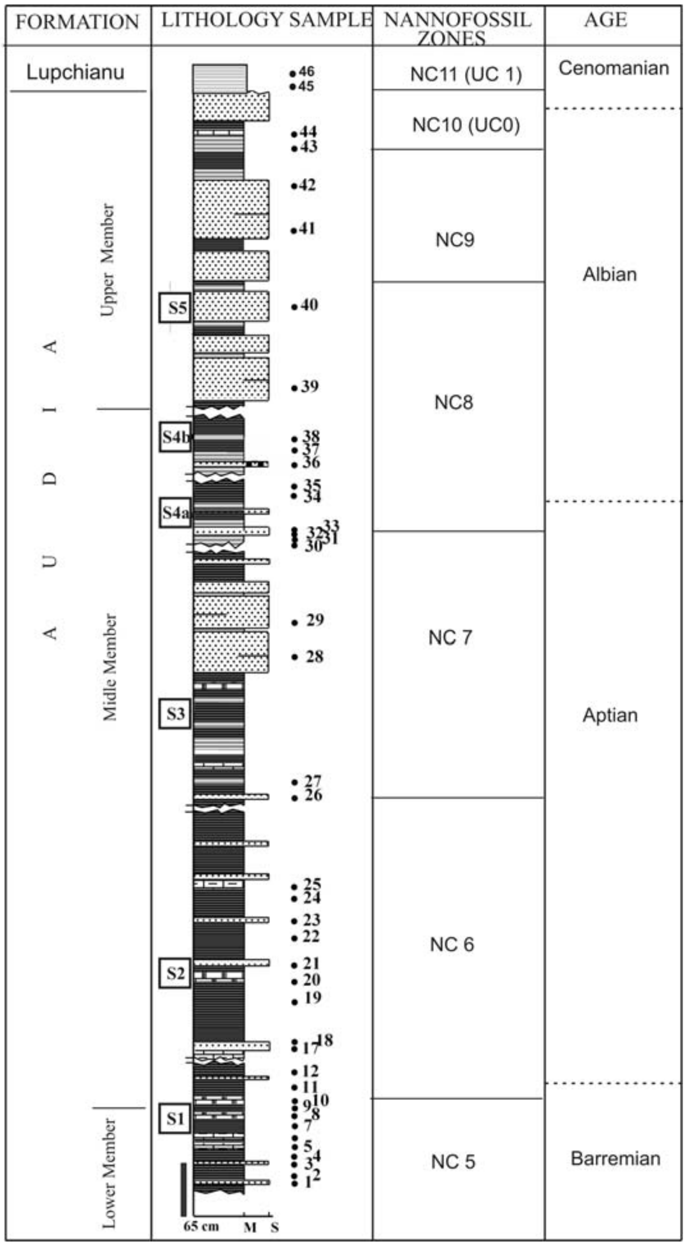

Fig. 1 Composite log of studied area from Audia Formation: litho- and biostratigraphy. S1 to S5 are the sections measured.

POSTER

Towards a Messinian ecostratigraphy: the Algerian example

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Keywords: Messinian Salinity Crisis, carbonate platforms, marine populations, Upper Miocene, Mediterranean

The refinement of biostratigraphic, magnetostratigraphic, tephrochronologic cyclostratigraphic data has helped to focus temporally different events, some dramatic, which marked the history of the Messinian. The models proposed to explain various aspects of the famous Messinian Salinity Crisis can now be discussed in terms of a much better constrained stratigraphic framework that time of the liveliest controversies. However, a number of these data can not be directly used, particularly for littoral facies, when the exposures concern only a part of the Messinian stratigraphic information or are obliterated by post-deposition deformation. The case of large blocks of Messinian deposits dislocated and displaced observed recently in the northern margin of the basin Chelif (Dahra Mountains) is very representative in this regard. In these circumstances it is probably legitimate to complement or confront the stratigraphic data evoked above with various ecostratigraphic indicators. The carbonate platforms abundantly represented on the margins of the Mediterranean Messinian thus present an ideal opportunity to use such ecostratigraphic criteria.

The Messinian is characterized by numerous paleoceanographic phenomena revealed by the changes and the evolution of marine populations. In this context, if the Messinian microfauna and microflora have been fairly well studied, few works has been devoted to the evolution of macrofauna populations of Mediterranean seafloors. To date, no comprehensive global inventory of these populations has been conducted in order to follow step by step the changes in their structure and composition. Yet variations in the composition of coastal flora and fauna are very sensitive both before the start of the crisis, estimated at around -5.96 Ma, during the crisis marked by widespread evaporitic deposits, the "lago mare" environment and the lowering of the Mediterranean sea level.

Many biological events or developments thus seem well identifiable in the Messinian sedimentation and could be placed in a general stratigraphic framework:
- *Heterostegina* accumulations;
- Presence of cold-water index taxa in diatom populations;
- Changes in the composition of benthic foraminifera;
- Changes in the composition of the fauna of corals build-ups;
- Architecture of coral *Porites* build-ups;
- Disappearance of hermatypic corals;
- *Halimeda* "bloom";
- Temporary suspension of some megafauna;
- Distribution of gastropod biodiversity;
- Temporary exclusion of terebratulid brachiopods;
- Temporary exclusion of clypeastreidae;
- Distribution of bryozoan assemblages;
- Coral-stromatolite association or replacement;
- Development of structures associated with stromatolites and thrombolites;
- Development of brackish fauna characteristics of facies lago-mare…

In the case of blocks of Messinian sediments from the northern edge of the basin Chelif mentioned above, several of these events have been identified. They suggest the existence of platform systems with evolution and paleontological facies quite similar to those conventionally represented across the Mediterranean at the same time.

Nevertheless, "blooms", appearances and disappearances in the Mediterranean during the Messinian biota may be only due in part to the absence of "windows" to observe certain biofacies. Therefore, exploration work on the field and consolidating palaeontological information have to be considered in order to provide a reliable ecostratigraphic tool particularly well suited to the Messinian events.

ORAL

Microorganisms from Santonian amber of Southern France

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Keywords: Bacteria, Fungi, micro-organisms, Amber, Santonian, SE France

Amber is known as an excellent medium that preserves various organisms bringing to our knowledge instants of life from fossil record. Insects, arthropods, vertebrates and plants remains were subject of particular attention concretized by a huge number of papers devoted to them (review in Perrichot, 2005). Micro-organisms in amber were less studied, in spite of their discovery during the nineteenth century.

Fossil micro-organisms trapped in amber are mentioned from Carboniferous to recent deposits over the world. In France, various fossil micro-organisms (bacteria, fungi, algae, diatoms) were found mainly in Late Albian and Early Cenomanian amber from the Charente region, but also from Sarthe and Dordogne departments.

Our study documents for the first time paleobiological inclusions in the Late Cretaceous (Santonian) amber from Martigues (SE France). The presence of "succinite" at Martigues was mentioned since 19th century, by Vasseur (1894). For a very long time, Martigues amber was forgotten and only recently rediscovered by Guiliano et al. (2006) and Onoratini et al. (2009) who focused their study on chemical analysis (FTIR spectroscopy).

We revisited this outcrop in order to investigate amber occurrences from a micropaleontological point of view. The sediments containing amber outcrop on the margin of the "Etang de Berre", southeast of the Martigues town. The Santonian dated by rudist fauna (*Hippurites socialis* Douvillé1890, *Radiolites squamosus* d'Orbigny 1842, *Hippuritella toucasiana* d'Orbigny 1850) is represented by 100 m of limestone displaying some intercalations of grey marls some of them bearing amber. Amber pieces may be presented as drop shaped-stalactite like and also as composite nodules.

The study of amber pieces was realised both on petrographic thin sections, polished sections and slides under optical microscope (Zeiss Axioscope 40) and confocal laser scanning microscopy (CLSM) using 40, 60 and 100 (oil immersion Zeiss) magnifications and under scanning electron microscope (SEM).

The microscopic study revealed microinclusions that present a filamentous character. They were assigned to bacteria and fungi. We observed sheathed filaments with a diameter of 4-6 µm resembling to *Leptotrichites resinatus* Schmidt 2005 recognised in many Cretaceous amber from Europe. Filaments of about 0,5-1 µm are assigned to actinomycetes (Fig. 1). Twisted ribbon like filaments of about 1,5 µm in width are attribute to unidentified bacteria. Mycelium with branched and septate hyphae of 3 µm diameter was assigned to *Cladosporioid* fungus. Translucent slightly flexuous filaments of 1,7- 2 µm in diameter may be ascomycetes.

This study revealed that the distribution of the filaments is related to the type of amber. Translucent red drops and stalactite mainly contain colonizer filaments with centripetal growth. Milky-opaque nodules contain a dense network of filaments that entirely colonised amber (fungi and actinomycetes). Some amber pieces (mostly red translucent but also milky opaque nodules) present a thin white cortex formed by filaments. Considering a sum of characteristic (such as a centripetal growth, the absence of an orientation of the filaments in the resin flow), most of the filamentous organisms found in Martigues amber seem to have grown in and/or on the fresh resin before its solidification. Their preservation in amber of Martigues reveals a new and totally unknown fossil resinicolous micro-world.

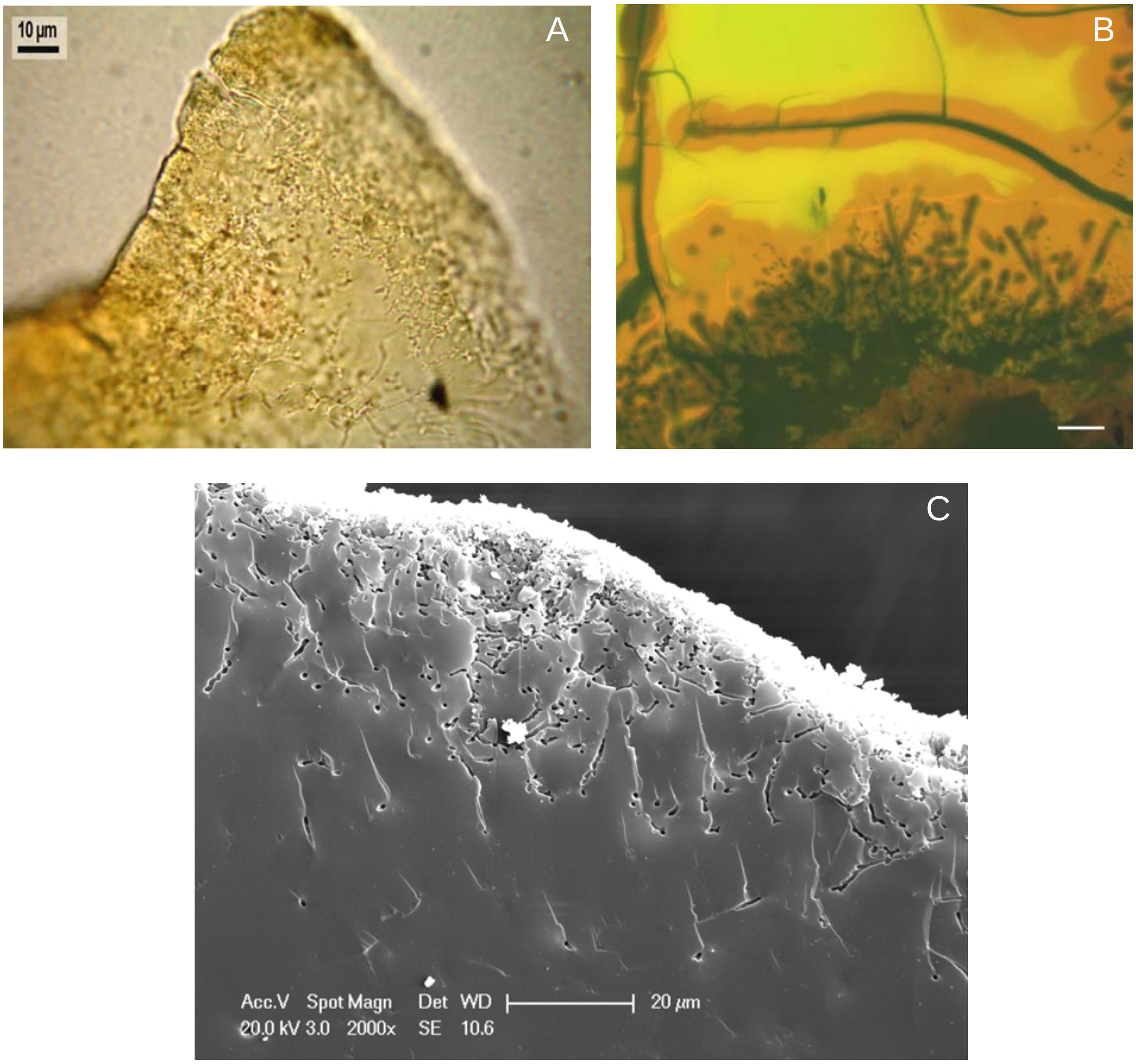

Figure 1 : Various images of the same actinomycete mycelium in Martigues amber. A. Light microscope; B. Confocal laser scanning microscope; C. Scanning electron microscope.

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ORAL

Preliminary interpretation of the Cabo section, Sierra de Prada, south Central Pyrénnées, NE Spain

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Keywords: Lower Cretaceous, Barremian-Aptian, Planktonic Foraminifers, microfacies

The Cabó section is a sedimentary sequence of the Organyá Basin, located in northeastern Spain, southeast central Catalan Pyrénnées, near Coll de Nargo. The studied section is on the southern flank of the Sierra de Prada, which includes the Prada Formation and the Cabó Marls that extend from the Barremian to the Lower Aptian. Several sedimentary basins exposed in the northern part of the Iberian Peninsula developed mainly during an Aptian to early Albian phase during which Iberia rifted and rotated counterclockwise away from Europe, leading to the opening of the Bay of Biscay, concomitant with the opening of the Atlantic Ocean (Carey, 1958; Bullard et al., 1965). In the Organyá basin, extension was followed by strong subsidence associated with the development and accumulation of carbonate platforms, and deeper-water hemipelagic sediments (Berástegui et al. 1990).

At the field scale the Cabó sedimentary succession is composed of alternating beds (15 - 220 cm thick) of limestones and marls, Medium gray (N 5) to very dark gray, and Black (N 1), showing no conspicuous primary structures. The beds vary from well consolidated to partly shaly, enhanced by partial weathering. Of the 33 meters studied, rare identifiable ammonites (*Deshayesites cf. luppovi)* occur at scattered intervals: 5.6m, 10.5m, 19.5m, and 30m, respectively.

Standard petrographic study in thin sections reveals weak bioturbation throughout. Typically, microfacies of the studied sequence are characterized by a matrix of fine dark carbonate mud with less than 20% allochems, which comprise fine fragments of echinoids and planktonic Roveacrinids (plates and spicules), ostracods, diversified benthic foraminifers, and ammonites. Planktonic foraminifers are consistently present throughout, including *Globuligerina hoterivica* and *Hedbergella sigali*. *Globigerinelloides blowi* occurs (FAD) at about 4.5 meters from the lower part of the studied section. The fine matrix also yielded different species of Dinoflagellates, which appear to be the main contributor of the carbonate particles in the sediment. Relative presence of allochems decreases from 5 to 14 meters, but the overall components remain the same.

Preliminary geochemical analyses of TOC have provided values ranging from 0.1 to 0.3 %, whereas stable carbon isotope ratios indicate values from -25.1 to -23.4.

Our preliminary results of the Cabó section thus suggest that the studied sequence may include the Latest Barremian to the Earliest Aptian, based on the occurrence of the planktonic foraminifers. The presence of *Deshayesites cf. luppovi* related to the lowest Ammonite *Deshayesites oglanlensis Zone* (Reboulet et al., 2006) corroborates the Early Aptian age of the lower part of the sequence.

Although temporal fluctuations in components indicate oscillations in environmental conditions, however the presence of weak bioturbation and epibenthic organisms indicates that bottom conditions were sufficiently oxygenated within that time interval to support benthic communities.

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POSTER

Fluvial systems – meandering rivers: a case study from Nălaţ-Vad area (Haţeg Basin, Romania)

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Keywords: continental deposits, fluvial channels, meandering system, Haţeg Basin, Maastrictian

The Maastrichtian continental deposits of the Haţeg Basin were first interpreted as lacustrine (at most fluvio-lacustrine) in origin (Nopcsa, 1905), and subsequently these deposits were often simply referred to as "fluvio-lacustrine". Neverthless, no arguments were put forth by Nopcsa or other researches to substantiate this claim. More recently, Grigorescu (1983) suggested the dominance of fluvial as well as the presence of deltaic depositional settings, while Grigorescu & Anastasiu (1990) considered that these continental deposits accumulated within a fluvial system dominated by braided rivers and alluvial fans. More recently, Van Itterbeeck et al. (2004) just noted the presence of both braided and meandering river deposits at Nălaţ-Vad, while Therrien (2005) on his turn mentioned the same in the so-called "Red Continental Strata" at Vurpăr (i.e. Şard Formation, Metaliferi sedimentary area; Codrea and Dica, 2005).

The lower section of the Râul Mare river, near Nălaţ-Vad, offers one of the most interesting outcrops of the Maastrichtian continental deposits (Smith et al., 2002), where the beds dip steeply and strike almost parallel to the river course. Accordingly, both the three-dimensional development of the individual bodies, and their spatial relationships are easily observed. A detailed sedimentological survey of these deposits suggests that they were laid down in a meandering river system, a depositional setting previously poorly documented in the Maastrichtian of the Haţeg area.

Based on the geometry of the coarser-grained, sandstone beds, both ribbon-like and sheet-like sandstone bodies can be recognized in the Nălaţ-Vad area. *Ribbon-like sandstone bodies* expose deposits (CH) formed in channels with a width/depth ratio of less than 15 (Friend et al., 1979). They can be divided into simple ribbons and complex ribbons. Generally, channel fills consist of yellow, moderately sorted, medium to coarse-grained sandstone with pebbly sand in their basal parts. These channel deposits have a distinctly erosional base, scouring and cutting into thick floodplain deposits containing pedogenic carbonate units. The upper boundary of the ribbon-like channel fills is gradational. The thickness of the channel fills usually varies between 1.5 and 4 meters. The basal part of the channel successions consists of an interval of poorly organized intraformational clasts and coarse sandstones, sometimes with markers of primary sedimentary structures, such as low-angle cross–bedding. A distinct fining-upward tendency can be observed, as these coarse basal deposits grade into planar cross–bedded, medium to coarse sands (lithofacies Sp), followed by horizontally laminated sands (lithofacies Sh).

Simple ribbons are interpreted as resulting from deposition in low–sinuosity channels with a fixed channel position, as well as in intermediate-sinuosity channels with some lateral accretion. Complex ribbons are the results of unstable and laterally shifting channels producing laterally stacked channel fills through successive erosion of the former channel fills.

Sheet-like sandstone bodies are sediment bodies with a laterally extensive or blanket-like geometry and a width/depth ratio of more than 15, according to Friend et al. (1979). Such sheet-like channel fills might have practically imperceptible margins in the field, with a slope of a few degrees only (Miall, 1985). These sheet sandstones are bounded in their basal part by a generally flat to slightly concave-upward surface, showing locally cut-and-fill relief and basal lags. The basal, coarse sandstones with low-angle cross–bedding are followed by sandstones showing abundant internal planar-tabular cross-bedding. The surfaces between the planar-tabular cross-bedding sets (lithofacies Sp) are cross-cutting erosion surfaces and truncate the underlying cross-bedding at a low angle.

These sheet sandstones represent lateral-accretion deposits, covered by the floodplain sequence (FF element). Low–angle lateral accretion surfaces are present, providing additional evidence for the high-sinuosity character of the channels. The laterally accreted bodies represent point bars of meandering streams (Miall, 1985, 1996).

Besides the yellow coloured sands, thinner bodies of fine-grained silver grey sands also occur within the outcrops. These sands appear as laterally continuous sheets that are locally incised into the underlying sediments. Often the incision stops along the more indurated calcrete horizons. The thickness of these deposits varies between 10 cm and 1m. Their tops often show finger-like burrows, infilled with sediments similar to those of the overlying beds. These deposits are interpreted as *crevasse channels and splays (CS)*, based on their limited lateral extent and their association with the channel deposits.

Dark coloured, mica-rich (mostly silty) mudstones make up the largest part of the outcrop. Inside these fines, calcrete-bearing palaeosols can be observed as being marked by white nodular layers. These deposits are interpreted as *overbank fines (FF) and palaeosols (P).*

These meandering river deposits are occurring to the middle and top of the Nălaţ-Vad succession, evidencing the complexity of the fluvial environments in the Maastrichtian of the Haţeg Basin.

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POSTER

On the presence of the genus *Pseudopolyconites* Milovanović in the Upper Cretaceous deposits from Northern Apuseni Mountains: biostratigraphic and biogeographic significance

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Keywords: Pseudopolyconites rudist bivalves, biostratigraphy, paleobiogeography, Upper Cretaceous, Apuseni Mountains

The rudist genus *Pseudopolyconites* has been established by Milovanović (1934) from Upper Cretaceous mixed siliciclastic-carbonate-volcanoclastic deposits in eastern Serbia (Bačevica). The numerous species of this genus cover a stratigraphic range between the Early Santonian-Late Maastrichtian and show a biogeographical distribution within the Mediterranean province (E Serbia, W Slovenia, Croatia, S Italy, Bulgaria, NE Italy, N Turkey). From the Upper Cretaceous rudist-bearing deposits that occur in the Northern Apuseni Mountains (Romania), only two holotype species belonging to this genera: *Pseudopolyconites hirsutus (= Duranddelgaia hirsuta)* PATRULIUS (1974) and *Pseudopolyconites milovanovici* LUPU (1975) are currently known. The holotype and paratypes of these specimens are actually housed in the National Geological Museum in Bucharest.

Patrulius (1974) has described the new genus *Duranddelgaia* (type species: *D. hirsuta)* from Early Santonian deposits from Dealul Măgura (Roşia basin, Northern Apuseni Mountains). This genus was later transferred to the genus *Pseudopolyconites* as *P. hirsutus* by Pejović & Sladić-Trifunović (1977). According to these authors, *P. hirsutus* represents "an older Senonian form" of genus *Pseudopolyconites.* Similar specimens have been found in Santonian-Early Campanian giant olistoliths from eastern Serbia (Lesak). Roşia basin (Northern Apuseni Mountains) and Lesak (Serbia) are the only two regions in which ancestral forms of the genus *Pseudopolyconites* were found (Pejović & Sladić-Trifunović, 1977; Sladić-Trifunović, 1998). Unfortunately, the original examples of *P. hirsutus* from Lesak (Serbia) seem to have vanished while at present the Serbian locality is unreachable (Tunis et al., 2011). The biostratigraphic significance of *Pseudopolyconites hirsutus* PATRULIUS consisted in its status as the Early Santonian "parental form" (Pejović & Sladić-Trifunović, 1977) and its potential to clarify the phylogenetic relationships of this genus.

Pseudopolyconites milovanovici has been described by LUPU (1975) from Early Maastrichtian mixed siliciclastic-carbonate-volcanoclastic deposits from Leşului Valley-Remeţi. Lupu (1976) and Ianovici et al., (1976) mentioned from the same occurrence a specimen of *Pseudopolyconites* aff. *orientalis* MILOVANOVIĆ. In fact, it seems to be the same specimen of *Pseudopolyconites* previously described as *P. milovanovici* LUPU. From the shell of this specimen a micropaleontological association with *Globotruncana elevata* (Brotzen), *Planoglobulina acervulinoides* (Egger), *Pseudotextularia elegans* (Rzehak) and *Ventilabella* sp. (Lupu, 1975, 1976; Ianovici et al., 1976) is mentioned. This association also suggests the presence of the Early Maastrichtian in the top of the stratigraphic section from Leşului Valley-Remeţi.

Due to its similarities concerning the composition of the rudist assemblages and the sedimentary evolution, the Upper Cretaceous rudist-bearing deposits from the Apuseni Mountains was correlated with coeval sediments within the Lower Gosau Subgroup (sensu Wagreich & Faupl, 1994). After a detailed reinvestigation of the rudist assemblages, it has been noticed that the rudist taxa typical for the Eastern Alps appear at different levels associated with taxa proceeding from the Mediterranean biopaleogeographic area (Lupu, 2002; Săsăran et al., 2010; Săsăran & Özer, 2011). The presence of *Pseudopolyconites hirsutus* as well as of species of *Miseia* genus in the Early Santonian rudist-bearing deposits from Roşia basin reveals some new paleogeographical insights. It seems that the Northern Apuseni Mountains were connected with the two above-mentioned biogeographic provinces starting with the Early Santonian and not with the Campanian-Early Maastrichtian interval, as previously thought (Lupu, 2002; Săsăran et al., 2010; Săsăran & Özer, 2011). The connection with the central and eastern subprovinces of the Mediterranean Tethys becomes more evident during the Campanian-Early Maastrichtian by an increasing number of the endemic genera (*Miseia, Gorjanovicia, Favus, Joufia, Colveraia, Pseudopolyconites,* and *Pironaea)* in the rudist-bearing deposits from the Northern Apuseni Mountains.

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POSTER

Sedimentary facies and depositional environment of the Bozeş Formation (Southeastern Apuseni Mts.)

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Keywords: sedimentology, ichnofossils, Bouma sequence, turbidites, Upper Cretaceous

As part of the Alps-Carpathians-Dinarides chain, Apuseni Mts. were formed during the Upper Cretaceous convergence and collision of the Tisia and Dacia microplates. The suture between these former plates is preserved within the newly created block and crops out in the south and southeast of the Apuseni Mts. Accordingly, the Upper Cretaceous syn-orogenic sediments hold significant clues in understanding the formation of the Apuseni orogen and the geodynamic evolution within the area.

Situated in the southeastern Apuseni Mts., Bozeş Formation (Ghiţulescu & Socolescu, 1941; Bleahu et al., 1981) represents such an important Upper Cretaceous unit. This deep marine sedimentary deposit (Săndulescu, 1994), consisting of 3000m-thick, turbidite-type sedimentary rocks, was targeted for a sedimentological study in order to constrain its sedimentary facies and depositional environment. For this purpose, more than 40 large outcrops (several meters wide) from seven valleys were investigated.

The studied exposures are in general characterized by interbedded centimetre to decimetre thick clays/siltstones and decimetre thick fine to medium grained sandstones. The clays/siltstones are usually horizontally laminated, and have non erosive bases. These, somewhat rhythmic alternations are sometimes interrupted by decimetre to meter thick coarse grained, massive sandstone bodies, rarely with scoured base, load structures or groove casts. Rip-up clasts are extremely rare throughout the sections.

The sandstones were interpreted as $T_{b(c)}$ low-density turbidites, whilst the clays/siltstones as $T_{d(e)}$ Bouma-type sequences. They may refer to a median/distal deep-water fan lobe(s).

The different lithological entities are barren in bioclasts or microfossils; however a few ichnofossils (*Ophiomorpha* sp.) have been recorded at the base of the sandstones. These ichnofossils were regarded to the *Nereites* ichnofacies, which is characteristic for the lower bathyal and abyssal marine regions (see Uchman, 2007).

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ORAL

Albian ostracods from the Moesian Platform (Romania)

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Keywords: Ostracods, Albian, Moesian Platform

This paper presents, for the first time, Albian ostracod assemblages from Romania. The micropaleontological material have been collected from a few hidrogeological boreholes located in the the south-eastern part of Moesian Platform (Călărași-Bala area). In this area, the Lower Albian deposits have been intercepted directly under the Quaternary cover and are represented by so-called Chiciu Sandstone (Muțiu, 2004) with marly intercalations, very rich in both foraminifers and ostracods. The first study of the Albian planktonic foraminifers from the same deposits have be done by Th. Neagu (2005).

The main ostracod species identified in the marly intercalations of the Chiciu Sandstone are represented by marine taxa: *Cytherella ovata* (Roemer), *Cytherelloidea ovata* Weber, *Schuleridea jonesiana* (Bosquet), *Eucythere trigonalis* (Jones & Hinde), *Cythereis (Cythereis) hirsuta* Damotte & Grosdidier, Protocythere *(Protocythere) albae* Damotte & Grosdidier, *Protocythere (Protocythere) derooi* Oertli, *Protocythere* sp., *Neocythere vanveenae* Mertens and *Paracypris wrothamensis* Kaye. All these ostracod species are described in systematic order and illustrated using SEM pictures.

The ostracod assemblage from the investigated samples supports the Lower Albian age for this interval and can be correlated with the **Protocythere nodigera Zone** separated in the Lower Albian of the British Islands and, partly, with the Upper part of the Lower Albian – **Subzone A** - from Paris Basin, as well as with the first two Albian ammonite zones: the **Leymeriella tardefurcata Zone** and the **Douvilleiceras mammilatum Zone**.

The ostracod fauna suggests shallow marine water conditions. In the same time a mixture of ostracods with Boreal and Tethyan affinities can be observed, proving the presence of connectivedness between the two paleobiogeographic domains at the time of deposition.

This paper represents the first attempt to investigate the Albian ostracod from Romania, and more research on this topic is needed.

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ORAL

Paleoenvironmental changes along the Oligocene – Miocene transition in Gura Vitioarei section (Prahova District, Romania), based on foraminifera assemblages

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Keywords: Tarcău Nappe, Teleajen Valley, Pucioasa-Fusaru lithofacies, Lower Miocene, paleoecology

Investigations near Gura Vitioarei (30 km of Ploiești, on the Teleajen Valley) focused on the Oligocene – Miocene transition in the Tarcău Nappe (Eastern Carpathians «flysch zone» - Săndulescu et al, 1995). We focused on the foraminifera assemblages recovered from the claystones of the Pucioasa-Fusaru lithofacies around the Vinețisu Tuff (considered as a landmark for the Oligocene – Miocene boundary).

In order to a better understanding on the evolution and paleoecological significance of the studied assemblages, the outcrop was sedimentologically described. 45 samples collected from silty clays and bituminous shales where processed and analyzed according to standard micropaleontological methods.

Several distinct foraminifera assemblages were identified:

1. **Agglutinated assemblage:** *Glomospira charoides* (Jones & Parker, 1860), *Ammosphaeroidina pseudopauciloculata* (Mjatliuk, 1966), *Haplophragmoides horridus* (Grzybowski, 1901), *Recurvoides anormis* Mjatliuk, 1970, *Reticulophragmium acutidorsatum* (Hantken, 1868), *Nothia excelsa* (Grzybowski, 1898), *Ammodiscus* sp. which are diagnostic for the deep-water turbiditic settings.

2. **Calcareous benthic assemblage:** *Ammonia beccarii* (Linnaeus 1758), *Elphidium rugosum* (d'Orbigny 1846), *Cicibicidoides ungerianus* (d'Orbigny, 1846), *Pyrgo simplex* (d'Orbigny, 1839), *Lenticulina gibba* (d'Orbigny, 1826) which is typical for shelf settings.

3. **Planktonic assemblage:** *Globigerina bulloides* d'Orbigny, 1826, *Globorotalia siakensis* Le Roy, 1939, *Orbulina bilobata* d'Orbigny, 1846, *Globorotalia praemenardii* Cushman & Stainforth 1945, *Globoquadrina* sp., *Globigerina* sp., *Globigerinatheca* sp., *Catapsydrax* sp. Amongst the identified species *Globigerina ciperoensis* Bolli, 1954 points toward an Oligocene/Early Miocene age (Rögl, 1994); while *Globorotalia* cf. *bykovae* Aisenstat 1960 and *Orbulina suturalis* Brönnimann, 1951 indicate that the sedimentation continued until the Middle Miocene.

The presence of *Sphenolithus belemnos* (NN3) and *Helicosphaera ampliaperta* (NN4) in the calcareous nannoplankton assemblage support a Lower Miocene age.

The alternation of the benthic foraminifera assemblages and local abundance of planktonic species point out paleoenvironmental changes from a deep-water basin to a shallow water environment, as parts of several sea-level fluctuations.

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POSTER

Holocene variability in the range distribution and abundance of *Quercus* in Romania

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Keywords: *Quercus*, tree establishment, distribution, climate, pollen maps, Holocene, Romania

This study examines fourteen fossil pollen datasets from Romania and aims to investigate the temporal and spatial variability in the range distribution and abundance of *Quercus* during the Holocene. This is essential for understanding its current status in the forests of Eastern Europe, the conditions under which it arose, and the timing and processes responsible for its variability. Results from the maps and graphics reveal some specific spatial and temporal changes in the proportion of *Quercus* across elevations and regions of Romania throughout the Holocene.

At the end of Younger Dryas and early Holocene (before 11,000 yr BP), *Quercus* was only present in scattered, low pollen percentages, signifying either a local presence, or that it was approaching its range limits at this time. The initial expansion of *Quercus* occurred synchronously at most sites between 11,000-10,600 yr BP, followed by a widespread expansion between 10,200-9500 yr BP. However, sites from eastern Romania show a late initial expansion as compared to the other sites from Romania, and this time lag could indicate the migration time needed from western sites, or this later expansion was incorrectly shown by the chronology. Elevation was an important factor in determining the past distributions of *Quercus*; lower elevation sites showed a higher proportion of trees, similar to the present day altitudinal distribution within Romania. *Q. robur, Q. cerris, Q frainetto, Q pedunculiflora, Q pubescens* are currently common on dry sunny slopes from forest steppe zone (>300m) up to 500-600 m in the colline zone, whereas *Q. petraea* grows at elevations up to 700 m (Toader and Dumitru, 2004).

Results indicate that the expansion of *Quercus* occurred 600-1000 years after that of *Ulmus*, the earliest temperate deciduous forest constituent (Feurdean et al., 2007a). Most of the palaeoecological records examined in this study suggest that, if present on the Late Glacial landscapes of the Romanian Carpathians, *Quercus* had been restricted to limited, small populations in isolated locations (Fărcaş et al., 1999; Tanţău et al., 2006, 2009; Feurdean et al., 2007a,b). *Quercus* is a long-lived species (commonly ca. 300-600 years), with slow recruitment and reproductive maturity, which requires a minimum sum of growing degree-days (GDDs) of 1100 and a minimum temperature of the coldest month of -9.0^{0}C. By comparison, *Ulmus*, the earliest temperate taxon to expand in Romania, needs 850 GDDs and a winter temperature of -9.5^{0}C (Miller et al., 2008). The marked expansion of *Quercus* at around 10,200 yr BP took place when there was a slight decrease in summer insolation and an increased winter insolation (Berger and Loutre, 1991), implying that although summer temperatures decreased, winter temperature and length of growing-season have increased (Kutzbach and Webb, 1993). Given that *Quercus* has slow life history traits and needs longer growing season length than other early Holocene species.

Results from this synthesis indicate large amplitude in the variability of *Quercus* percentages within and between sites during the Holocene, and that *Quercus* is the only continental deciduous tree species which has been able to maintain its abundance till present. Although a good temporal correlation is difficult, some intervals of a decline in *Quercus* abundance are concurrent at several sites, recorded approximately between 9400-9000; 8400-7500, 6000-5500, around 2500 yr BP, and 1400-1200 yr BP. These periods match a number of cool and dry short-term events recorded locally or worldwide (Tămaş et al., 2005; Wanner et al., 2008). The period of lowest *Quercus* abundance recorded between

8400 and 7800 is visible at all our sites and coincides with the coldest and driest spell of the Holocene (8.2 event). Conversely, intervals of high *Quercus* abundance are recorded between 10,000-9500, 9000-8500, 7200-6500, 4800-4200, 3400-3000, 2800-2400 and 1200-700 yr BP). These intervals could possibly be concurrent with warmer, drier periods recorded around 10,000; 8750; 5000; 3500, 2400, and 1100-700 yr BP (Andresen et al., 2005). Since, other periods of low/high *Quercus* abundance between sites were poorly correlated, this indicate that factors driving fluctuations in local population size were also site-specific i.e., local disturbance regimes, microclimate, and human impact. Interestingly, *Quercus* experienced much larger abundances in the majority of the sites from the eastern Carpathians than in north-western sites situated at similar elevation. Indeed, the *Quercus* genera include several species (particularly *Q. robur*), which are resistant to warm and dry conditions, with frequent droughts and cold winters. Presently, it is common for *Q. robur* to forms forest in eastern and southern Romania, regions that are characterized by more continental and seasonal climate conditions than the rest of the country (Toader and Dumitru, 2004). Thus, the higher *Quercus* abundance at these eastern sites may have been favored by the prevalence of drier climatic conditions.

The long-term persistence of *Quercus* during the Holocene has been observed in other central and western European forests and here it is suggested that its persistence from 6500 yr BP to present was related to human activities resulting in the opening up the primeval forests and its greater resilience to anthropogenically-induced fires. Another fact, which could partly explain the continuous presence of persistence of *Quercus* in the forest of Romania over the last 11,000 years, is a lack of strong competitors. The expansion of mid Holocene (*Corylus avellana*) and late Holocene (*Carpinus betulus, Fagus sylvatica* and *Abies alba*) forest tree species has mostly taken place in the colline to mountain belt, and therefore their main habitat did not significantly overlap with that of *Quercus*, a taxa typical for the lowlands and the colline zone.

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ORAL

Trans-border (north-east Serbia/north-west Bulgaria) correlation of the Jurassic lithostratigraphic units

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Keywords: Jurassic correlation, East Getic, Infra-Getic, Moesian Platform

It is well known that the rock strata –sedimentary, igneous and metamorphic are organized in lithostratigraphic units, based on the macroscopically discernable lithologic properties or combination of lithologic proporties and its stratigraphic relations. Often these units crossed the state borders. In the geological practice it is a general “rule” that on the geological maps, the lithostratigraphic units from the two sides of the border are different and had different names. It is the same case with the Jurassic lithostratigraphic units from the two sides of the Serbian/Bulgarian state border – they are reaching only the border and do not cross it. Our aim is to make correlation of the Jurassic lithostratigraphic units from the two sides of the state border. For the start of the correlation we are making the inventory of the existed in the Bulgarian and Serbian literature lithostratigraphic units (Tchoumatchenco et al., 2006, 2008) – names, lithology, biostrtigraphy, age – by paleogeographical units – Thracian Massif (Serbo-Macedonian massif), Supra-Getic, Getic (western and eastern Getic), Infra-Getic and Moesian platform. With the present paper we make the final trans-border correlation of the Jurassic units (Formations, Members) from nort-east Serbia and north-west Bulgaria. The next step will be, after an analyze of all existed and newly collected data, to replace the later names of the lithostratigraphic Formations and Members by the earlier existed names, other consideration being equal – following in general, the principle of the reasonable priority. By these way of critic studies will be satisfied the exigencies of the Stratigraphical Guide (A. Salvador, ed. 1994, p. 31) to diminish the number of the names of the lithostratigraphic units.

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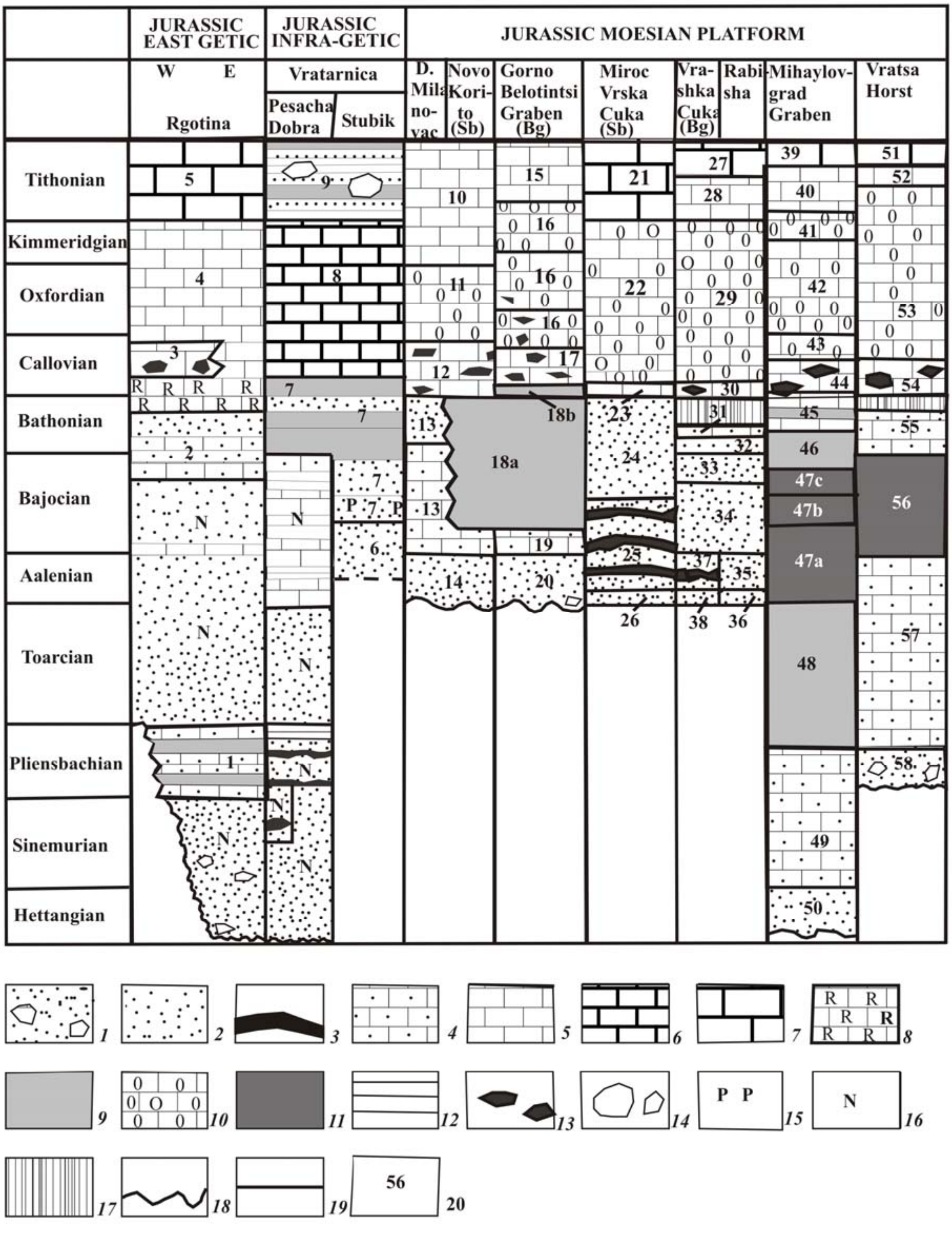

Fig. 1. Trans-border (north-east Serbia/north-west Bulgaria) correlation of the Jurassic lithostratigraphic units

Lithology: 1 – conglomerates and sandstones; 2 – sandstones; 3 – coal; 4 – sandy and bioclastics limestones; 5 – limestones; 6 – thin bedded limestones; 7 – tick bedded limestones; 8 – redish limestones; 9 – clayey limestones; 10 – nodular and/or lithoclastic limestones; 11 – marls; 12 – argillites; 13 – black shales; 14 – clays; 15 – silex nodules; 16 – olistolites; 17 – black shales with "Posidonia"; 18 – non nominated beds; 19 – sub-marines lack of sedimentation; 20 – transgressive boundary. *Lithostratigraphy*: (1) – (58) – nominated lithostratigraphic units (explanation in the text).

ORAL

The Life cycle of *Entzia* (Foraminifera) in the salt marsh at Turda, Romania

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Keywords: monitoring, number of chambers, megalospheric, microspheric, halophyte, Transylvania

Turda is located in the NW of Romania, near Cluj-Napoca. In this area, a brine spring is located near the Turda salt mine, which is associated with salt deposits of Miocene age. In our study area, there exists a small salt marsh containing vegetation of halophyte species. The only place that we have found a living *Entzia* population is now in danger due to human activity. For this reason, we are undertaking a study of the habitat and life cycle of *Enzia* in its only known locality.

The locality in Deva where the *Entzia tetrastomella* Daday, 1884 was first found unfortunately no longer exists. We checked for the existence of *Entzia* in several parts of Transylvania, but the only place where this foraminifer was positively identified was in the Turda salt marsh.

The Turda location is visited on monthly intervals to collect samples. *Entzia* lives near the soil surface among the plants roots. Two samples are routinely collected each time: one for *Entzia* (to monitor the population) and one for other parameters (humidity, conductibility, salinity, ph, temperature). The sample for *Entzia* is stored in 40% Alcohol (Vodka) and Rose Bengal for one day to distinguish the dead and living specimens. After this day, the specimens are picked for further analyses. We are monitoring the size, population, the diameter (number of chambers), of the living and dead specimens, in order to understand the life cycle of the taxon. Variations in the size and shape, and in the number of chambers, were already observed from one month to another.

During October, November and December, we noted that the specimens are decreasing in diameter (on average), while from December to January the specimens are increasing in diameter again, so it is possible that between December and January reproduction occurs; the same phenomenon was also observed regarding the number of chambers. The highest number of living specimens have been observed in January.

We will continue to monitor the locality in Turda throughout the year, and by measuring the diameter of the proloculus, we hope to resolve megalospheric and microspheric generations.

POSTER

Miocene gastropod fauna (Turridae) from Bahna Basin (Southern Carpathians) Romania

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Keywords: gastropods, taxonomy, paleoecology

From the Miocene deposits of Bahna Basin are presented 14 turrid species. The specimens belong to three collections (Macovei - 1909, Stancu - 1961 and Tiţă - 2009), that are stored in the paleontological collections of the National Geological Museum - Geological Institute of Romania.

Fourteen specimens of *Perrona* (*P.*) *descendens* Hilb. was collected from Bahna Formation (Egerian) by Macovei and Stancu. Other 13 species were collected by the three authors, from Early Badenian Curchia Formation (Leitha limestone facies): *Gemmula coronata* (Münst.), *Gemmula annae* Hoern. et Auing., *Gemmula subcoronata* (Münst.), *Gemmula annae mathildae* Hoern. et Auing., *Gemmula* (*G.*) *badensis* Hoern et Auing.), *Pleurotoma trifasciata* Hoern., *Clavus* (*Drillia*) *spinescens* Partsch., *Bathytoma cataphracta* Broc., *Raphytoma harpula* Bell., *Crassispira obeliscus* (Desm.), *Cochlespira subterebralis* Bell., *Mangelia sandberi* Partsch., *Microdrillia crispata* De Cristofori et Jan.

The aim of this paper is the review of turride species from the two old collections (Macovei and Stancu), the identification of turride species from the author collection and also the description and illustration of the specimens. It also presents paleoecological features of these species.

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ORAL

Continental vertebrates from the Upper Cretaceous of Provence (SE France): A review of the local biodiversity and biostratigraphy

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Keywords: Dinosaurs, polymorphism, Aix-en-Provence Basin, Campano-Maastrichtian

The Late Cretaceous paleontological record of Provence is one of the most important in Europe, coming from several distinct synclines. Among them, the Aix-en-Provence Basin (Bouches-du-Rhône and Var) is the richest in localities and its continental deposits have been famous since the 19th century for their fluvio-lacustrine series rich in vertebrate remains (dinosaurs, crocodiles, turtles, pterosaurs, mammals, fishes). Except for the Fox-Amphoux syncline (Var), other fossiliferous areas remain poorly known. Several studies on the localities of Provence have led to a better understanding of their faunal assemblages (Matheron, 1869; Lapparent, 1947; Broin *et al*., 1980; Buffetaut, 1989 ; Buffetaut and Le Loeuff, 1991; Buffetaut *et al*., 1991, 1997; Allain and Pereda Suberbiola, 2003). However, these assemblages were considered as a single group, generally dated as Campano-Maastrichtian, comparable to those from the other coeval fossiliferous regions of France (Aude, Hérault) and Europe (Spain, Romania). The studies of particular taxa discovered since the 1980s have included neither stratigraphic correlations with other sites nor a precise repositioning in the general stratigraphy of the concerned area (Buffetaut *et al* ., 1986, 1988 ; Le Loeuff *et al* ., 1989, 1992 ; Le Loeuff and Buffetaut, 1991; Le Loeuff, 1993; Buffetaut et al., 1995; Vasse, 1995; Cavin *et al*., 1996; Le Loeuff and Buffetaut, 1998; Garcia *et al* ., 1999, 2000; Allain and Taquet, 2000; Buffetaut *et al*., 2000, 2006; Buffetaut, 2008; Martin and Buffetaut, 2008; Chanthasit and Buffetaut, 2009; Garcia *et al*., 2010). It mainly was a result of the fragmentary character of the specimens discovered, and of the scarcity of useful biostratigraphic data. Indeed, only a few localities were studied with some precision (Garcia et al., 1999, 2000, 2010; Tabuce et al., 2004) but never with the purpose of stratigraphic correlation on the scale of the Aix-en-Provence Basin or on a wider scale.

Excavations conducted by the Museum of Natural History of Aix-en-Provence over the last fifteen years, have provided a large quantity of vertebrate remains from a dozen localities in Provence. This study presents, for the first time, all the sites discovered in Provence (with faunal lists) and an attempt at positioning them within the Upper Cretaceous. The use of all available dating techniques, such as magnetostratigraphy, geological data (drillings, fluvial sedimentology) and biomarkers (fossil eggshells, charophytes, ostracods, gastropods) allows a biostratigraphic accuracy never reached previously, in the general context of the Provence area.

The comparison between the different faunas discovered in Provence reveals a marked diversity for some taxa (titanosaurs, crocodiles) which was suggested on a European scale but never for a limited geographical area. Ongoing studies on isolated titanosaur bones reveal clear anatomical variations (in the teeth, vertebrae and limb bones) from one site to another, depending on their geographical position in Provence. The same approach is being applied to the remains of the common ornithopod, *Rhabdodon* and should show whether the degree of polymorphism in this taxon is the same as in titanosaurs. *In fine,* dinosaur remains could serve as a new biostratigraphic tool in order to correlate local sites and other Campano-Maastrichtian localities in Southern France and Europe.

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POSTER

Palynology and palynofacies of Gura Şoimului Formation from Bistriţa-Râşca Half-window

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Keywords: Burdigalian, palynomorphs, palaeoenvironment, palaeoclimate

The Gura Şoimului Formation, characterized by a pelitic-arenitic facies with features of flysch, was separated and described by Stoica (1953). It marks the beginning of the aerobic sedimentation, following the bitumolite accumulation during the Upper Oligocene.

This formation is found in all half-windows of Vrancea Nappe, under that name, except being in Vrancea Half-window where is known as the "Goru Mişina Formation" (Săndulescu et al., 1962).

The area of sampling the analyzed rocks in this paper is between Suha Valley to the north and Tazlăul Sărat Valley in south (Bistriţa-Râşca Half-window).

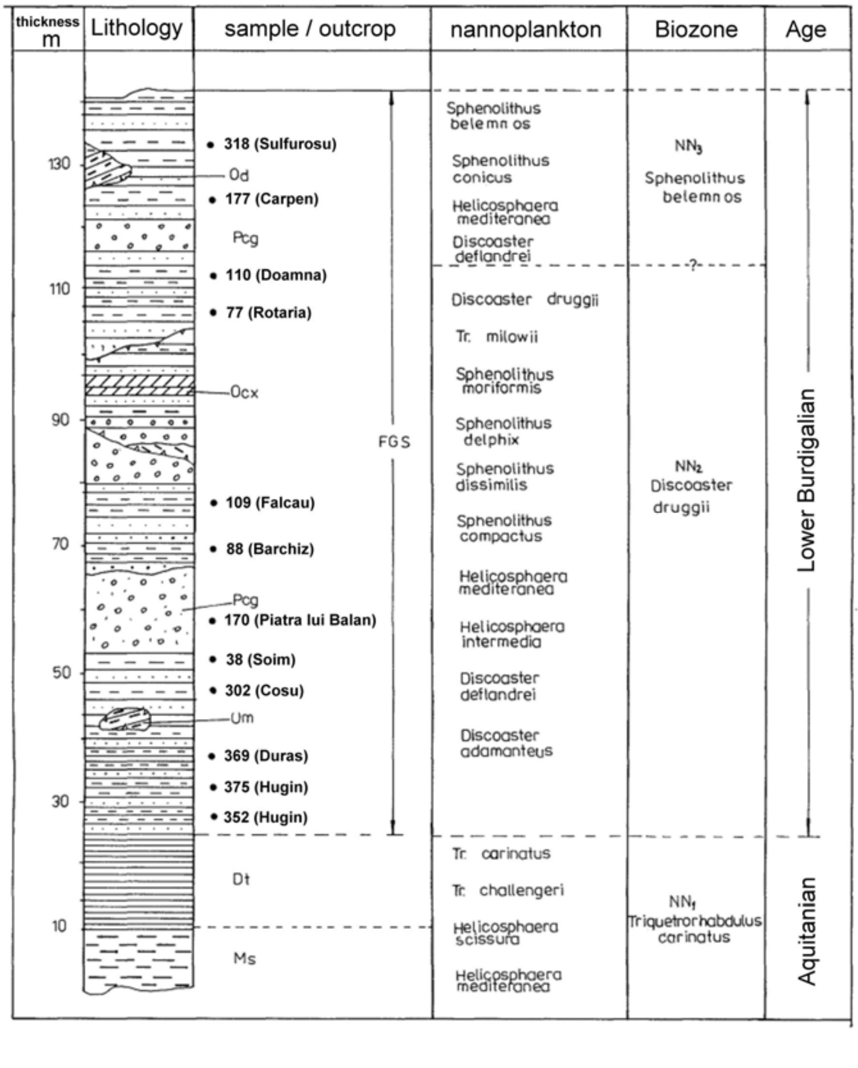

Fig. 1.
Lithostratigraphical column of the deposits of Gura Şoimului Formation: Ms- Upper menilites; Dt - Upper dysodilic shale; FGS - Gura Şoimului Formation (Pcg - paraconglomerates, Om - olistolith of menilites, Od - olistolith of dysodilic shale; Ocx - olistolith with different type of rocks).

Calcareous nannoplankton identified in Gura Şoimului Formation shows that the lower limit of this formation belongs to the lower part of NN2 Biozone (Fig. 1). The middle part of this formation corresponding to NN2 Biozone and upper part belong at the end of NN2 Biozone and possibly the lower part of NN3 Biozone. This interpretation is consistent with the data of Dicea & Dicea (1980) and Ionesi & Mészáros (1995). The NN2 Biozone and the beginning of NN3 Biozone correspond the interval Early Burdigalian – the beginning of Upper Burdigalian.

Palynological and palynofacial analysis achieved from the Gura Şoimului Formation revealed the following conclusions:

- palynomorphs identified belonging aquatic and terrestrial environment. Their presence indicates a inner-outer neritic setting of the sedimentary basin, where lived taxa such as *Homotryblium* and *Operculodinium*. Swamp area is argumented by the presence of ferns (*Polypodiaceae, Osmunda*), gymnosperms (*Taxodium* and *Sequoia*) and angiosperms (*Myrica*). Riparian assemblage is well represented by *Engelhardia* genus and mixed mesophytic forest was populated by taxa such as *Quercus* div. sp., *Betula*, *Carya*.

- climatic parameters (calculated after "Coexistece approach" method) during the sedimentation of this formation are following: Mean Annual Temperature 15,6 – 21,7°C; Mean Annual Precipitations 823 – 1520 mm; Mean Temperature of the Coldest Month 5 – 14,8°C şi Mean Temperature of the Warmest Month 24,7 – 28,2°C.

- palynofacies analysis showed 95-98% to continental phytoclasts from total of kerogene extracted from the rock. This type of palynofacies, abundant in organic particles with continental origin, indicating an environment of estuary, delta or lagoon.

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ORAL

New data on the phylloceratid fauna of the Praşca Klippe (Early Jurassic, Rarău Syncline, Eastern Carpathians, Romania)

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Keywords: *Phylloceratidae, Juraphyllitidae*, Sinemurian, Transylvanian Nappes

General framework

Uhlig (1900) discovered the klippe of Praşca Peak emphasizing the profusion of the ammonites, the age, and the similitude with the Adnet limestone. Therewith, Uhlig described five new species, including one phylloceratid, *Rhacophyllites* (= *Juraphyllites*) *bucovinicus.* Trauth (1906), Popescu and Patrulius (1964), Turculeţ (1965, 1971), Turculeţ et al. (2002) etc. improved the paleontological data during the different stages of research. The up-side down position of the klippe within the wildflisch, the presence of the interval ranging from the *Arnioceras semicostatum* (YOUNG and BIRD, 1828) to the *Echioceras raricostatum* (ZIETEN, 1831) zones, and the documentation of the big sized ammonites were the latest data added.

The klippe occurs in the Cretaceous Wildflysch of the Rarău Syncline, several kilometers south-west of Câmpulung Moldovenesc (Suceava County) and it belongs to the Transylvanian Nappes *sensu* Săndulescu, 1984. It is built in the "ammonitico rosso facies": red nodular limestones, massive limestones and marls.

Praşca Klippe – depiction of the Order *Phylloceratida* ARKELL, 1950

As generally in the Early Jurassic, two families of the *Phylloceratina* Suborder can be encountered in the deposits of the klippe: *Phylloceratidae* ZITTEL, 1884 and *Juraphyllitidae* ARKELL, 1950.

The <u>*Phylloceratidae*</u> were recorded by both its subfamilies, *Phylloceratinae* ZITTEL 1884 and *Calliphylloceratinae* SPATH 1924. The first subfamily was documented starting from the uncovered basis of the klippe, respectively the *Arnioceras semicostatum* Zone, the genera *Zetoceras, Geyeroceras* and *Phylloceras* being especially common. It should be noted that several authors considered only *Phylloceras* as a valid genus, the other taxa being regarded as its subgenera (e. g. Hyatt, 1900 – *fide* Fantini Sestini, 1969 – proposed *Geyeroceras* as subgenus). In the *Echioceras raricostatum* Zone – the last zone of the Sinemurian -, *Calliphylloceratinae* is represented by different species of the genera *Partschiceras* and *Calliphylloceras*.

Firstly, *Zetoceras* should be mentioned due to the occurrence of several big fragments of the shell cast (*Z. pseudo-oenotrium* KOVÁCZ, 1942), and *Geyeroceras* by the abundance of the small specimens of *Geyeroceras cylindricum* (SOWERBY, 1831); also, few individuals of the rare *G. persanense* (HERBICH, 1878) were also noted. *Phylloceras* is present, with *P. frondosum-hebertinum* (REYNÈS, 1868) since the basal zone. The most frequent genus of this family is *Partschiceras,* represented mainly by the species *Partschiceras tenuistriatum* (MENEGHINI, 1868) and *P. striatocostatum* (MENEGHINI, 1853).

<u>*Juraphyllitidae*</u> is characterized by a well developed umbilicus, smooth or with a scarce sculpture only on the body chambers, sometimes by few constrictions, and a simple suture line. *Juraphyllites, Paradasyceras,* and *Harpophylloceras* were documented with certainty, the presence of a few other genera being doubtfully supposed. *Juraphyllites* is a genus with a moderate frequency in the *Arnioceras semicostatum* Zone, and only with rare specimens in the last one. Several first mentions of different taxa should be pointed out for this area, including those of *Juraphyllites diopsis* (GEMMELLARO, 1884), *J. dorsoplanatus* **(**FUCINI, 1901), *J.* (or *Togaticeras*) *stella* (SOWERBY,

1833) and *Juraphyllites libertus* (GEMMELLARO, 1884); the last species is known mainly from Pleinsbachian strata, but here it appears in the *Echioceras raricostaum* Zone.

Also *Juraphyllites bucovinicus* (UHLIG, 1900) requires a special emphasis having the holotype described from the studied klippe; it is a rare species, only a few records of it being encountered in the available literature - Gugenberger (1936), Kovácz (1942), and Meister et al., (2011). Several topotypes of *J. bucovinicus* have been collected in the last years.

Paradasyceras is the most frequently occuring genus of this suborder, being noted especially in the last zone mainly through the presence of *Paradasyceras planispira* (REYNÈS, 1868). *Harpophylloceras eximius* (v. HAUER, 1854) was noted only based on a fragment (Turculeţ and Ţibuleac (2002). Also, it has to be noted that several authors (e. g. Fantini Sestini, 1974; Schweigert, 2005) considered the genera *Meneghiniceras, Harpophylloceras* and *Juraphyllites* as synonyms, *Meneghiniceras* having the priority.

Importance of the phylloceratid fauna from the Praşca Klippe

Above all, the various taxa and the proportional frequency of the phylloceratids sustain once again the affiliation of the klippe at the Mediterranean Paleoprovince of Europe during the Early Jurassic. Moreover, the different *Phylloceratidae* and *Juraphyllitidae* species were encountered together in the same strata, the last family being more abundant in specimens.

Donovan (1967) documented a diachronic phenomenon for the phylloceratids (and also lytoceratids), several genera appearing earlier in Eastern Europe. The first appearance of few taxa in the Praşca Klippe sustains and further details this event: *Phylloceras* was recorded throughout *P. frondosum–hebertinum* since the *Euagassiceras sauzeanum/resupinatum* Subzone (*Arnioceras semicostatum* Zone). The records of *Juraphyllites libertus* in the uppermost part of *Echioceras raricostatum* Zone also should be noted.

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ORAL

Benefits of multidisciplinary collaboration to Palaeontology; some examples from the Spanish IGCP

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Keywords: Vendian, Ordovician, Devonian, K/T extinction

The International Geoscience Programme (IGCP) represents an example of international and multidisciplinary scientific cooperation between the IUGS and the UNESCO that permits direct interaction between junior and senior scientists from developed and developing countries. The IGCP is within the UNESCO's Ecological and Earth Sciences Division, which focuses its main actions into five larger themes. One of them is "The Global Change and Evolution of Life: evidence from the geological record". Main goal of this "theme" is to advance in the understanding of climate change and the evolution of life from geological records.

The Spanish National IGCP Committee has been very active in this particular theme; accordingly, the purpose of this report is to show the contribution of the Spanish National Committee to the global augmentation in knowledge by explaining in detail the activities and results of five selected Spanish Working Groups (SWG), which are devoted to the Proterozoic (IGCP 493), the Palaeozoic (IGCP 499 and 503) and the Mesozoic-Cenozoic Boundary (IGCP 522 and 555).

IGCP 493 ("The rise and fall of the Vendian Biota") was mainly focussed on the precise timing of the sudden increase in biodiversity that took place about 600 million years ago and on the effects that changing environments, climates, global chemistry and palaeogeography had on the development and diversification of animals that ended with the Ediacaran/Vendian faunas.

IGCP 493-SWG has participated in the international meetings and has organized national symposia. The main research activities have been focused on: (1) taxonomic studies on skeletal microfossils from the Vendian of Spain (mainly aimed at increasing knowledge of global biodiversity) and (2) refinement of the Spanish biozonation scheme around the Proterozoic/Phanerozoic transition that can support and stimulate international debate on the future proposals regarding the global chronostratigraphy and geochronology of the interval.

IGCP 499 ("Devonian land-sea interaction: Evolution of Ecosystems and Climate in the Devonian") evaluated the interactions between the marine and continental domains and was focused on detailed and multidisciplinary studies of different facies parameters on distinct palaeogeographic contexts. The reconstruction of the Devonian global picture was improved by means of international cooperation in several case studies.

IGCP 499-SWG has actively participated in most of the international meetings and has organized each year a national symposium within the frame of the Spanish Palaeontological Society. The SWG has intensively surveyed the palaeontological and geological record of key peri-gondwanan regions; some of the more relevant contributions are: (1) the establishment in the Pyrenees of a main stratigraphical framework for the Devonian; (2) a high-resolution biostratigraphic scale for selected intervals in five regions; (3) studies of reefal development in some intervals and regions; (4) assessment of migration patterns for certain fossils (mainly brachiopods); and (5) palaeogeographic studies.

IGCP 503 ("Ordovician Palaeogeography and Palaeoclimate") aimed at obtaining a better understanding of environmental changes and their effect on Ordovician and Early Silurian biodiversity patterns. Special attention was devoted to the late Ordovician extinction and early Silurian radiation.

IGCP 503-SWG has been very active, participating in most of the international and national meetings and has organized an international IGCP 503 Symposium. The main results of the SWG include: (1) appraisal of the sedimentological and palaeontological changes during the Hirnantian (late Ordovician) in Spain, Portugal and Morocco; (2) evaluation of Ordovician biodiversity and palaeoclimatology in the Gondwana Realm; and (3) detailed studies on the Cambrian/Ordovician transition.

The focal points of IGCP 522 and 555 ("Rapid Environmental/Climate Change in the Cretaceous Greenhouse world") were the multidisciplinary characterization of rapid climatic changes and the Cretaceous/Tertiary extinction (K/T), and the analysis of the possible causes of this extinction.

IGCP 522 and 555-SWG have participated in numerous national and international meetings. Special attention was paid to the study of the boundary in SE Spain, Agost and Caravaca, two of the relevant Spanish localities for characterizing this mass extinction. Main results of the SWG can be summarized in three key points: (1) refined biological and geochemical characterization of the K/T; (2) discussion about causations of this extinction, specially the hypothesis of an extraterrestrial impact; and (3) description of the effects of such impact and the consequences for life.

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ORAL

The first report of continental fossil remains from Crăguiş (Haţeg Basin, Romania), and their stratigraphical significance

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Keywords: Haţeg, lithostratigraphy, Maastrichtian, microvertebrates

The continental fluvial deposits cropping out just west of Crăguiş have yielded no fossils in more than a century of geological and palaeontological research in the Haţeg Basin (see Grigorescu, 2010, for a review). The absence of any fossil remains made the stratigraphical assignment of these deposits difficult. Although they appear to cover the fossiliferous Maastrichtian deposits cropping out further west, at Livezi and Tuştea, the deposits from Crăguiş could not have been positively assigned to either the Cretaceous, or the Paleogene, being termed by Laufer (1925) as "problematic Paleogene".

Grigorescu & Anastasiu (1990) described the succession of red ortho-rudites and silty mudstones from Crăguiş as belonging to a distinct, upper member of the Densuş-Ciula Formation, characterized by being devoid of vertebrate remains and volcanic clasts, but found no definitive arguments neither for a Cretaceous, nor a Paleogene age of these deposits. The recent discovery of Maastrichtian microvertebrates and dinosaur eggshell fragments in the proximity of the nearby village of General Berthelot (Vasile et al., 2011), in floodplain deposits previously assigned to the same lithostratigraphical subunit as those from Crăguiş, hinted at the possibility that microvertebrate remains could eventually be found in the fine-grained levels from this latter area as well.

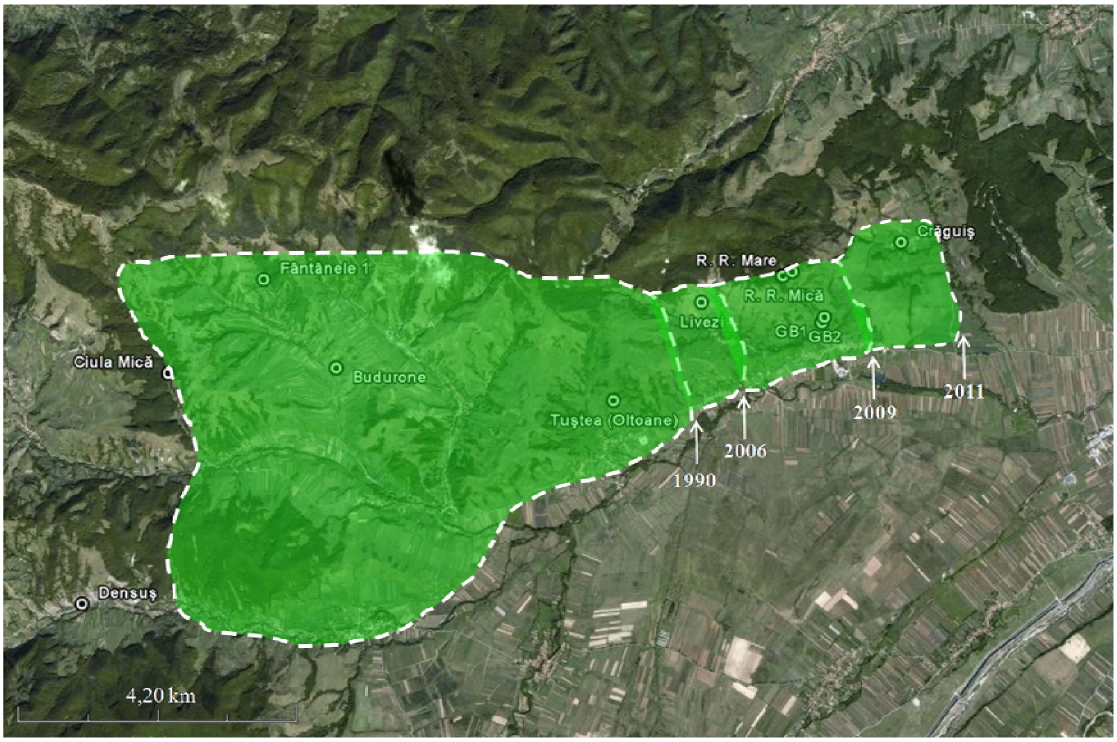

Figure 1. Progressive reassessment of the outcropping area of the Maastrichtian deposits assigned to the Densuş-Ciula Formation, due to the discovery of vertebrate fossil remains at Livezi in 2006 (Grigorescu & Csiki, 2008), at General Berthelot in 2009 (Vasile et al., 2011), and at Crăguiş in 2011 (present study). (Base image from Google Earth)

The screen-washing of approximately 200 kg of red mudstones from the alluvial sedimentary succession cropping out west of Crăguiş led to the discovery of a diverse microvertebrate assemblage, including fishes, anurans, albanerpetontids, lizards, snakes, crocodylians, theropods and ankylosaurs, as well as dinosaur and lizard eggshell fragments. The taxa identified from this new microvertebrate assemblage represent common occurrences in the most important fossil localities from the "middle member" of the Densuş-Ciula Formation, thus supporting the Maastrichtian age of the continental deposits from Crăguiş, as well. The good state of preservation of fragile fossil structures, such as the eggshell fragments, dismisses the probability of fossil reworking from some underlying Maastrichtian deposits into newer, Paleogene, sediments.

The presence of unreworked and definitively Late Cretaceous vertebrate remains within the fluvial deposits from Crăguiş (Fig. 1) calls for the redefinition of the "upper member" of the Densuş-Ciula Formation, now proved to be fossiliferous, and of certainly Maastrichtian age, or else for a different subdivision of the entire lithostratigraphic unit, possibly entailing the definition of a new, more comprehensive, subunit (i.e. member) that would include (and replace) the former "middle" and "upper" members.

Acknowledgments

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POSTER

The Miocene Petrified Forest of Limnos, Greece

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Keywords: Miocene, Aegean terranes, Mediterranean Flora, petrified wood, palaeoclimate

The paper presents the palaeoxylotomical study of a material coming from Aegean, from the central-southern part of Limnos Island, from around Moudros gulf, where an Early Miocene volcano-sedimentary formation occurs (Innocenti et al, 1994; Voudouris et al, 2007). The first paleoxylotomical identifications showed the presence of petrified remnants of tropical plants and a new taxon attributed to the form genus *Pinoxylon* KNOWLTON emend. READ, (*Pinoxylon parenchymatosum* SÜSS & VELITZELOS, 1993), recently renamed *Lesbosoxylon* (Süss & Velitzelos, 2010) and structures of *Palmoxylon* type but also leaves of *Phoenix* found in Antissa area (Limnos) and other leaves and silicified woods within tuffitic layers near Moudros. The studied material was collected from a volcano-sedimentary formation, especially from Romanou Unit in the area of the villages of Thanos, Kondias, Portianou, Lihna, Varos, Romanou, Rousopouli and Moudros. It is represented by fragments of petrified trunks. This kind of fossil imposes an adequate methodology of preparation and study named paleoxylotomy. It implies realization of oriented thin sections of petrographic type followed by their microscopic study in transmitted light, for their scientific description, and capture of images of specific taxonomic details, followed by the comparative study with similar structures published in the specialty literature. The results of the complex palaeoxylotomical study are materialized in the following species identifications which are the fossil equivalents of extant species which have a big scientific significance giving possibilities of palaeoclimatic and paleoenvironmental reconstructions:

Fossil lignotaxa	Extant equivalent
Cupressaceous wood	*Cupressaceae*
Libocedroxylon sp.	*Libocedrus sp.*
Taxodioxylon sp.	*Taxodium sp.2*
Chimairodoxylon sp.	*Taxodiaceous wood*
Pinuxylon	*Pinus*
Cedroxylon	*Cedrus libani*
Coniferoxylon sp.	*Abies?*
Coniferoxylon sp.	*Coniferous wood, unidentified*
Dicotyloxylon sp.	*Dicotylodonous wood, unidentified*
Laurinoxylon sp.	*Lindera?, Litsea?*
Platanoxylon sp..?	*Platanus*
Quercoxylon sp.	*Quercus sp.*
Lithocarpoxylon sp.	*Lithocarpus sp.*
Ulmoxylon sp.	*Ulmus carpinifolia*
Fraxinoxylon sp.	*Fraxinus sp.*
Oleoxylon sp.	*Olea*
Palmoxylon sp.	*Palmae*

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ORAL

Late Cretaceous pterosaurian diversity in the Transylvanian and Haţeg basins (Romania): new results

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Keywords: vertebrate palaeontology, Pterosauria, Maastrichtian, Romania

Late Cretaceous (Maastrichtian) pterosaur remains are extremely scarce in Romania and only a handful of specimens have so far been collected and described.

A few small–sized ornithocheirid-like fossil remains (notarium, several teeth, unidentified "hollow bones") were first reported from the lower-middle Maastrichtian of Sânpetru in the Haţeg Basin (Nopcsa, 1914). Much later, additional pterosaurian materials (notarium, fragmentary humerus and femur), collected from the same locality, were identified as belonging to a small-sized pteranodontid (Jianu et al., 1997); because these specimens were never figured or described in detail, their affinity is still uncertain. The giant azhdarchid *Hatzegopteryx thambema* (wsp: 10-11 m) from the Early Maastrichtian beds of the Densuş-Ciula Formation of Vălioara (Haţeg Basin), was then later described on the basis of a palatal fragment, the occipital region of the skull, and a proximal humerus (Buffetaut et al., 2002). A second specimen represented by a large femoral shaft (restored length 40 cm), was described from the Tuştea dinosaur nesting site (Buffetaut et al., 2003). The "ornithocheirid" notarium mentioned by Nopcsa from Sânpetru was recently reviewed and most likely represents a maniraptoran theropod sacrum (Ősi & Fözy, 2007). Several ornithocheirid-like teeth were also recorded from the Haţeg Basin (Csiki et al., 2009), however their affinity is still not clear, as some may belong to a small-sized titanosaur sauropod. A third fragmentary specimen, assigned to *Hatzegopteryx* and originating from Vălioara, was recently identified in Bucharest University Paleontological Collection, being identified as an incomplete anterior mandibular symphysis.

Three newly collected Haţeg specimens are represented by an incomplete small sized wing-phalanx (wp 2?), recovered from Boiţa, an almost complete large sized (wsp: 4,5-5,0 m) coracoid from Vadu, most probably belonging to a subadult individual of *Hatzegopteryx*, and a medium sized (wsp: 3,0 m) scapula from the continental deposits of Pui.

In the Sebeş region (SW Transylvanian Basin), several recently collected specimens can be assigned to pterosaurs (Vremir et al., 2009; Vremir, 2010). The oldest specimens include a heavily crushed wing phalanx shaft fragment and an incomplete humerus, both belonging to a large-sized individual, from the lowermost Maastrichtian estuarine-coastal facies of Petreşti-Arini; another specimen, a fragmentary sternum, comes from the basal beds of the Sebeş Formation, up-section within the same Petreşti-Arini section. The partial-articulated skeleton of a medium- sized (wsp: 3,5-4,0 m) azhdarchid was discovered in the upper part of the Lower Maastrichtian at Sebes-Glod; a wing-bone fragment comes from similar overbank facies at Oarda de Jos. Finally, the ?upper Maastrichtian deposits of Râpa Roşie yielded a gigantic azhdarchid cervical vertebra, as well as a large braincase fragment and a small cervical vertebra.

Altogether, the Romanian Maastrichtian pterosaurian discoveries (Table 1) demonstrate a greater morphological and taxonomical diversity than previously thought, with at least three distinct taxa represented. These range from possible small pteranodontids to various medium-to- large and gigantic azhdarchids, while the presence of the small sized ornithocheirid-like forms is far from being ascertained.

Taxonomic identity has been confirmed using bone histology.

Locality	Taxon	Material	Stratigraphic unit	Age	Depositional environment	References; notes
Vălioara northern Haţeg	*Hatzegopteryx thambema*	palatal fragment; occipital skull; proximal humerus;	middle *Densuş-Ciula* Formation	Early Maastrichtian	fine overbank deposits; sandy-pebbly channel fill	Buffetaut et al., 2002; 2003 Holotype
	Hatzegopteryx? (large size)	mandibular symphysis				LPB (FGGUB) unpublished
	Ornithocheiridae?	isolated teeth (sauropod teeth?)				Csiki et al., 2009
Boiţa northern Haţeg	pterosauria indet.(small size)	2nd wing phalanx?	*Densuş-Ciula* Formation	Early Maastrichtian	overbank red silty-claystone paleosol	unpublished
Tuştea northern Haţeg	*Hatzegopteryx thambema*	femur shaft	middle *Densuş-Ciula* Formation	Early to early Late Maastrichtian	overbank red silty-claystone paleosol (dinosaur nesting site)	Buffetaut et al., 2003
Vadu central Haţeg	Azhdarchidae (large size) *Hatzegopteryx?*	coracoid	*Sînpetru* Formation	early Late Maastrichtian	coarse pebbly sandy chanell fill	Vremir M. unpublished
Sînpetru central Haţeg	Pterosauria indet. ("Ornithocheiridae") (small size)	isolated (sauropod?) teeth, ?notarium (Maniraptora), "hollow bones"	*Sînpetru* Formation	Early Maastrichtian	medium to coarse channel fills; fine overbank deposits	Nopcsa, 1914; Ősi & Fözy, 2007; Csiki et al., 2009
	Pteranodontidae indet.	partial humerus; femur; notarium				Jianu et al., 1997
Pui eastern Haţeg	Pterodactyloidea indet.	scapula	*Sînpetru* Formation	Early-Late Maastrichtian	overbank red silty-claystone paleosol	Vremir M., unpublished
Petreşti-Arini Sebeş	Azhdarchidae (gigantic size)	wing phalanx shaft fragment	top *Bozeş* Formation	Early Maastrichtian	brackish coastal-estuarine facies	Vremir, 2010
		partial humerus				unpublished
	Pterosauria indet.	fragmentary sternum	base *Sebeş* Formation	late Early Maastrichtian	overbank, red silty-claystone paleosol	unpublished
Sebeş-Glod Sebeş	Azhdarchidae (medium size)	partial articulated skeleton	lower-mid part of *Sebeş* Formation	late Early Maastrichtian	overbank red silty-claystone paleosol	Vremir, 2010
	Pterosauria indet.	limb bone fragment				unpublished
Oarda de Jos, Sebeş	Pterosauria indet.	limb bone fragment	mid-Sebeş Formation	late Early Maastrichtian	overbank red silty-claystone paleosol	unpublished
Râpa Roşie Sebeş	Azhdarchidae (gigantic size)	cervical vertebra	*Sebeş* Formation upper section	Late? Maastrichtian	cross laminated sandy-pebbly shallow meandering channel fill	Vremir et al., 2009 Vremir, 2010
	Pterosauria indet. (azhdarchid?)	braincase fragment, cervical vertebra				unpublished

Table 1. Overview of pterosaurian discoveries reported from the Maastrichtian of the Haţeg and Transylvanian basins

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ORAL

Primitive pleurodiran turtles (Dortokidae) in the Late Cretaceous-Early Paleogene of central-East Europe

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Keywords: vertebrate paleontology, turtles, paleobiogeography, Cretaceous, Paleogene, Europe

The turtle family Dortokidae represents a strictly European endemic group of pleurodires, characterized by a series of peculiar and primitive shell morphological features (Lapparent de Broin & Murelega,1999; Lapparent de Broin, et al., 2004). Two genera were formerly described: *Dortoka* (type species: *D. vasconica* Lapparent de Broin & Murelega, 1996) from the Upper Campanian-Lower Maastrichtian of Spain and France, respectively *Ronella* (type species: *R. botanica* Lapparent de Broin, 2000) from the Upper Paleocene of Romania. *Dortoka*-like specimens are also known from the Upper Barremian of Northern Spain and the Lower Cenomanian of southwestern France (Vullo et al., 2010). The question regarding the geographical and temporal isolation of the Romanian and Ibero-French dortokid lineages, received some answers due to the discovery of new dortokid specimens in the Maastrichtian of Transylvanian basin (Vremir, 2004). Based on this materials a new genus and species, namely *"Muehlbachia nopcsai"* was erected (Vremir & Codrea, 2009), subsequently considered as *nomen nudum.* However, as this dortokid shows an intermediate morphology between the Late Cretaceous *Dortoka* and the Late Paleocene *Ronella* (Vremir, 2010), the question of the geographical isolation from the western European dortokids persists.

Recently further dortokid specimens were recovered and re-evaluated, from the Santonian continental deposits of Iharkút in Hungary, the Campanian Gosau facies deposits of Muthmannsdorf in Austria (Rabi et al, in press) and the Maastrichtian of the Haţeg Basin in Romania (Fig. 1). The most relevant and complete specimen is represented by a carapace and associated plastron, scapula, humerus and pelvic girdle, originating from the Maastrichtian deposits of the Haţeg Basin (Romania; Fig. 2). Our phylogenetic analysis using a modified matrix of Gaffney et al. (2006) including the new Maastrichtian Transylvanian dortokid ("*Muehlbachia*"), *Ronella* and *Dortoka* yielded no resolution regarding the interrelationships of the group which might be explained by deep divergence times (well before the Santonian). It appears that there were at least two dortokid radiations in central-East Europe: one during the Late Cretaceous and one during the Early Paleogene. The western dortokids (*Dortoka* lineage) became extinct at the end of the Cretaceous, while in central-East Europe, the *Ronella* lineage survived until the very end of the Paleocene and even to the Early Eocene, when a considerable change occurred in the local and other European turtle faunas through the immigration of new fresh-water taxa (Carettochelyidae, Podocnemididae, Geoemydidae) from Northern Africa and Asia.

Acknowledgments

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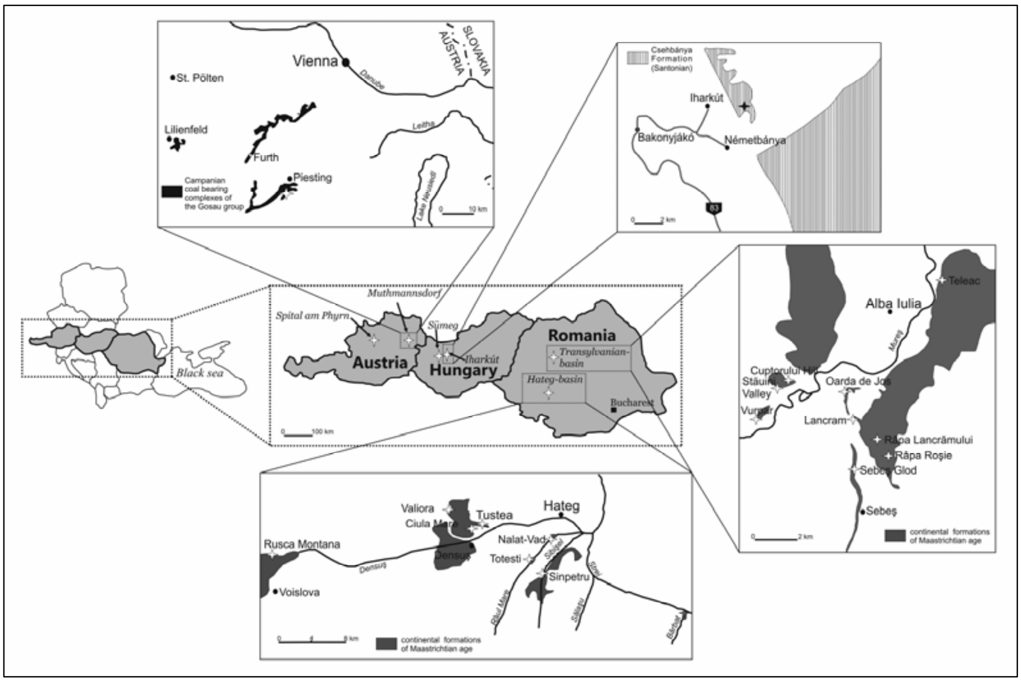

Fig. 1. Geographic location of Late Cretaceous dortokid bearing sites in East-Central Europe (Austria, Hungary and Romania) and the distribution of the fossiliferous geological formations. Stars correspond to turtle localities.

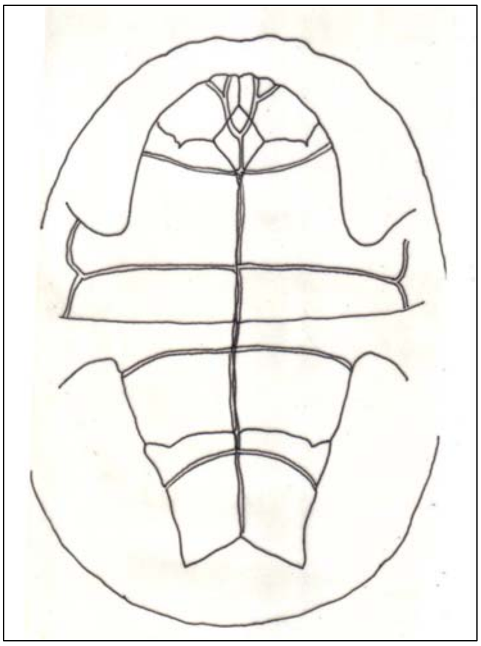

Fig. 2a

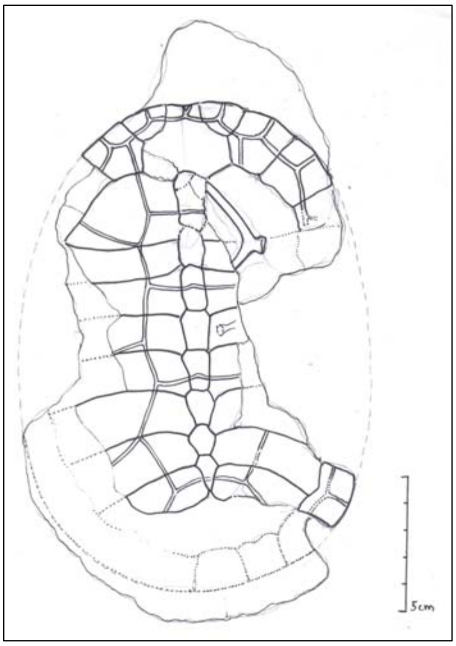

Fig.2b

Fig. 2a, b. LPB (FGGUB) R.2297: a new dortokid (Pleurodira) turtle plastron (2a) and partial carapace (2b) from the lower Maastrichtian deposits of Sânpetru (Sânpetru Formation; Haţeg Basin; Romania)

ORAL

Late Jurassic to Early Cretaceous biostratigraphy in southern Tibet

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Keywords: nannofossil, isotope age, Jurassic/Cretaceous boundary, Gyangze-Nagarze, Nyalam

Jurassic and Cretaceous strata of Tethys-Himalayas are well exposed in the Gyangze-Nagarze and Nyalam areas of southern Tibet (Fig.1). The Jiabula and Jiabula-goukou sections near Gyangze, the Kadong section in Nagarze and the Gucuo section in Nyalam are studied for the Jurassic/Cretaceous boundary. In the Gyangze-Nagarze area the Jurassic Weimei Formation is composed mostly of sandstone and siltstone. The overlying Cretaceous Sangxiu Formation is a thick group of sedimentary – volcanic strata in Nagarze. In Gyangze, however, The Cretaceous strata above the Weimei Formation is named as Jiabula Formation and is mostly composed of black shale and muddy siltstone. In Nyalam, the boundary is between the dark shale of Menkadun Formation and the sandstone of Gucuo Formation. Many fossils have been found, including calcareous nannofossils, bivalves, belemnites, ammonites, and gastropods.

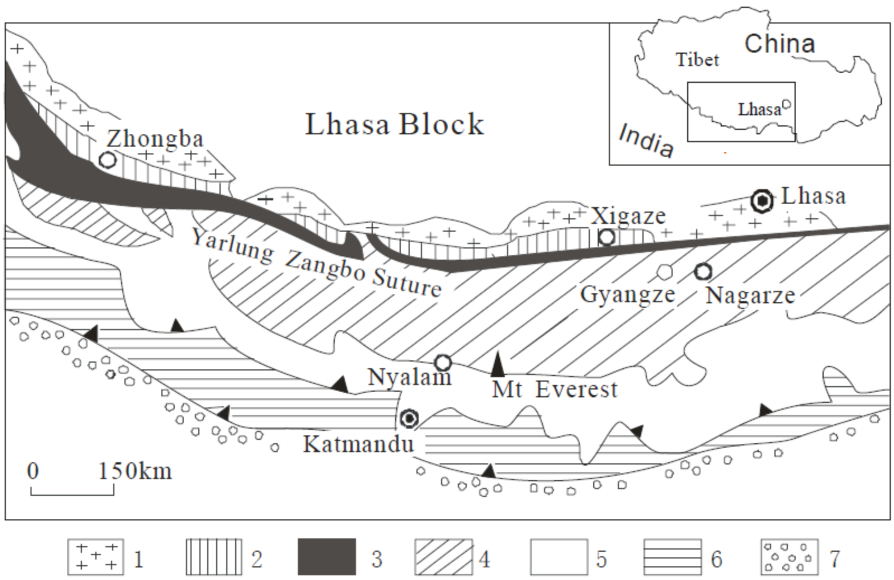

Fig.1 Sketch map showing the study areas and sedimentary belts of Tibetan Tethys. 1 - Gangdese Belt; 2 - Forearc Basin; 3 - Ophiolites; 4 - Tethys Himalayas; 5 - High Himalayas; 6 - Lesser Himalayas; 7 - Sub-Himalayas

1. The J-K boundary biostratigraphy

The J-K boundary succession is normally constrained by ammonites. Unfortunately ammonites are mostly domestic elements and calcareous nannofossils have become a key biostratigraphic tool. The calcareous nannofossils in this area comprise the *Nannoconus st. steinmannii- N. st. minor-Watznaueria barnesae* assemblage and the *Calcicalathina oblongata - Speetonia colligata* assemblage. The former assemblage can be correlated to NJK-D and NK-1 of the Tethys zonation, and the latter assemblage to NK-3 (Hardenbol et al., 1998). The two assemblages are also comparable with the Boreal biostratigraphy (Mutterlose & Kessels, 2000). Compared with the corresponding fossil zones in other areas in the world, the calcareous nannofossils found in the lower unit of the Jiabula and Sangxiu formations are characteristic of Berriasian and Valanginian in age.

In the Nyalam area, five ammonite assemblages were recognized (Yin and Enay, 2004). The *Belemnopsis galoi*-bearing beds can be regarded as the oldest Tithonian sediments in which the basal Tithonian ammonoid *Kossmatia* is not present. The Lower Tithonian includes the *Virgatosphinctes–Aulacosphinctoides* and *Uhligites–Aulacosphinctes* assemblages; the Upper Tithonian includes the *Haplophylloceras pingue*, *Blanfordiceras wallichi* and *Haplophylloceras strigile–Corongoceras–Himalayites* assemblages. The *Spiticeras* assemblage is suggested to be from the Lowermost Berriasian.

2. The SHRIMP U-Pb analyses from Lower Cretaceous

The rhyolite samples were collected from the upper unit of the Sangxiu Formation, and 15 zircon grains of the rhyolite sample were tested. The test results in an age for magmatic zircons of 136 ±3.0 Ma, which constrains the age of rhyolitic volcanism in the Sangxiu Formation. However more detailed dating by utilizing zircon SHRIMP for the basalt in the lower part of the Sangxiu Formation should be conducted. The sedimentary sequence was deposited rapidly and is characterized by coarse and fine clastics after the basaltic volcanism. Deposition was followed by the rhyolite extrusion with columnar jointing and dissilient fabrics of partial quartz phenocrysts. These features indicate that volcanism in the Sangxiu Formation was a short period, and the basaltic magmatism was only slightly earlier than the eruption of rhyolite. Both the rhyolite and the basalt in the Sangxiu Formation were formed in an extensional tectonic setting. The zircon SHRIMP age of rhyolite, therefore, is the age of volcanism of the upper Sangxiu Formation during the Valanginian Stage following deposition of the *Calcicalathina oblongata - Speetonia colligata* assemblage.

3. Discussion on the J/K boundary in southern Tibet

The ammonites found recently by the present authors in their geological survey in southern Tibet provide some crucial links for the correlation with other regions of the SW Pacific domain where these ammonite genera are widely distributed. In southern Tibet the *Haplohylloceras strigile-Corongoceras- Himalayites* assemblage is of latest Jurassic age, and the *Spiticeras* assemblage, including *S. spitiense, S. stanleyi, Sarasinella* sp., and *Cuyaniceras* sp. represents the earliest Cretaceous. More indicative data are the nannofossils reported herein. The globally distributed *Nannoconus steinamnnii steinmannii- N. st. minor- Watznaueria barnesae* Assemblage indicates Berriasian age, and the *Calcicalathina oblongata -Speetonia colligata* Assemblage correlates with the Valanginian. The first appearance of the Berriasian nannofossil assemblage in the Gyangze-Nagarze area is about 3 to 5 m above the base of the Sangxiu and Jiabula formations. Therefore the J/K boundary is placed near the bottom of the Jiabula Formation at Gyangze, and at the base part of the Sangxiu Formation at Nagarze. The boundary is marked by the first appearance of the ammonite *Spiticeras* and the nannofossil *Nannoconus st. steinmannii -N. st. minor -Watznaueria barnesae* Assemblage.

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