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Iuliana LAZĂR, Mihaela GRĂDINARU and ?tefan VASILE
University of Bucharest

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Bucharest, 27-28 September 2017

ABSTRACT BOOK

IULIANA LAZĂR, MIHAELA GRĂDINARU, ȘTEFAN VASILE
(Editors)

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The 11th Romanian Symposium on Palaeontology

Bucharest, September 27th-28th, 2017

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CONTENT

Andrășanu, A. – Geoparks and Education in Geosciences ………………………………… 1-2

Antoniade, C., Ioniţă, C., Radu, E. & Stoica, M. – Sarmatian-Maeotian microfauna from Musata borehole, Vaslui ………………………………………………………........... 3

Antoniade, C. & Limberea, E.L. – Oligocene microfauna from Prigoria borehole, Getic Depression ……………………………………………………………………….. 4

Baciu, D.S., Grădianu, I., Seserman, A. & Dumitriu, T.C. – Oligocene fish fauna from the Bituminous Marls of Vrancea Nappe, Eastern Carpathians, Romania …………… 5-6

Bindiu-Haitonic, R., Filipescu, S., Aroldi, C., Veress, E. & Damian, M. – Foraminiferal assemblages from the deep water deposits of the Tarcău Nappe (Moldova Valley Basin). Age and paleoenvironmental interpretation……………………………………… 7-8

Boivin, S., Vasseur, R., Lathuilière, B., Lazăr, I., Durlet, C., Martindale, R. C., El Hmidi, K. & Martini R. – A little walk between Liassic sponges and corals ……… 9-10

Bojar, A.-V., Guja, O., Pelc, A., Vasile, Ş. & Piotrowska, N. – *Bison bonasus* skull from the Bihor Mountains, Romania: isotopic and morphological investigations ……….…. 11

Briceag, A., Dimitriu, R.G., Stănescu, I., Secrieru, D., Opreanu, G., Barbu, B., Stanciu, I. & Nuțu, G. – Paleoenvironmental changes from the Late Roman settlement Halmyris, Danube Delta results ……………………………………………………… 12-13

Bucur, I.I., Săsăran E., Pleş G., Mircescu C.V. & Oprişa A. – Barremian-lowermost Aptian microfossils from the patch-reefs of the Dâmbovicioara zone ……………… 14-15

Călin, A.G., Popa, M.E. & Iamandei, S. – New fossil woods from Bozovici Basin ……… 16

Chelaru, R. – Middle Miocene coralline algal assemblages from intra-Carpathian basins of Romania ……………………………………………………………………………. 17

Chira, C.M., Aroldi, C., Popa, M.V. & Giurea, E. – Calcareous nannofossils, mollusks and sedimentological investigations in the Sarmatian to Romanian deposits from the Dacian Basin ………………………………………………………………………….. 18-19

Chira, C.M., Balog, A.-A., Negru, R. & Bedelean, H. – Badenian calcareous nannofossils and foraminifera from the Ocolisu Mic Section (Strei Basin, Central Paratethys, Romania): Taxonomy and paleoecology …………………………………………… 20

Codrea, A.V., Venczel, M., Rățoi, G.B. & Ursachi, L. – Stratigraphic distribution of the Middle-Late Miocene artiodactyls from Moldavia (Eastern Romania) ………………. 21-22

Csiki-Sava, Z., Meng, J., Vremir, M., Vasile, Ș., Brusatte, S.L. & Norell, M. A. – Ghosts in the night - multituberculate diversity at the feet of the latest Cretaceous Transylvanian dinosaurs ………………………………………………………………… 23-24

Diaconu, A.-C., Tóth, M., Lamentowicz, M., Heiri, O., Panait, A.-M., Grindean, R., Feurdean, A. & Tanţău, I. – Quantitative reconstruction of Holocene climate variability in the Eastern Carpathians, Romania ……………………………………… 25

Dragastan, O.N. – Paleozoic calcareous algae from Denver Collection donors, Museum Support Center, Smithsonian Institution (Washington D.C., U.S.A.) ……………… 26

Drăguşin, V., Vasile, Ş., Terhune, C., Petculescu, A., Robu, M., Vlaicu, M., Constantin, S., Ştiucă, E., Taron, U.H., Hofreiter, M. & Paijmans, J.L.A. – Late Pleistocene occurrence of *Cuon alpinus* in Romania 27

Dumitraşcu, V., Petculescu, A., Vasile, Ş., Cosac, M., Murătoreanu, G., Vereş, D., Niţă, L., Schmidt, C., Hambach, U., Alexandru, R., Cuculici, R., Buzea, D.L., Mărgărit, M. & Deneş, I. – Preliminary report on the faunal assemblage from a Middle Paleolithic site in the Vârghiş Gorges (Perşani Mountains, Romania) 28-29

Dumitrică, P. – Crucicanistridae n. fam., a new family of post-Triassic Entactinarian Radiolaria 30-31

Dumitriu, S.D., Loghin, S., Dubicka, Z. & Ionesi, V. – Paleoenvironmental reconstruction of the Middle Miocene deposits from SE Poland and NE Romania based on micropaleontological studies 32-33

Faur, L., Mirea, I-C., Robu, M., Kenesz, M., Arghir, R., Dimofte, D., Codrea, A.V., Petculescu, A., Constantin, S. & Soare, B. – The mineralogical composition of MIS 3 cave bear bones from Muierilor Cave, Southern Carpathians, Romania 34

Filipescu, S., Zănoagă, L., Bindiu-Haitonic, R., Săsăran, E. & Silye, L. – A discussion on the Badenian - Sarmatian transition based on foraminifera 35-36

Floroiu, A., Vasiliev, I., Stoica. M., van Baak, C.G.C., de Leeuw, A., Krijgsman, W. & Mulch, A. – Stable isotopes on ostracods indicate marine incursions in the Dacian Basin during Upper Miocene and Pliocene 37-38

Gallemí, J., Dochev, D. & Metodiev, L. – The echinoids of the K/T boundary Moravitsa section (Western Fore-Balkan, Bulgaria)... 39-40

Ghiţă, D., Stan, C.D., Creţu, D.M. & Şindilar, V.D. – Early and Middle Miocene microfauna and nannoplankton assemblages from Totea – Valeni Area (Southern-Central Getic Depression, Romania) 41-42

Głowniak, E. – Palaeobiogeographic differentiation and phylogeny of the Oxfordian (Upper Jurassic) perisphinctid ammonites in the Submediterranean Province and its implications for the intra- and interprovincial biostratigraphic correlations ……….... 43-44

Grădinaru, E. – 150 years from the publication of Carl Ferdinand Peters' monograph on the geology of Dobrogea – the palaeontological legacy 45-46

Grădinaru, E. – *Tubiphytes*-microbial facies, a chemosynthetically-driven oasis in the Bithynian (Anisian, Middle Triassic) of North Dobrogea (Romania) 47-48

Grădinaru, E. & Gaetani, M. – Spathian to Bithynian (Early to Middle Triassic) brachiopods from North Dobrogea (Romania) ………………………………….... 49

Grădinaru, E., Lazăr, I., Andrăşanu, A. & Grădinaru, M. – *Neohoploceras submartini* (Mallada, 1887) - a key occurrence for timing the intra-Valanginian stratigraphic gap in the Dâmbovicioara Zone (Southern Carpathians, Romania) ………………………. 50-51

Grădinaru E. & Sobolev E.S. – Late Anisian (Middle Triassic) nautiloids from Cristian (Braşov Mountains, Southern Carpathians, Romania): stratigraphic distribution and paleobiogeographic connections 52-53

Grădinaru, M., Lazăr, I., Petrescu, L. & Ducea, M.N. – Geochemical and mineralogical microbial signatures recorded within Jurassic ferruginous stromatolites from the Romanian Carpathians …………………………………………………………….......... 54-55

Grigore, D. & Lazăr I. – Callovian ammonite assemblage from the Rucăr area (Southern Carpathians, Romania) …………………………………………………………....... 56

Grigore, D., Rusu, S. & Sebe-Rădoi, O.G. – Review of the Jurassic micro- and macro faunal assemblages from the Cetăţii Valley Formation (Râşnov, Southern Carpathians, Romania …………………………………………………………………… 57

Grigorescu, D. – Vertebrate Paleontology at the University of Bucharest ………………….. 58

Grigorescu, D. & Ciobotea Barbu, O. – SEM comparative analysis of eggshell biomineralization in megaloolithid (*Megaloolithus siruguei*) dinosaur eggs from the Maastrichtian of the Haţeg Basin and recent birds ………………………………………… 59-60

Grindean, R., Tanţău, I. & Feurdean A. – Climate change and human influence in the control of vegetation dynamics in the Eastern Romanian Carpathians ……………….. 61

Haiduc, B.S., Răţoi, B.G. & Brânzilă, M. – New mammoth material from the Moldavian Platform …………………………………………………………………………….. 62

Iamandei, S. & Iamandei, E. – New trees in the Late Cretaceous Petrified Forest from South Apuseni Mountains, Romania ………………………………………………… 63

Iamandei, S. & Iamandei, E. – New Trees in the Mid-Miocene Petrified Forest from South Apuseni Mountains, Romania …………………………………………………… 64

Juravle, D.-T., Mare, S., Ionesi, V., Chira, C.M. & Juravle, A. – The biostratigraphic, mineralogical and sedimentological significations regarding the evolution of the East-Carpathian Foreland in-between the Suceava and Moldova Valleys (Eastern Carpathians) ….. 65-66

Kołodziej, B., Bucur, I.I., Lazăr, I. & Uchman, A. – Winding and branched terebellid-like burrows from Upper Jurassic and Lower Cretaceous limestones (Dobrogea, Rarău Mts. and Dâmbovicioara zone, Romania) …………………………………… 67-68

Król, J.J., Jakubowicz, M. & Zapalski, M.K. – Paleoecology of tabulate corals from Aferdou el Mrakib (eastern Anti-Atlas, Givetian, Morocco) ………………………… 69-70

Lazăr, I., Sandy, M.R., Forel, M.-B., Grădinaru, E., Peckmann, J. & Grădinaru, M. – Late Triassic brachiopod *Halorella* assemblages from paleokarst cavities near Vaşcău, Apuseni Mountains, Romania …………………………………………… 71-72

Lodowski, D. G., Walaszczyk, I., Grădinaru, E., Dubicka, Z. & Wierny. W. – Turonian-Coniacian (Upper Cretaceous) succession of the Babadag Basin (North Dobrogea); microfacies succession and integrated biostratigraphy ……………………………… 73

Mare, S. & Ionesi, V. – Planktonic and benthic foraminieral assemblage of Bisericani Formation, Tarcău Nappe (Eastern Carpathians, Romania) …………………….…... 74-75

Melinte-Dobrinescu, M.C. – Solving biostratigraphical issues of the Oligocene-Miocene interval in Romania based on calcareous nannoplankton analysis …………………… 76

Mircescu, C.-V., Săsăran, E. & Bucur, I.-I. – Cyclic sedimentation of the Uppermost Jurassic-Lowermost Cretaceous limestones from the Piatra Craiului Massif ………… 77-78

Mirea, I.-C., Robu, M., Kenesz, M., Faur, L., Arghir, R., Codrea, A.V., Petculescu, A. & Constantin, S. – Taphonomic assessment of MIS 3 cave bear bone assemblages using GIS techniques. Case studies: Muierilor and Urşilor caves, Romania ……….... 79-80

Oltean, G., Mircescu, C., Pleş, G. & Bucur, I. I. – Microfossil assemblages and facies associations in Upper Jurassic calcareous olistoliths from the Perşani Mountains (Eastern Carpathians) 81-82

Ősi, A., Csiki-Sava, Z. & Prondvai, E. – Needles in the haystack - sauropod teeth from the uppermost Cretaceous of Iharkút (Santonian, Hungary) and Haţeg (Maastrichtian, Romania), and latest Cretaceous sauropod diversity in central-eastern Europe 83-84

Panaitescu, D. – The microfacies study of the Piatra Arsă carbonate olistoliths 85

Pirnea, R. & Popa, M.E. – Oligocene and Miocene *Pronephrium stiriacum* from Romania 86

Pleş, G., Bârtaş, T., Chelaru, R. & Bucur, I. I. – Encrusting organisms from the Urgonian limestones of Rarău Mountains 87

Popa, M.E. & Kędzior, A. – The Early Jurassic flora from Mehadia, South Carpathians, Romania 88

Popa, M.V., Costea. A., Filipescu, S., Chira, C.M. & Săsăran, E. – Paleontological and sedimentological data of the Middle Miocene from Holdea (Făget Depression, Romania) 89

Popescu, A. – Fossiliferous outcrop Podari (Dolj County, SW of Romania): valuation and capitalization results 90

Popescu D.A. & Popescu L.G. – Triassic (Olenekian – Norian) Foraminifera from the Carbonate Deposits of the Median Dacides Nappes of the Eastern Carpathians (the North compartment of the Crystalline – Mesozoic Area) 91-92

Posmoşanu, E. – Middle Triassic bony fishes from Lugaşu de Sus, Bihor, Romania 93

Rausch, L., Stoica, M., Lazarev, S., Krijgsman, W. & van Baak, C. – A Miocene – Early Pliocene ostracod fauna from the Denizli Basin (southwestern Anatolia) and its regional paleogeographic implications 94

Saint Martin, J.-P., Bucur, I., Saint Martin, S., Caze, B. Letenneur, C. & Moissette, P. – The Sarmatian littoral environment from South Dobrogea: an overview 95-96

Saint Martin, S. & Saint Martin, J.-P. – Unexpected occurrence of marine diatoms in amber 97-98

Săsăran, E., Ungur, C., Bucur, I.-I. & Mircescu, C.-V. – The Cheile Dâmbovicioarei Formation: facies and sedimentary evolution 99-100

Săsăran, L. – Reviewing of the rudist type species described from the Upper Cretaceous deposits from Romania 101-102

Sebe-Rădoi, O.-G., Forel, M.-B., Crasquin, S. & Grădinaru, E. – Ostracod assemblages around the Spathian-Anisian (Lower-Middle Triassic) boundary in the Deşli Caira GSSP candidate (North Dobrogea, Romania) 103

Seghedi, A. – Scientific and educational values of the geological heritage of Dobrogea 104-105

Seserman, A. & Mare, S. – *Paleodictyon* assemblage from Frasin, Bukovina Area (Eastern Carpathians, Romania) 106

Seserman, A. & Miclăuş, C. – Ichnological-sedimentological analysis of Podu Secu Formation (Tarcău Nappe, Eastern Carpathians)... 107-108

Stoica, A. & Stoica, M. – Maeotian ostracods from Costeşti area (Vâlcea) 109

Stoica, M. – Miocene-Pliocene microfauna from Barda Rash area (NE Iraq-Kurdistan) …... 110

Toma, C. & Kudor, G-S. – Geodiversity interpretation in Buzău Land Geopark 111

Torcărescu, B.A. & Vasile, Ş. – First report of mammoth fossil remains from Peretu, Teleorman County (Dacian Basin, southern Romania) 112

Trif, N. & Codrea, V. – Reassessment of the teeth of the shark *Otodus* AGASSIZ, 1843 (*sensu* Cappetta, 2012) hosted in the main Romanian collections 113

Ţabără, D. – Dinocyst stratigraphy and palynofacies of Oligocene sequences in the northern Eastern Carpathians 114-115

Ţibuleac, P. – Taxonomical significance of several nautiloid specimens of Praşca Klippe (Rarău Syncline - Eastern Carpathians, Romania) 116-117

Vasiliev, I., Reichart, G.J., Krijgsman, W., Mulch, A. – Large paleoenvironmental changes during the late Miocene affecting the Black Sea Basin (Taman Peninsula, Russia) 118-119

Vasseur, R., Boivin, S. Lathuilière, B. Lazăr, I. Durlet, C. Martindale, R-C. Bodin, S. & El Hmidi, K. – Reminiscences of Palaeozoic structures in a Liassic coral: convergence or inheritance from the past? 120-121

Văcărescu, M.-R., Bucur, M., Roman, A., Vasile, Ş. & Csiki-Sava, Z. – Theropod teeth from the Maastrichtian of the Haţeg Basin, Romania: dental morphotype diversity in an European context - preliminary results 122-123

Walaszczyk, I. & Grădinaru, E. – Inoceramids of the Upper Cretaceous of Romania 124-125

List of contributors 127-138

ORAL

Geoparks and Education in Geosciences

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Keywords: Geoparks, Geoconservation, Education, Geosciences

UNESCO's General Conference approved, on 17 November 2015, the creation of the International Geoscience and Geoparks Program. This program is supported by the Geopark community and representatives of the International Geoscience Program (IGCP) and IUGS. The statutes and the new structure were proposed by IUGS and UNESCO Member States to gather the Global Geoparks Network (GGN) and the IGCP as two pillars under a joint umbrella, the IGGP (UNESCO, 2016). This new program is recognising at the highest level the importance of geosciences in our modern society and also is the official recognition of geoconservation. Geoconservation as a new area of geosciencies is based on several interrelated concepts: geodiversity assessment, geological heritage, geoeducation, geotourism and geoparks. The geopark concept is a result of continuous efforts of dedicated specialists and innovative approaches in using local geodiversity and geological heritage as main resources for socio-economic development (Zouros, 2004; Zouros & Martini, 2001). The geoparks are places of practical use in education geotourism and public awareness of all geological assets in their strong connections with natural environment and local tangible and intangible heritage.

A geopark has three main pillars: optimum territory, partnerships and a sustainable management plan to be implemented by the geopark team. The three pillars are building a bridge between the beginning of the geopark project and the real management of the geopark territory. An optimum territory is a territory which is well defined from the geological, historical, cultural and administrative point of view. It could be defined after multidisciplinary research studies, meetings with local stakeholders, associations, local administrations and local communities. The territory has to be imagined not just as an interesting area but a manageable one, where identified objectives of the management plan have to be implemented in a coherent context. Partnerships are crucial and have to comprise strategic partners for management, communication, research and cultural activities. The management plan is based on territorial resources, type of partners and geopark team creativity in identifying development objectives and related activities.

All the three pillars need to have a strong geological and paleontological research and educational support. The territory comprise sites and landscapes of international geological significance. Partnerships are supporting multidiciplinary researches involving specialists and students in order to identify geological assets part of the local geoheritage. A sustainable management plan is offering the resources and the framework to continue these activities and to use the results for education, public awareness, development planning and promotion of geosciencies.

In Romania, Hateg Country Global UNESCO Geopark has been created as grass roots project by a consortium of universities, local administrations, local and national institutions coordinated by University of Bucharest (Grigorescu & Andrășanu, 2000). Buzău Land Aspiring Geopark is also based on multidiciplinary reaserch and local and national partnerships developed by University of Bucharest (Andrășanu, 2010) and important steps have been taken so far in order to become a Global UNESCO Geopark in the near future.

The two geoparks are using the results of research projects to develop an infrastructure for interpretation of subjects like: dinosaurs, volcanoes, fossils, minerals and rocks, plate tectonics, geologic time etc. They could be case studies and models for other geopark initiatives and for a national project aiming to develop a network of Educational Centers in Geosciences, in rural areas. Universities, researcs institutions and professional associations need to be involved in this national project.

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ORAL

Sarmatian-Maeotian microfauna from Musata borehole, Vaslui

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Keywords: Upper Miocene, foraminifera, ostracods, biostratigraphy

In this study we present a short description of the micropaleontological contents identified in the sedimentary sequence intercepted by the hydrogeological well F1 Musata, drilled in Vaslui area, Moldavian Platform. The borehole is 198 m deep and 79 cuttings have been analysed. The sediments are represented by fine sands and grey clays with few intercalations of yellow-greenish silty clays and grey marls. From the base to the top we identified micropaleontological associations characteristic for the Bessarabian, Chersonian and Maeotian stages. The Bessarabian microfauna suggests normal marine conditions, being represented by an assemblage of benthic calcareous foraminifera, rich in species of *Porosononion* and *Elphidium* genera.

A strong change of the microfauna was observed on the 30-138 m depth interval when the foraminifera are replaced by fresh tolow brackish water ostracods, gastropods, charophytae gyrogonites and fish fragments that indicate a significant salinity drop. Since both, the Chersonian and Maeotian are developed in a fresh water facies, the difference between these two stages is difficult to establish. However, in the samples from the 94-96 m depth interval we identified small *Porosononion* and *Nonion* species, that in our opinion could indicate the marine transgresion that marks the base of Maeotian.

POSTER

Oligocene microfauna from Prigoria borehole, Getic Depression

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Keywords: Upper Palaeogene, foraminifera, nannoplankton, Getic Depression

Biostratigraphical and micropaleontological investigations for foraminifera and calcareous nannoplankton have been carried out in Oligocene deposits from 10 Prigoria Borehole, located in the western sector of the Getic Depression. The borehole was analysed on the 1631-2907 depth interval, being represented by gray, dark gray-blackish silty claystone, greenish calcareous claystone to marls and sandstones.

The micropaleontological samples from 2811-2907 depth interval, show a benthic calcareous foraminifera assemblage consisting mainly of pyritized cylindrical and conical forms of *Chillostomella*, *Virgulinella*, *Allomorphina* and *Bulimina* species. Pyritized radiolarians and diatoms, represented by triangular, circular and elliptical frustules of *Triceratium* sp., *Coscinodiscus* sp. and *Odontella* sp. were also identified. The calcareous nannoplankton identified in the samples is represented by *Ponthosphaera latelliptica* and *Reticulofenestra minutula* assemblages and correlates with the standard zone NP21 – NP 22 (Martini, 1971). Within it, together with the taxa listed above, there are taxa with a wider range, such as *Coccolithus pelagicus*, *Cyclicargolithus floridanus*, *Pontosphaera latelliptica* and *Reticulofenestra bisecta.* The microfauna and nannoplankton assemblages suggest Rupelian age and are interpreted as a bathyal association indicative of an anoxic environment.

In the 1631-2768 depth interval the micropaleontological content is represented by benthic calcareous and agglutinated specimens of *Cibicidoides*, *Globocassidulina*, *Bulimina*, *Bolivina*, *Almaena*, *Glomospira* and *Haplophragmoides* suggest the Chattian substage. Few planktonic foraminifers such as *Tenuitella* sp., *Tenuitella liverovskae* and *Globigerina* sp. were also found. Many fish fragments and siliceous fossils (sponge spicules) are present too. This microfossil assemblage with many pyritized forms suggests an environment developed under anoxic conditions.

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POSTER

Oligocene fish fauna from the Bituminous Marls of Vrancea Nappe, Eastern Carpathians, Romania

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Keywords: fish fossils, Oligocene, Vrancea Nappe, Bistriţa Half-Window, Eastern Carpathians

The study was conducted in the Bistriţa Half-Window, Vrancea Nappe (Marginal Folds Nappe, *sensu* Săndulescu, 1984), in the Bituminous Marls, an intriguing lithostratigraphic entity, from ichthyological and sedimentological points of view. This formation and its equivalents (Heller Mergelkalk, Dynow Marls) are considered to be sedimented during the maximum isolation of the Parathethys (NP23) being a marker level of the Oligocene sedimentary succession (Popov et al., 2002), although its age seems to be "not older than late Chattian" (Guerrera et al., 2012). Formally considered a monotonous lithostratigraphic unit, at a closer look, this formation, rich in organic matter, contains a variety of sedimentary features such as current and wave ripples, cross-bedding, hummocky and swaley-like cross-stratification, clastic dykes, intraformational slump folds among others. Therefore, the high level of bottom current activity indicated by these structures seems to contradict somehow the previous ideas about the causes for preservation of large quantities of organic matter.

In this study, we present the taxonomic overview of 13 fish fossils species belonging to 13 families and 8 orders, recovered from the Bituminoius Marls. The palaeoecology of the fish assemblage is reconstructed based on bathymetrical comparisons with the present-day fish fauna. Accordingly, the decribed taxa are distributed in the following oceanic zones (Fig. 1): *Cetorhinus*, *Clupea* - shallow-water; *Carcharias*, *Oliganodon*, *Scophthalmus* - associated with the sea bottom on continental shelf; *Auxides* - epipelagic zone; *Scopeloides*, *Eovinciguerria*, *Oligophus* - mesopelagic with vertical migration; *Glossanodon*, *Anenchelum*, *Palaeogadus*, *Proantigonia* – benthopelagic, living on the outer shelf and upper slope.

The sedimentary features of the Bituminous Marls indicate a basin affected by tectonic deformations and gravitational collapses. This basin floor dynamics may explain the source of coarse material, that supplied occasionally the muddy shelf system via hyperpicnal flows, induced by storm or turbiditic currents and started by floods or storms. In such cases, the fish specimens do not provide precise ecological constrains. Nevertheless, detailed sedimentological investigations and the discovery of new fish fossil specimens, may allow reconstruct the bathymetry of the sea floor during the sedimentation of the Bituminous Marls.

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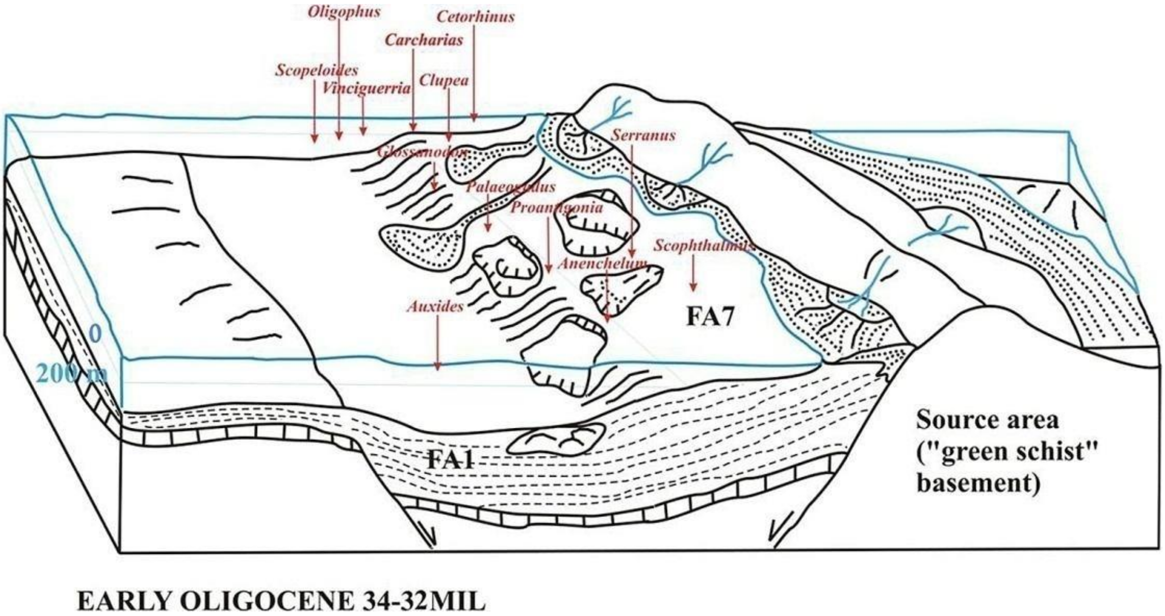

Fig. 1 The distribution of the fish genera in the basin during the sedimentation of the Bituminous Marls, based on the reconstruction of Miclăuş et al. (2009)

POSTER

Foraminiferal assemblages from the deep water deposits of the Tarcău Nappe (Moldova Valley Basin). Age and paleoenvironmental interpretation

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Keywords: agglutinated foraminifera, morphogroups, diversity, “flysch-type” biofacies, Eocene

The Tarcău Nappe is the largest and displays the highest stratigraphic and tectonic complexity among the units of the Carpathian flysch (Săndulescu, 1984). Eocene formations are exposed throughout a relatively large area between Suceava and Moldova valleys. The studied section (located near the Paltinoasa in the Moldova river basin) was recently exposed by the digging of a landfill site, thus providing new information on the geological formations in the area. The succession (30 m thick) contains tectonized hemipelagic shales including cohesionals debris flow deposits belonging to the Suceviţa Formation (Joja et al., 1963; Ionesi, 1971).

The samples were collected from the hemipelagic shales and were processed by standard micropaleontological methods. More than 300 foraminifera were picked from the >63 µm fraction. Paleoecological methods included the analysis of agglutinated foraminifera morphogroups (Kaminski et al., 2005; Cetean et al., 2011; Murray et al., 2011; Setoyama et al., 2011) and diversity analysis (Murray, 2006).

Foraminiferal assemblages are relatively abundant, while preservation of the individuals is moderate to good. The foraminifera assemblages are dominated by agglutinated species, rarely these are associated with calcareous benthic and planktonic forms. Except for the M3b morphogroup (flattened irregular - *Ammolagena clavata*) all morphogroups of agglutinated foraminifera are present in the investigated samples. The dominating morphogroups are M1 (tubular - *Nothia* spp., *Psammosiphonella* spp, *Bathysiphon* spp.), M2b (rounded streptospiral - only *Recurvoides* spp.), M2c (elongate keeled - only *Spiroplectammina* spp.) and M4a (rounded planispiral - *Haplophragmoides* spp., *Reticulophragmium* spp.). The distribution of the agglutinated foraminifera morphogroups and the diversity varies through the section revealing periods with low organic matter flux (suggested by the dominance of tubular forms – M1 morphogroup) alternating with periods with eutrophic palaeoenvironmental conditions with high organic matter flux and moderate oxygenation (suggested by the dominance of the *Spiroplectammina spectabilis* individuals).

The foraminiferal assemblages contain taxa with a large stratigraphical range. Even so, the presence of the species *Reticulophragmium amplectens* and *Saccaminoides carpathicus* suggests the middle Eocene age for the studied section.

Agglutinated taxa belonging to “flysch-type” biofacies are dominant, suggesting an upper bathyal to middle bathyal setting with distal turbiditic (hemipelagic) deposition and paleoenvironmental instability and changes in the organic matter input.

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ORAL

A little walk between Liassic sponges and corals

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Keywords: chaetetids, corals, Early Jurassic, taxonomy, CT scan, convergence

Distinguishing corals from sponges is an easy task in modern specimens when soft tissues are available, but the distinction is not so easy for fossil skeletons. Over the last few decades a number of extinct taxa have been re-classified as corals or as sponges (originally identified as the other taxa). The classification issue has been a matter of debate for archaeocyaths, tabulates, stromatoporoids, and among them chaetetids.

We were challenged with a similar issue when looking at benthic organisms from carbonate platforms, and their derived olistholiths, in the Liassic (Early Jurassic) of the Moroccan High Atlas Mountains. The discovered specimens are characterised by massive to branching bodies made of parallel closely packed tubes. These tubes are delimited by thick common walls, and each tube is typified by one major vertical plate attached to the wall and reaching the centre of the tube. In the literature, these specimens have been assigned to both sponges and corals. On the one hand, Turnsek et al. (1975) interpreted these forms like a colonial Amphiastreid coral with the vertical plate considered homologous of a major septum. She created a coral genus *Hispaniastraea* based on Liassic samples from Spain. On the other hand, Fischer (1970) and Beauvais (1980) interpreted these forms as *Chaetetes* (*Pseudoseptifer)*, a Chaetetid sponge described by several authors in the 19th century and first half of the 20th century before the assignment of chaetetids to sponges. In this second interpretation, the vertical plate is called pseudo-septum and its growth results in the fissiparous division of the tube: one or more pseudo-septa grow progressively up to separate the tube into two new tubes. Then, the vertical plate is homologous of an incipient wall.

It must be noted that in the last decades, the study of chaetetids has highlighted significant differences between scleractinian and chaetetid skeletal microstructures. In spite of this, no well-preserved specimens of species have been found to date and so the assignment of this species remains contentious. Our study, based on all available diagnostic macrostructural characters of the Moroccan material completed with some samples from South of France, allow us to establish two groups of specimens, one with characters specific to scleractinian corals, and the other with those of chaetetids. Thus we hypothesize that there was morphological convergence between *Hispaniastraea* and *Chaetetes (Pseudoseptifer)*. To our knowledge, this possibility has not been considered previously; indeed, each author described their material as either scleractinians or chaetetids using the respective homologies and vocabulary. Accordingly, we have reconsidered the literature in the light of two convergent genera with their own diagnostic characters.

Considering the new specimens discovered, it appears necessary to revise the systematics of both genera and outline clear criteria to distinguish one from the other. The study of this fauna was supported by biometrical and morphometrical approaches. Furthermore, computerized tomography (CT-scan) is used to provide a better resolution of morphological and ontogenetical differences. CT scans provide critical information about the interior structures of the specimens for example, the region between the major septum of *Hispaniastraea* and the pseudo-septa involved in the fissiparous division of *Chaetetes* (*Pseudoseptifer*).

This work demonstrates that there were both scleractinian corals and chaetetids sponges in Early Jurassic Moroccan reefs, and so allows us to refine our understanding of peri-Tethyan Liassic reefs. Indeed, the end-Triassic crisis strongly impacted coral biodiversity. Historically, the Early Liassic has been known as a "reef gap" because reefs are uncommon worldwide and corals are always found in association with several other groups such as chaetetids and lithiotid bivalves. Despite their restricted geographical distribution, scleractinian corals quickly regained a significant position in reef ecosystems during Early Jurassic before the Pliensbachian-Toarcian boundary. The Liassic reefs found in the High Atlas of Morocco present a very interesting and unique example of biodiversity recovery between mass extinction episodes.

This contribution is part of the long-term research project on reef and carbonates build- up development (REEFCADE to RM), started in 2007 and supported by the Swiss National Science Foundation.

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ORAL

Bison bonasus skull from the Bihor Mountains, Romania: isotopic and morphological investigations

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Keywords: European bison, stable isotopes, radiometric dating, Quaternary large mammals

Quaternary distribution of the European bison (*Bison bonasus* Linnaeus, 1758) in Romania is relatively poorly known, due to the scarcity of well-dated remains positively assigned to this taxon. Some information related to the extinction of the European bison in Romania records the presence of the last free-roaming individuals in the northern part of the Eastern Carpathians in the 1700s, before becoming extinct, during the first decade of the 19th century (von Fichtel, 1791; Szalay, 1916; Săhleanu, 1933).

The discovery of a bison skull in an open pit from the Şesul Gârzii karst plateau (Bihor Mountains) offers new data on bison distribution and its ecology in the Western Romanian Carpathians. The taxonomical assessment of skull is based on the morphology and size of the orbitals and horn-cores, which fit the characteristics and measurement ranges of *Bison bonasus* (Skinner & Kaisen, 1947; Empel, 1962).

Radiocarbon dating of a bison rib shows two maxima, one around AD 1550, the other around AD 1645, indicating that the animal lived during the "Little Ice Age" (Bojar et al., 2015). Stable isotope composition of carbon from tooth enamel shows that the bison's diet consisted mainly of C3 grasses, whereas oxygen isotope ratio suggests it drank from lakes subjected to evaporation.

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POSTER

Paleoenvironmental changes from the Late Roman settlement Halmyris, Danube Delta results

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Keywords: ostracods, foraminifers, grain-size analyses, archaeology

From ancient times, the coastal areas are natural habitats that host a great variety of faunal and floral species and, from an anthropological point of view, are the most populated areas of the planet. At the same time, these coastal areas, which include most of the deltas, lagoons and wetlands are particularly vulnerable to the effects of global change (rise of sea level, climate change, etc.) which can be triggered by anthropogenic activities (global warming due to greenhouse gases produced during the industrial period, changes in sediment flows, pollutants, etc.). The Danube Delta was mainly formed during the Upper Pleistocene and Holocene (Panin & Jipa, 2002). Its present-day geomorphology expresses the interaction between the river (sediment and water discharges, flow energy, etc.) and the sea (wave and littoral currents regime, sea-level changes, etc.) over the last 12000 yr BP (Panin & Jipa, 2002). The aim of this study is to understand the evolution of the Danube Delta during Late Holocene times.

The study area, comprising the archaeological site Halmyris located in Northern Dobrogea, on the northern end of Dunavăț promontory which separates the dryland from the Danube Delta plain. According to the recent geodynamic study of Dimitriu et al. (2017) the entire area is subsident with amplitude up to -4 to -5 mm/yr, compared to the southward high-lying ground.

Two cores (2016/F1 - Halmyris and 2016/F2 - Halmyris), 6 m and respectively 5 m long, collected in October 2016, were multi-proxy analyzed. The cores were collected with a percussion coring tool from the close vicinity of the archeological site located in the vicinity of Murighiol locality. This study presents the main biostratigraphical characteristics of the Late Holocene deposits intercepted by these cores, coupled with archaeological, geochemical and grain-size analyses.

The paleontological content identified in the two cores is represented by plant fragments (wood, seeds), fragments of insects, fish and/or amphibian bone fragments, fish teeth, radiolarians, charophytae algae, sponge spicules, ostracods and foraminifera. Most of the ostracods identified in the cores are represented by freshwater species: *Darwinula stevensoni*, *Eucypris inflata*, *Candona* sp., *Candona compressa*, *Candona candida*, *Pseudocandona* sp., *Cypria ophthalmica*, *Cypria* sp. Brackish water ostracod species like *Heterocythereis amnicola*, *Cyprideis torosa*, *Leptocythere* sp., *Tyrrhenocythere donetziensis*, *Cytheroma variabilis* occur also, with a lower abundance than the freshwater ones. The identified foraminiferal assemblage is very scarce, mainly containing species belonging to the genus *Ammonia*. The occurrence of these species indicates a freshwater environment with some influxes of brackish water.

The grain-size analyses performed on the sediments cores from 2016/F1 and F2 - Halmyris indicate deltaic-lacustrine sediment, accumulated in a shallow area. At the lower part of 2016/F1 - Halmyris core, the sediments reflect a deposition in a submerged low-velocity water regime (maybe a secondary branch) dominated by a high sedimentation rate. In the case of 2016/F2 - Halmyris core, the occurrence of coarse particles indicates the closer proximity of the main course of the paleo-river. The relatively high composite variability of sediments noted is partly due to the mixing of sedimentary materials with different chemical compositions, coming from several sources.

The archaeological investigations performed on ceramic fragments collected from the two studied cores, indicate the Late Roman period, from 3rd century AD until the beginning of the 7th century AD.

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ORAL

Barremian-lowermost Aptian microfossils from the patch-reefs of the Dâmbovicioara zone

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Keywords: Calcareous algae, Foraminifera, Patch-reefs, Lower Cretaceous

Introduction

The carbonate deposits from Dâmbovicioara region represent the eastern part of the Getic carbonate Platform. They consist of Upper Jurassic and Lower Createceous limestones, covered by uppermost Albian-Cenomanian conglomerates. The uppermost part of the Štramberk-type limestones is known as Cheile Dâmbovicioarei Formation (Patrulius & Avram, 1976). Following the lowermost Valanginian discontinuity on the top of the Cheile Dâmbovicioarei Formation, marked by a hardground surface (Patrulius, 1969; Grădinaru et al., 2016) the Dâmbovicioara Formation (Patrulius, 1976; Patrulius & Avram, 1976; 2004) consists of three members: Cetatea Neamţului Member (Upper Valanginian), Dealul Sasului Member (Uppermost Valanginian-Hauterivian), and Valea Muierii Member (Barremian-lower Aptian). The Valea Muierii Member, dated by ammonites as Barremian-lower Bedoulian, 150-200 m thick, is represented by marls with argillaceous limestone intercalations. At certain levels coarse lime-packstone and grainstone, and bioclastic rudstone, with rudists and other reef builders occur. These patch-reefs consist of ramified, lamellar or globulous corals, sclerosponges (*Neuropora lusitanica*, *Cladocoropsis* sp.), worm tubes (annelids and *Terebella lapillloides*) and a diverse association of encrusting organisms (foraminifera, bryozoans, red algae, *Crescentiella morronensis*, *Koskinobulina socialis*, *Lithocodium aggregatum*, *Perturbatacrusta leini*, *Radiomura cautica*, and bacinellid structures). The coral bioconstructions are followed by bioclastic shoales (Săsăran et al., 2011).

Methodology

The Barremian-lower Aptian buidups were sampled, and several hundred of thin sections have been made. They were studied under a stereomicroscope and petrographic microscope, for microfacies analysis and microfossil determination.

Results

Within the limestone buildups intercalated in the Barremian-lower Aptian marls a diversified assemblage of calcareous algae and foraminifera has been identified:

Calcareous algae. Dasycladales: *Griphoporella cretacea, Montiella elitzae, Neomeris cretacea, Neomeris* sp., *Salpingoporella muehlbergii, Salpingoporella pygmaea, Suppiluliumaella elliotti,Terquemella* sp., *Triploporella* cf. *praturloni*. Bryopsidales: *Arabicodium meridionalis, Arabicodium* sp., *Boueina hochstetteri, Boueina* sp., ?*Permocalcilus* sp. Red algae: *Polystrata alba, Sporolithon rude,* Elianellaceae (?*Pycnoporiudium* sp., "*Solenopora*" sp.). The incertae sedis *Carpathoporella occidentalis* is also present.

Foraminifera: *Acruliammina* sp., *Akcaya minuta, Ammobaculites* sp., *Arenobulimina* cf. *corniculum, Bdelloidina urgonensis, Belorusiella* sp., *Bullopora* sp., *Charentia cuvillieri, Coscinophragma cribrosa, Dobrogelina* sp., *Gaudryina* sp., *Lenticulina* sp., *Meandrospira bancilai, Melathrokerion praesigali, Montseciella arabica, Paracoskinolina* cf. *jourdanensis, Paracoskinolina* sp., ?*Praeorbitolina* sp., ?*Praereticulinella* sp., *Rectodictyoconus giganteus, Vercorsella scarsellai, Vercorsella* sp.

Accorging to Patrulius (1969) the Barremian-lower Bedoulian deposits contain four levels with rudists and corals (noted RB1 to RB4) dated by the ammonite fauna from the marls surrounding the limestones. The micropaleontological assemblage also suggests a different stratigraphic position of the patch-reefs. The buildups from the northern side of Dealul Sasului (near the touristic complex) with *Paracoskinolina* sp., *Paracoskinolina* cf. *jourdanensis*, and abundant *Salpingoporella pygmaea* belong most probably to the early Barremian. The buildups from Valea Zamvelei and Valea Cheii, with *Montseciella arabica* and *Paorbitolina lenticularis* were formed during the Upper Barremian-lowermost Aptian, while the limestones from Valea Muierii, with *Rectodictyoconus giganteus* and *Palorbitolina lentocularis* indicate the lower Aptian.

Patrulius (1969) suggested that the interlayering between the marls with cephalopods and the reef limestones could be explained in three ways: 1) the clay suspension input to the platform was periodical, but only when this input ceased reefs could develop on a stable bottom, due to the sedimentation compensating the subsidence; 2) a temporary interruption (caused by a low amplitude rise) of the slow subsidence of the platform during a continuous input of argillitic suspension, causing a general shallowing of the basin and permitting the reef constructors to develop in higher, less affected areas by the clay input; 3) the input of clay suspension and subsidence of the platform were continuous, but the subsidence was compensating by deposition, bringing the bottom of the basin within the strong reach of waves which generated the breccias forming the base of the bioconstructions and of bioclastic limestones.

Actually, as Patrulius and Avram (1976) demonstrated later, during the Barremian-Aptian the Dâmbovicioara area was affected by a block (horst and graben) tectonic driven by more or less vertical fault system. On the horsts, conditions for shallow-water sedimentation and installation of small reefs have been created. Corroborated with a cyclic subsidence these conditions could give rise to the successive patch-reef levels from the Dâmbovicioara area.

Conclusion

The study of the micropaleontological assemblages from the patch-reefs intercalated within the marls of the Dâmbovicioara region reveal their different stratigraphic position, from lower Barremian (northern part of the Dealul Sasului), to upper Barremian-lowermost Aptian (Valea Zamvelei and Valea Cheii), and to lower Aptian (Valea Muierii).

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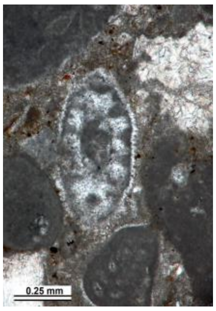
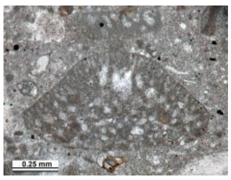


Salpingoporella muehlbergii

Arabicodium meridionalis

Rectodyctioconus giganteus



Palorbitolina lenticularis

Neotrocholina friburgensis

POSTER

New fossil woods from Bozovici Basin

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Keywords: silcified woods, Bozovici Basin, Lighidia Quarry, Miocene

New silicified woods from the Lighidia Quarry, Bozovici Basin were collected and studied using transmitted light microscopy. The Bozovici Basin is a typical molassic basin with Miocene continental sediments, including conglomerates, sandstones, clays, tuffs and coal seams. The paleoflora is very diverse, with horsetails, ferns, conifers (Cupressaceae) and angiosperms, preserved both as compressions and as silicified woods, next to a rich paleofauna. The silicified woods are preserved in various states, sometimes they are associated with carbonate petrifactions, a rare combination of preservation modes. From 12 samples of silicified woods were obtained 40 thin sections, and four taxa were identified: *Taxodioxylon taxodii* Gothan, *Glyptostroboxylon rudolphii* Dolezych & Van der Burgh, *Taxodioxylon* sp. and *Glyptostroboxylon* sp. The Bozovici Basin is rather poorly known, with few palaeobotanical, palaeozoological or geological data published (e.g. Gheorghiu, 1954; Pop, 1959; Iliescu et al., 1967; Grigorescu, 1985; Codrea, 2001), silicified woods representing the least studied group of this area.

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POSTER

Middle Miocene coralline algal assemblages from intra-Carpathian basins of Romania

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Keywords: rhodolith, Transylvanian Basin, Baia Mare Basin, Badenian, taxonomy

The main objective of the present study is to report and describe the diversified red algal assemblages identified in Middle Miocene (Badenian) deposits from the intra-Carpathian region of Romania.

The studied material has been sampled from the southern Baia Mare Basin and the western and south-western part of the Transylvanian Basin. From the southern Baia Mare Basin, two outcrops near Ciolt and Vălenii Şomcutei localities have been studied. The abundant red algae in these Badenian carbonate deposits has been well noted in old published papers but the studies were focused on other micropaleontologic materials, such as foraminifera or bryzoans (Ghiurcă, 1969). From the western and south-western Transylvanian Basin, eight studied successions belong to the Gârbova de Sus Formation and one succession is located in the Orăştie Depression.

A total of 30 red algal species have been recorded, belonging to the orders Corallinales, Hapalidiales, Sporolithales and Peyssonneliales. In addition to the identified species, the red algal assemblage contains also specifically undetermined specimens of *Lithothamnion*, *Mesophyllum* or *Sporolithon*.

In the red algal assemblages, the non-geniculate forms dominate while the geniculate corallines are rare. The most diversified are the melobesioids (Subfamily Melobesioideae), followed by the mastophoroids (Subfamily Mastophoroideae), sporolithoids (Subfamily Sporolithoideae) and lithophylloids. The most common red algal species are: *Lithothamnion ramosissimum*, *Mesophyllum alternans*, *?Neogoniolithon* sp.1, *Lithoporella melobesioides*, *Spongites fruticulosus*, *Hydrolithon corculumis*, *Lithophyllum pustulatum* and *Peyssonnelia antiqua*.

Depending on the palaeoenvironmental conditions, the identified species are showing different types of growths: free-living branches and fragments, encrusting forms developing bindstones and they can all participate to the formation of rhodoliths. Taking into consideration the morphological features and the textural classification of Embry & Klovan (1972), the following main facies types have been separated: rhodolith rudstone, rhodolith floatstone, coralline algal debris grainstone, coralline algal bindstone, coralline algal rudstone-floatstone, branching algal (mäerl) rudstone-floatstone.

The most similar red algal carbonates have been described from the Carpathian Foredeep in Poland (Studencki, 1999). The resemblance is emphasized by the presence of the same red algal facies and red-algal species.

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POSTER

Calcareous nannofossils, mollusks and sedimentological investigations in the Sarmatian to Romanian deposits from the Dacian Basin

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Keywords: Calcareous nannoplankton, mollusks, sedimentology, Dacian Basin

Introduction

The studied area is located in northern Oltenia, western part of the Dacian Basin and belong to the Carpathian foredeep. From north to south, a succesion of Sarmatian, Meotian, Dacian and Romanian deposits have been studied, in the area of Vaideeni, Horezu, Oteşani, Cârstăneşti, Urşi as well Panga and Alunu quarries. Previous studies in the investigated area were realised by Anechitei & Popa (2006), Chira et al. (2014), among others.
Three sedimentary cycles occurred during the development of the Dacian Basin: Sarmatian (s. l.), Maeotian and Pontian-Dacian-Romanian (Jipa & Olteanu, 2006, 2009).

Results

Sarmatian occurences have been analysed from Vaideeni, Horezu and Oteşani.
The section from Vaideeni shows an alternance of sands and silty clays in the lower part, while in the upper part sandstones are dominant. The content of calcareous nannofossils from Vaideeni section is very scarce. A lot of small ascidian spicules are present in the basal part of the section. The nannoplankton assemblages contain: *Reticulofenestra pseudoumbilicus, Coccolithus pelagicus, Calciosolenia murrayi, Cyclicargolithus floridanus* and reworked species from Cretaceous and Paleogene.
The section from Horezu, Ulmului Hill, contain clays and sands with entire coccospheres of *Coccolithus pelagicus* and *Reticulofenestra pseudoumbilicus.* Frequent reworked species from Cretaceous and Paleogene were remarked and also ascidian spicules. The calcareous nannoplankton assemblages contain also: *Coccolithus miopelagicus, Calcidiscus macintyrei, Helicosphera carteri*.
At Oteşani - Luncavăţ River, non-tractive laminated siltic clays prouve a low energy of the depositional paleoenvironment, confirmed also by the presence of interconected valves of *Ervilia* genera. Remains of fossil fishes, sometimes leaves and coal fragments are present.
Oteşani – meadow. Another occurence contains at the base laminated siltic clays and a sandy level in the upper part. In the middle part of the section, a particular clay level is rich in iron-oxide concretions.
The calcareous nannofossils assemblages from the two occurences from Oteşani contain: *Calcidiscus leptoporus*, *Calcidiscus macintyrei*, *Calcidiscus pataecus*, *Coccolithus pelagicus, Solidopons petrae*, *Helicosphaera carteri*, *Reticulofenestra pseudoumbilicus, Triquetrorhabdulus rugosus*, *Sphenolithus moriformis*, *Discoaster* cf. *bellus*, *Pontosphera multipora*, *Braarudosphaera bigelowii*, *Thoracosphera* sp., a.o. Reworked species from Cretaceous and Paleogene and a high frequence of ascidian spicules were observed.
The Maeotian cycle. There are several places where the Maeotian sequence consists of a lower part with dominant clays, while in the upper part sands and/or gravels are more abundant. The most complete development shows a continuous transition from lower clayey facies to sandy deltaic facies linked to fluvial sedimentation. This is observed on the right slope of the Luncavăţ River (Cârstăneşti village, Vâlcea County)
An outcrop of about 40 m from Cârstăneşti**,** presents a succession mostly represented by sands and sandstones. In the upper part of the occurrence are present lumachelic levels of about 15-20 cm

very rich in species of *Limnocardium* and other bivalves, with entires valves or only fragments. This succesion prouve a progressive transition from a low energy shallow waters paleoenvironment to a higher energy and deeper paleoenvironment.

The calcareous nannoplankton assemblage contain: *Coccolithus mioplelagicus*, *Calcidiscus macintyrei*, *Triquetrorhabdulus rugosus*. A lot of ascidian spicules, smaller as at Otesani are present. Frequent are also calcispheres, belonging to *Thoracosphera*. Reworked species like in the other occurrences are present. The samples collected from the Limnocardiids levels contain very rare calcareous nannofossils, represented by *Reticulofenestra pseudoumbilicus* and calcispheres like *Thoracosphera* sp. and rare ascidian spicules. The age of these deposits is probably Pontian, due to the presence of Limnocardiids species and subordonately *Congeria* and *Melanopsis.*

Among Limnocardiids frequently occurring are *Pontalmyra subincerta* and *Pseudocatillus* cf. *subedentatus*.

The sedimentary cycle including Dacian-Romanian littoral and fluvial deposits show different sedimentary characters.

In the front of the Alunu and Panga quarries, Dacian – Romanian deposits, contain an alternance of sands, clays, silty clays and coals. At the top of the VI coal bed, the *Viviparus bifarcinatus* (Bielz) zone occurs, which is a marker for the Early Romanian. This species indicates a swamp paleoenvironment or an alluvial plain.

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POSTER

Badenian calcareous nannofossils and foraminifera from the Ocolisu Mic Section (Strei Basin, Central Paratethys, Romania): Taxonomy and paleoecology

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Keywords: Middle Miocene, calcareous nannoplankton, foraminifera, Strei Basin

Introduction
The Ocolisu Mic section is located in the eastern part of the Strei Basin, that is connected to the north-east with the Transylvanian Basin and to the north-west with Zarand Basin. The sedimentary succession of Strei Basin is represented by Badenian, Sarmatian and Quaternary deposits, which are disposed transgressively on the crystalline of the Sebeş Mountains.

Results
The paleontological and sedimentological study of the section from Ocolisu Mic, indicates lithofacies associations which suggests inner to outer shelf settings.
Twenty-three samples were investigated for calcareous nannofossils. Heterococcoliths, holococcoliths and nannoliths, belonging to 28 species of calcareous nannoplankton, 15 genera (*Helicosphaera, Pontosphaera, Calciosolenia, Syracosphaera, Rhabdosphaera, Cyclicargolithus, Reticulofenestra, Coccolithus, Coronocyclus, Calcidiscus, Holodiscolithus, Braarudosphaera, Micrantholithus, Discoaster, Sphenolithus*), 12 families (Heterococcoliths: Helicosphaeraceae, Pontosphaeraceae, Calciosoleniaceae, Syracosphaeraceae, Rhabdosphaeraceae, Noelaerhabdaceae, Coccolithaceae, Calcidiscaceae; Holococcoliths: Calyptrosphaeraceae; Nannoliths: Braarudosphaeraceae, Discoasteraceae, Stephanolithiaceae) and 7 orders (Zygodiscales, Stephanolithiales, Syracospherales, Rhabdospherales, Prinsiales, Coccospherales, Discoasterales) have been identified. Calcareous nannofossils belonging to ascidian spicules and calcareous dinoflagellates are also present. The calcareous nannofossils assemblages belong to NN5 Biozone.
A number of 20 species of calcareous foraminifera (14 benthic and 6 planktonic) and 15 genera included in 4 orders were identified and described.
The foraminifera assemblages belong to *Orbulina suturalis* Biozone, respectivelly M5 – M6.
Based on the morphometric studies of bentic foraminifera the following morphotypes were identified: rounded-planispiral, tapered/cylindrical, flattened-tappered, characteristic for an infaunal life-type.
From each sample a number of 100 foraminifers were counted, separated in benthic and planktonic species, and the P/B ratio was calculated.
Paleobathymetry was estimated on the basis of P/B ratio (100 x planktonic /benthic foraminifera) and benthic foraminifera characteristics. The P/B ratio obtained in these samples, suggest the presence of the inner, middle and outer shelf.

ORAL

Stratigraphic distribution of the Middle-Late Miocene artiodactyls from Moldavia (Eastern Romania)

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Keywords: Miocene artiodactyls, taxonomy, stratigraphy, eastern Romania.

Miocene artiodactyls are rather poorly known in eastern Romania. Such remains are recorded in the Moldavian and Scythian platforms, both of these units sharing a common geological history in the Middle-Late Miocene. This territory became gradually emerged after the Moldavian tectogenesis (Early Sarmatian s.l.). Therefore, the land vertebrate assemblages first settled either in the northern areas, or nearby the uplifted Eastern Carpathians.

The oldest Miocene artiodactyl known from this region was found in Fălticeni area, in Lower Sarmatian *s.l.* (Volhynian, Astaracian MN 7+8) coal-bearing deposits of the Fălticeni-Boroaia Formation. A small antler fragment documents an indeterminate cervid (Ţibuleac & Codrea, 1997). Recently, in the Arghira Member of the Şomuz Formation (Volhynian; details in Codrea et al., 2014), a skull fragment preserving the right horn-core documents the presence of the bovid "*Miotragocerus*" ("*M.*") *pannoniae* (KRETZOI, 1941), a species firstly reported herein in Romania.

Nothing was known concerning the Bessarabian (Middle Sarmatian *s.l.*) artiodactyls (Ionesi et al., 2005) until the report from the Scheia Formation at Draxeni of a tibia fragment, possibly documenting the presence of ?Lagomericynae (Codrea & Ursachi, 2007).

In the Khersonian (Late Sarmatian *s.l.*), excepting the presence of *Lagomeryx* cf. *flerovi* (Ionesi et al., 2005 and references therein) from Păun (type-section of the Păun Formation), a list of taxa can be sketched based on the discoveries from Crețești-Dobrina 1 (Early Vallesian, MN 9; Ursachi et al, 2015): *Hippopotamodon* sp., "*Tragoceras leskewitschi*" (BORISSIAK, 1914), Paleotraginae.

The Meotian artiodactyls are rare, described or only mentioned in localities such as Vutcani-Fălciu, Zorleni, Giurcani, Plopana, Colacu-Valea Putnei (Macarovici, 1978 and references therein), Reghiu-Vrancea (Vallesian, ?MN 10-11; Ştiucă, 2003) or Bacău (Vallesian, MN 10 or ?MN 9; Rădulescu & Şova, 1987).

Apart the fossils found *in situ*, numerous Miocene horn-cores and antler fragments were found reworked in Quaternary deposits, in localities as Simila (Codrea et al., 2013) or Movileni (both in Vaslui County). Some specimens originating from the second locality could document the presence of Cervidae (possibly ?*Euprox*) and *Gazella*.

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ORAL

Ghosts in the night - multituberculate diversity at the feet of the latest Cretaceous Transylvanian dinosaurs

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Keywords: Haţeg Basin, Transylvanian Basin, Kogaionidae, distribution

The multituberculates represent the longest-lived mammalian clade, with a fossil record that extends from the Middle Jurassic to the latest Eocene (Kielan-Jaworowska et al., 2004), and with a dominantly northern, Laurasian distribution. The uppermost Cretaceous (Maastrichtian) continental deposits of the Transylvanian area (and especially those of the Haţeg Basin) are remarkable in that they yield the only Late Cretaceous representatives of this group in Europe, whereas the group is relatively well represented in both earlier (Jurassic-Early Cretaceous) and later (Paleogene) timeslices. Furthermore, these Transylvanian multituberculates form a monophyletic assemblage, the Kogaionidae (Rădulescu & Samson, 1996; Csiki et al., 2005; Smith & Codrea, 2015) that is endemically restricted to the Haţeg Island of the Late Cretaceous European Archipelago, before spreading towards western Europe starting with the basal Paleocene. Previous reviews have suggested the presence of a relatively low diversity of kogaionids in Transylvania (Haţeg, Transylvanian and Rusca Montană basins), with only two genera (Csiki et al., 2005; Codrea et al., 2016): the monospecific namesake genus *Kogaionon* (Rădulescu & Samson, 1996) and the slightly more diverse *Barbatodon* (Rădulescu & Samson, 1986), with the type *B. transylvanicus* (Csiki et al., 2005; Smith & Codrea, 2015) and the minute *B. oardaensis* (Codrea et al., 2014, 2017).

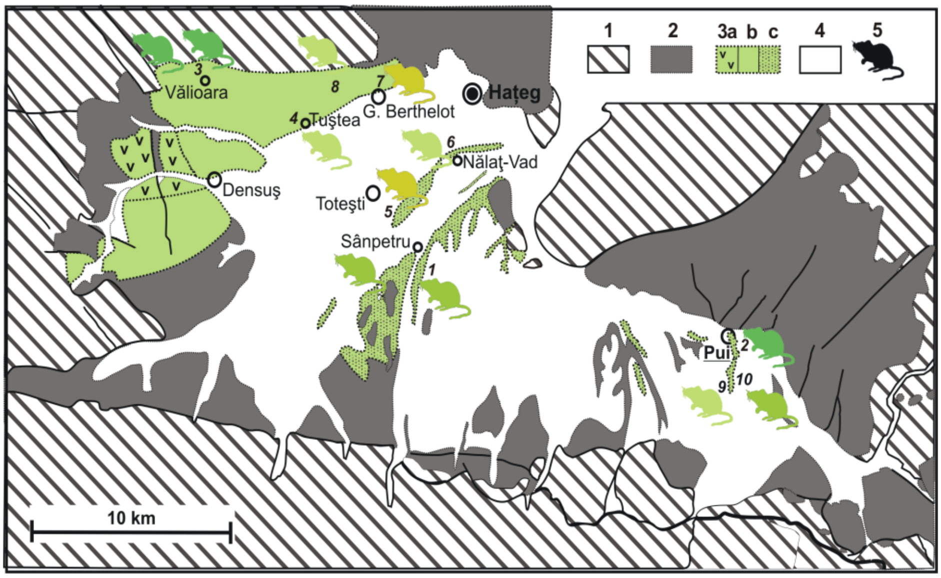

Fig. 1 Simplified geological map of the Haţeg Basin (based on Csiki-Sava et al., 2016), with the geographic and startigraphic distribution of the kogaionid remains. *Legend*: ***1*** – crystalline basement; ***2*** – sedimentary cover; ***3*** - Maastrichtian continental beds – ***a***, lower volcanoclastic member of the Densuş-Ciula Formation, ***b***, middle-upper part of the Densuş-Ciula Formation, ***c***, Sînpetru Formation and correlative beds; ***4*** – Quaternary deposits; ***5*** - multituberculate remains, with darker to lighter hues representing stratigraphically sequentially younger occurrences (based on references cited in the text).

New discoveries across the Hațeg and Transylvanian basins seem to document a higher taxonomic diversity than that previously recognized (e.g., Vremir et al., 2014; pers. observ.), suggesting that this clade underwent a moderately important adaptive radiation within the confines of the Hațeg Island during the latest Cretaceous. This local taxonomic diversity, unmatched in later, Paleogene kogaionid assemblages, is doubled by a marked size disparity within the group, disparity that probably reflects ecological differentiation in order to reduce intra-clade competition within the restrictive insular environment of the Transylvanian Landmass. Together with the newly recognized higher taxonomic diversity, the increasing fossil record of the group, especially in the Hațeg and southwestern Transylvanian basins, also suggests that the stratigraphic and geographic distribution of the kogaionids shows a more complex pattern (Fig. 1) than that previously charted by Codrea et al. (2016).

Finally, the remarkable preservation state of some of the new kogaionid discoveries, represented by associated cranial, dental and postcranial remains, allows for the first time a reasonably complete reconstruction of the kogaionid body plan, reliable body mass reconstructions, as well as assessment of some of the paleobiological characteristics of the group. It appears that at least some of the Transylvanian kogaionids have heightened senses of smell and hearing, as well as sensory-motor coordination, in accordance with the suggestion that many multituberculates had a preference for a nocturnal lifestyle (Kielan-Jaworowska et al., 2004). Meanwhile, other kogaionids were possibly burrow-dwelling organisms, although their cranial and postcranial features do not support a dominantly fossorial lifestyle as it was documented by certain other members of the Cimolodonta (e.g., Kielan-Jaworowska & Qi, 1990; Rougier et al., 2016).

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POSTER

Quantitative reconstruction of Holocene climate variability in the Eastern Carpathians, Romania

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Keywords: Holocene, Climate dynamics, Eastern Carpathians, Chironomidae, Testate amoebae

As natural and anthropogenic ecosystems are dependent on the local water availability, understanding past hydroclimate changes is a priority area in the research of climate variability. For this purpose, ombrotrophic bogs are most suited for hydroclimate reconstruction as they are entirely dependent on water from precipitations.

We used radiocarbon dating, testate amoebae (TA) and chironomids analysis on 2 sequences (complex of peat bog and small pond) from an ombrotrophic raised bog (Tăul Muced, Eastern Carpathians, Romania) to quantitatively determine major hydrological changes and July air temperature over the last 7500 years.

Specific objectives are to: (1) Determine the main ecological trends of subfossil communities of testate amoebae and chironomids assemblages; (2) Quantitatively reconstruct water table depth and pH based on testate amoebae, and July air temperature based on chironomids; (3) Use the July air temperature reconstruction to constrain the potential effect of evapotranspiration on changes in the water table; (4) Assess how our inferred hydroclimate conditions compare at the regional to continental scales.

Using the TA, we reconstructed wet mire surface conditions with a pH between 2.3 and 4.5 for the periods 4500–2700 and 1300–400 cal. yr BP by the occurrence of *Archerella flavum*, *Amphitrema wrightianum* and *Hyalosphenia papilio*. We inferred dry mire surface conditions and a pH between 2.5 and 5 for 7550–4500, 2750–1300 and 0 cal. yr BP–present by the dominance of *Nebela militaris*, *Difflugia pulex* and *Phryganella acropodia*. The chironomid-based mean July temperature reconstructions suggests low summer temperatures for the periods 6500–5600, 4500–3150 and 1550–600 cal yr. BP, while periods of slightly higher summer temperatures were observed for 5600–4500, 3150–1550 and 40 cal. yr BP–present.

Our climate reconstruction provides the first Holocene quantitative reconstruction of water table depth, pH and July air temperature based on two sets of biotic proxies, i.e. testate amoebae and chironomids in the Carpathians.

Results show a good agreement between drier phases of the peat surface conditions and higher summer temperature, suggesting that temperature may be an important factor controlling water table fluctuations on the mire in this region.

The findings of our study are relatively consistent with those from other palaeoclimate reconstructions from central-eastern Europe. However, they show contrasting conditions to other estimates from north-west Europe.

ORAL

Paleozoic calcareous algae from Denver Collection donors, Museum Support Center, Smithsonian Institution (Washington D.C., U.S.A.)

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Keywords: Calcareous algae, *Solenoporaceae*, Ordovician, *Anchicodiaceae*, Pennsylvanian

The calcareous algae *Denveropora loubortzii* n. gen. n. sp., *Denveropora* n. sp., *Solenopora spongioides* Dybowski 1878, *Garwoodia gregaria* (Nicholson 1888) emend. Wood 1941, *Ortonella furcata* Garwood 1914, *Girvanella wetheredii* Chapman 1907 and *Tubiphytes* sp. have been described from Ordovician deposits, Bromide Formation, Arbuckle Group, Oklahoma.

The new taxa described in this study belong to Family *Solenoporaceae* and they certify that their thalli have a compact inner structure with growth zones, no differentiation in hypo- and perithallus tissue. They are crossed by tube filaments sometimes with walls slightly moniliform, without partitions, but the most important these species character is represented by the sporangial conceptacle, variable in shape, length and opening. All features regarding the sporangial conceptacle, including dimensions, type and disposition of surrounding cells, became characteristic for each species.The finding of a sporangial conceptacle in this case, besides other distinctive features of the inner structure of the thallus, represent the valid arguments to separate the calcareous algae species from the Ordovician deposits.

Another taxon *Anchicodium wrayi* n. sp., from Pennsylvanian deposits, included in the group of phylloidal algae, was found from Paradox Basin, an oil reservoir located in the southeastern part of the Utah State. This taxon and others fossil taxa from the group of phylloidal algae belong to the Family Codiaceae, Chlorophyta sensu Littler and Littler, 2000. This group was characteristic for the most important oil, buildup algal reservoirs from USA with a high porosity and permeability and huge oil stock deposits.

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ORAL

Late Pleistocene occurrence of *Cuon alpinus* in Romania

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Keywords: Canidae, dhole, late Pleistocene, *Cuon alpinus*

The dhole (*Cuon alpinus* Pallas, 1811) is a middle size canid presently inhabiting patchy areas of Central, South, and Southeast Asia (Kamler et al., 2015). Albeit rare, the genus *Cuon* is present in Pleistocene fossil assemblages across Central and Southwest Europe where it was represented by at least two species, *C. priscus* and *C. alpinus* (Ghezzo & Rook, 2014). The dhole is extremely rare in the Pleistocene fossil record of Eastern and Southeastern Europe, but is present in the Caucasus (Baryshnikov, 1996).

Small surface probing excavations carried out in Stoieni Cave (Mehedinţi County, southwest Romania) yielded a diverse large mammal assemblage, including artiodactyl herbivores (cervids, bovids, suids) and carnivores (canids, felids, mustelids, ursids). Among the canid material the first dhole remains reported from Romania were identified: one right mandible bearing the first and second molars, one scapholunate, three metacarpals, and two metatarsals. The dental and metapodial elements clearly differ in size and morphology from those of other canids in the same assemblage, but are similar to other fossil and extant specimens of *Cuon alpinus*.

The material from Stoieni Cave, belonging to two individuals (based on the presence of two right 5th metacarpals), is not only the first Romanian occurrence of the dhole, which adds to its poor fossil record in the region, but it is also one of the geologically youngest European occurrences. Radiocarbon dating of the mandibular fragment places it at 27,301 ± 401 calibrated years BP, contributing important new information to the attempt of assessing the moment of dhole extinction in Europe.

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ORAL

Preliminary report on the faunal assemblage from a Middle Paleolithic site in the Vârghiş Gorges (Perşani Mountains, Romania)

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Keywords: Mousterian, late Pleistocene, vertebrate fossil assemblage, megafauna, microvertebrates

The Vârghiş Gorges represent the most important karst system of Perşani Mountains, including more than 100 caves of various sizes, formed in Triassic and Jurassic limestones (Cioacă, 2002). Some caves have yielded various Pleistocene large mammal fossil remains (e.g., Orghidan & Dumitrescu, 1963), but also archaeological material of various cultural styles (Mottl, 1950; Murătoreanu et al., 2015).

Abundant Middle Palaeolithic lithic material belonging to the Mousterian culture was found in Abri 122 rock shelter, along with large mammal fossil remains. Most of the fossil specimens are fragmentary, and were assigned, based on size and morphological affinities, to four generic groups, until more diagnostic material is found. Most bone fragments belong to large artiodactyls, assigned to the "*Bos/Bison* group", followed by large carnivore remains of the "*Ursus* group", and fragmentary bones of medium-sized ruminants, referred to as the "*Ovis*/*Capra*/*Capreolus*" group. Smaller carnivore bone fragments, assigned to the "*Canis* group", are the rarest in the megafaunal assemblage. There are no carnivore gnawing marks on the bones, but clear evidence of anthropic intervention can be seen, such as cut marks on large bovid bones. Evidence of bone processing for tool making is also present.

In addition to the macrofaunal remains, fossil microvertebrates were also found for the first time in the area, after a small quantity of sediment (around 50 kg) was screenwashed to test for their presence. Rodent and insectivore teeth determined as *Microtus arvalis*, *Microtus gregalis*, *Lagurus lagurus*, *Arvicola terrestris*, *Cricetulus migratorius*, *Cricetus cricetus*, *Microtus nivalis* and *Sorex araneus* were recorded. Herpetofaunal remains represented by teeth and postcranial remains belonging to indeterminate fishes, amphibians (*Rana* sp., *Pelophylax* sp., *Hyla* sp.), snakes (*Natrix* sp. and an indeterminate colubrine), and lacertid lizards are also present.

The microvertebrate assemblage, including taxa closely related to extant species, helps reconstruct the local environment as it includes taxa that show affinities to cold rocky habitats, but also to grasslands and shrubberies, or forests, in the vicinity of permanent waters (Petculescu, 2013; Cogălniceanu et al., 2013a, b).

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ORAL

Crucicanistridae n. fam., a new family of post-Triassic Entactinarian Radiolaria

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Keywords: Radiolaria, Entactinaria, post-Triassic Mesozoic, taxonomy, internal structures

It has become more and more evident that at the base of generic and especially suprageneric systematics of spumellarian and entactinarian Radiolaria should be the fundamental type of the innermost or first skeleton(s) and the ontogenetic development of the whole skeleton. Being built during the first stages of skeletal morphogenesis the innermost skeleton is more conservative and remains almost unchanged, whereas the external parts of the test change easier because they are built in later stages and undergo in a more direct manner the environmental control. They are also subject to convergence, homeomorphy and other adaptative phenomena which raise problems when the systematics is exclusively based on external morphology.

The Jurassic and Cretaceous family I describe herein proves plainly this phenomenon. The family consists generally of a lenticular, ellipsoidal or sphericl shell and 2 or 4 or, rarely more, three-bladed spines and have in the centre a double latticed medullary shell with a basket-shaped microsphere in its centre.

The fossil record of these radiolarians is rather spotty until present and, is practically restricted to Bajocian, lower Tithonian and Cenomanian. Despite their rather long range, they represent structurally a unitary group of entactinarians having as initial skeleton (see figure) a microsphere with a bar-centred 6-rayed spicule consisting of a median bar (**MB**), 2 apical bars (**A**), and 4 basal bars (**B**) that form together an apical structure with 2 triangular and 2 trapezoidal faces. The antapical structure is represented by 4 descending bars originated in the basal bars of the spicule and interconnected at the antapical end by 4 horizontal bars forming a square pore (**prst**). This initial structure resembles a basket (*canistra* in Latin) that determined the name of the family. The basal bars of the spicule have 2 or more nodal points in which the following shells or girdles have their origin. The first 2 nodal points give rise to pairs of opposite branches in successively perpendicular planes. The first nodal point has branches in the equatorial plane that form together an equatorial rectangle (**abcd**). The second nodal point (**e**, **f**, **g**, **h**) has 2 opposite branches in vertical plane. These branches are interconnected with the distal ends of apical bars (**A**, **A**) and with the distal ends of the antapical bars (**P**, **R**, **S**, **T**) (see drawing) forming arches that repeat at a larger scale the shape of the microsphere. These arches, which are usually well-marked on the shell by constrictions, represent the scaffolding on which the first latticed shell is built.

By their general shape, with a globular or lens-shaped shell and 4 primary spines, some Crucicanistridae can be compared with some species of *Emiluvia* from which they differ in having no nodes on the two faces and, of course, in having another initial structure.

The Crucicanistridae are rather common in the middle Jurassic, especially Bajocian, from Japan and the lower Tithonian from the Solenhofen area. They should be present within the interval between these two stages, and between lower Tithonian and the lower Cenomanian, when I found the youngest representatives. Most taxa of this family are easily recognisable, consisting of a globular test with one lattice shell (*Crucicanistrella* n. gen.) or two to three shells (*Crucicanistra* n. gen.) and 4 equatorial three-bladed spines. These spines represent external prolongations of the 4 basal bars of the spicule. Usually the spines are not equal, two opposite spines or only one being longer that the others. Sometimes the short spines are not at all visible outside, but they are present inside the shell.

The whole shell is usually latticed. In one or two genera the shell outside the medullary shell consists of spongy layers of various thickness (*Spongocanistra* n.gen.) leaving outside one or

several spines or having even a pylom. In a single genus with only 2 main spines expressed outside, the shell outside the medullary one can become spiral (*Spirocanistra* n. gen.).
The article describes and illustrates all genera and species of the family known until present by the author.

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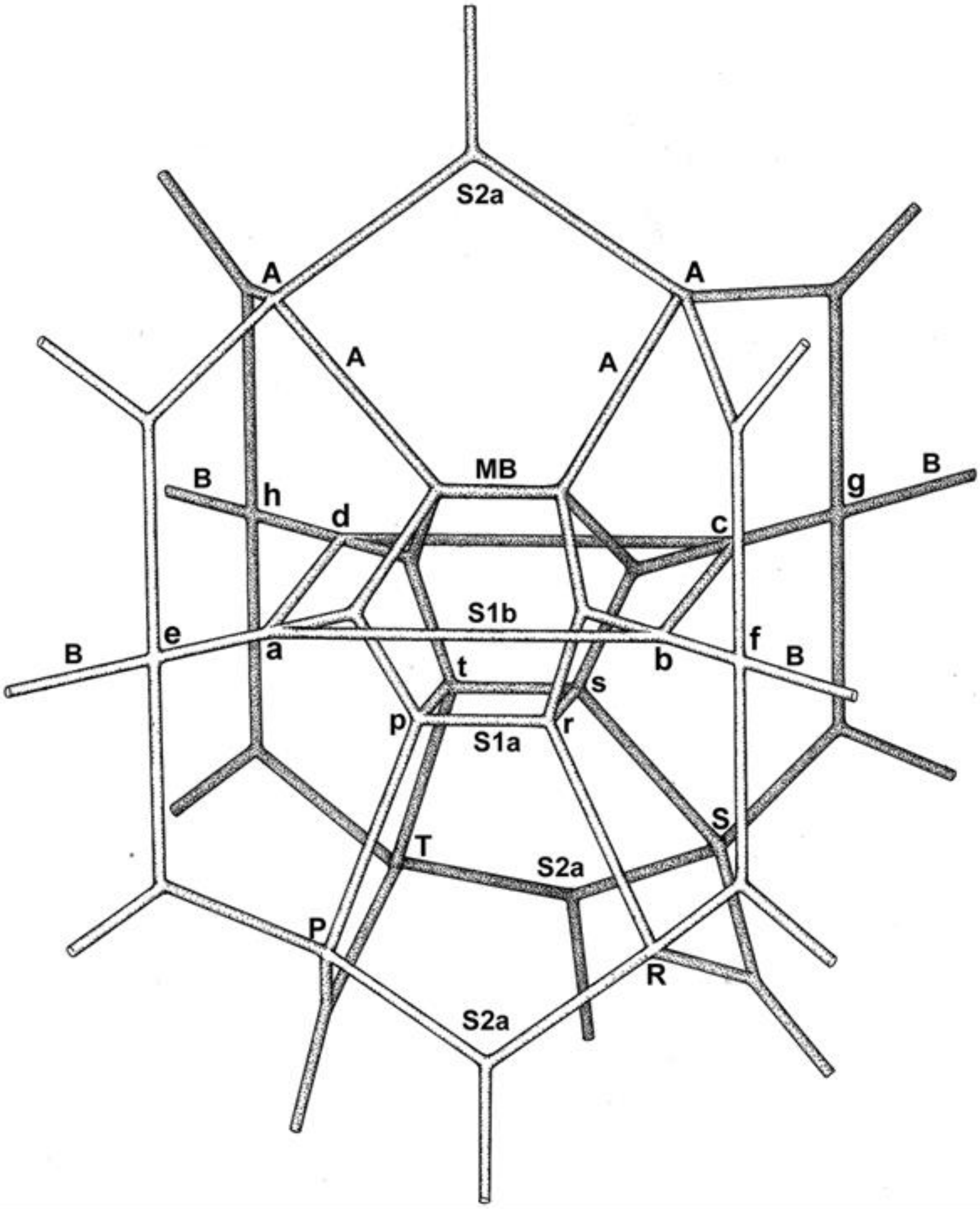

Fig. 1 Structural scheme of the mid Jurassic – mid Cretaceous family Crucicanistridae n. fam.: **MB** – median bar; **A** – apical bar; **B** – basal spines; **S1a** – microsphere (first girdle of first system); **S1b** – second girdle of first system; **S2a** – first girdle of second system; **abcd** – corners of the rectangle **S1b**; **prst** – corners of the antapical rectangular pore of the microsphere; **e**, **f**, **g**, **h** – second node of basal spines; **P**, **R**, **S**, **T** – corners of the rectangle of the girdle **S2a**;

POSTER

Paleoenvironmental reconstruction of the Middle Miocene deposits from SE Poland and NE Romania based on micropaleontological studies

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Keywords: Badenian, Sarmatian, foraminifera, ostracoda, Central Paratethys

The material analysed herein comes from 2 outcrops (Dorneşti și Ripiceni) and 4 drilling cores (Machów, Jamnica M-83, FH_3P_1 Rădăuţi, Bilca 1) from Poland and Romania. During the Middle Miocene all the studied sections were a part of the Central Paratethyan domain. The studied deposits from Machów, Jamnica M-83 (Poland), FH_3P_1 Rădăuţi, Bilca 1 and Dorneşti (Romania) successions belong to the outer part of the western and eastern Carpathian Foredeep Basin (foredeep depozone). In turn, sediments of the Ripiceni section (Romania) belong to the backbulge depozone of the Eastern Carpathians Foreland Basin System (Grasu et al., 2002). In all 6 sections we identified 176 of both calcareous and agglutinated benthic foraminifera, 18 species of planktic foraminifera and 57 ostracod species.

Foraminifera are commonly and successfully used as tools for paleoenvironmental reconstructions since the primary production, strictly connected with organic matter flux to the sea floor, oxygen concentrations within the water and sediment column, temperature, salinity, chemistry and pH of ambient water are believed to be main parameters which control the distribution of both planktic and benthic foraminifera (e.g. Bé, 1977; Van der Zwaan et al., 1999; Murray, 1991). Similarly, ostracods have a great potential for paleoenvironmental reconstructions using their assemblage composition, the species distribution and the ecophenotypic variability can provide valuable information including water salinity, temperature, depths as well as substrate characteristics of the basin (Van Morkhoven, 1962).

Accordingly, the occurrence of quite diverse planktic foraminifera (*Globigerina*, *Globigerinita*, *Globorotalia*, *Globigerinoides*, *Velapertina*) in the latest Badenian deposits of Machów, Jamnica and Bilca 1 sections, indicate occurrence of full marine conditions. This is also supported by the ostracod fauna identified in the same interval, respectively the species *Henryhowella asperrima*, *Kyrte* sp., *Cnestocythere truncata*, *Verucocythereis verucosa*, *Cytheropteron* spp. which are also indicating normal marine conditions.

Benthic foraminiferal assemblages from the upper Badenian sediments from Poland and Romania yielded a large number of buliminds, bolivinids, uvigerinids, rotaliids, enrolled or partly uncoiled milioline as well as agglutinated foraminifera. The large number of shallow- and deep-infaunal taxa buliminds, bolivinids and uvigerinids, which thrive in organic-rich sediment, indicate large input of the organic matter to the bottom of the sea and possibly oxygen deficiency within the sediment column (e.g. Murray, 1991; SenGupta & Machain-Castillo, 1993; Dubicka et al. 2014), as well as normal marine or slightly increased salinity. The occurrence of organic rich-deposits usually associated with relatively low pH are also supported by large amount of infaunal agglutinated taxa, which can overcome the difficulty of secreting calcium carbonate in such environments (Dubicka et al., 2014). In turn, the abundant epifaunal planconvex and/or biconvex *Cibicides*, *Heterolepa*, *Hanzawaia* and *Lobatula* and coiled or partly uncoiled milioline such as *Sigmoilinita*, *Miliolinella*, *Pseudotriloculina* suggest well-oxygenated bottom water (Kaiho 1991, 1994). As a result, benthic foraminiferal fauna indicate that during the late Badenian in Polish and Romanian studied areas, the sedimentation took place in normal marine conditions, which is also supported by the abundant planktic foraminifera, with relatively large organic matter supply and relatively well/moderate oxygenation at the bottom of the sea.

During the early Sarmatian, different paleoenvironmental conditions are postulated and many controversies arise especially regarding the brackish character of this interval (e.g. Brestenská, 1974; Piller & Harzhauser, 2005). Based on faunistic criteria, different authors (e.g. Ionesi, 1968) consider that during the early Volhinian, the salinity was relatively higher than in its upper part, which explain the presence of some Badenian taxa in the Sarmatian deposits. Some of the authors (Łuczkowska, 1964; Odrzywolska-Bieńkowa, 1974) consider the planktic foraminifera (globigerinids) in some intervals of the early Sarmatian in the Polish sections as introduced forms.

In our sections, the planktic foraminifera re-appear in several intervals of early Sarmatian deposits. However, their well-preservation and relative abundance in our samples rather suggest that they are in situ, indicating periods of temporary nearly normal-marine conditions. Our study points that in the early Sarmatian the salinity oscillated from brackish to slightly higher probably due to some minor transgressions when short-lived near-fully marine conditions where re-establish in the Polish as well as in the Romanian studied areas. The taxonomic composition of the ostracod assemblages, e.g. the following genera *Aurila*, *Callistocythere*, *Henryhowella*, *Xestoleberis*, *Loxoconcha*, *Loxocorniculum* from the early Sarmatian deposits of the studied sections are also indicating a normal marine environment (e.g. van Morkhoven, 1963; Ter Borgh et al., 2014). Fluctuations of salinity during the early Sarmatian were also documented in other parts of Central Paratethys (e.g. Filipescu et al., 2014).

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POSTER

The mineralogical composition of MIS 3 cave bear bones from Muierilor Cave, Southern Carpathians, Romania

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Keywords: mineralogical analysis, *Ursus spelaeus*, Muierilor Cave, Southern Carpathians, Romania

In the last two years a paleontological excavation was carried out in the Muierilor Cave, within the scientific reserve, of the Urşilor Passage, aiming to identify the faunistic assemblage and to reconstruct the abrupt climate changes as documented in the late Pleistocene of southwestern Romania. Until now, the paleontological excavation yielded fossil remains belonging to the following taxa: cave bear (*Ursus spelaeus*), cave lion (*Panthera spelaea*), cave hyena (*Crocuta crocuta spelaea*), wolf (*Canis lupus*), along with several herbivores (*Ibex capra,Cervus elaphus* and *Bos primigenius*) and micromammals (*Arvicola terrestris, Cricetus cricetus, Glis glis, Microtus nivalis* and *Talpa europaea*).

The aim of this study is to define from a mineralogical perspective the patterns and degree of bone preservation, and to identify diagenetic changes that had occurred. These processes include changes in qualitative and quantitative mineralogical composition of bones, mineral replacement of primary bone material, infilling of cavities with secondary minerals, and changes of crystallinity.

For this study, analyses were performed on the cave bear bones that date back to between ca. 35 - 48 ka cal BP. The crystallinity index was determined using X-ray diffractometry following Person et al. (1995). Two fragments of bones from each level of the paleontological excavation were analysed in order to observe if there is a vertical variation of the mineralogical parameters.

This site provides the opportunity to understand the processes leading to bone alteration in caves, such as dissolution, precipitation and recrystallization and illustrates the interaction of the bone material with the karstic environments.

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ORAL

A discussion on the Badenian - Sarmatian transition based on foraminifera

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Keywords: Middle Miocene, foraminifera, biostratigraphy, Transylvanian Basin

The paleogeographic evolution of the Paratethys produced important consequences on the regional stratigraphic record. Therefore, biozonations in the Paratethyan basins are based sometimes on some planktonic foraminifera with wide stratigraphic ranges or only regional paleogeographic distribution, or on endemic benthic taxa.

The Badenian – Sarmatian transition coincided with a major biotic change around the boundary, the so called Badenian-Sarmatian Extinction Event. However, the biotic event which defines more reliably the boundary is the base of the *Anomalinoides dividens* Acme Biozone (Luczkowska, 1963; Brestenská, 1974; Popescu, 1995; Filipescu, 2004; de Leeuw et al., 2013). Unfortunately, this clear and marked bioevent was not always identified or properly considered (e.g. Palcu et al., 2015). In order to avoid possible biostratigraphic misinterpretations, our purpose is to describe the foraminifera assemblages in the vicinity of the Badenian – Sarmatian boundary and to underline the specific characters having biostratigraphic and correlation value.

The studied material was collected from an abandoned quarry in the vicinity of Cluj-Napoca (46.767536N, 23.691362E), displaying a more than 90 m thick sedimentary record of dominantly fine grained deep marine mudstones with intercalations of volcanic ashes, sandstones, and pebblestones (Nagy et al., 2015).

The Upper Badenian succession is dominated by planktonic foraminifera assemblages, including the index *Velapertina* (Popescu, 1979). The identified large planktonic taxa are usually associated with pteropods in the transgressive intervals. Higher sedimentary and organic input produced changes in populations, by switching to smaller planktonics (see Filipescu & Silye, 2008) and increasing proportions of either agglutinated forms (activation of turbiditic systems), or calcareous benthics (shallower environments). A possible uplift and deposition of volcanic ashes towards the top of the Badenian resulted in a shallowing of the environments, as suggested by the almost exclusive benthic assemblages.

Above the lithostratigraphic marker of the Badenian – Sarmatian boundary (Apahida Tuff), the first specimens of *Anomalinoides dividens* occur, together with eurihaline benthic foraminifera (*Elphidium* and Miliolids) and ostracods. This transitional interval suggest a significant instability in the chemistry of marine water. The first bloom of *A. dividens* can be observed in the mudstones associated to the transgressive interval above the volcanic ashes. This was also recorded in well logs (Krezsek & Filipescu, 2005). The sedimentological trend, the absence of other typical benthic taxa, the rare accompanying globigerinids, and the test's ultrastructure suggest a tychoplanktonic behaviour for *A. dividens*. Additionally, the transgressive setting gives good reasons for using this bioevent for tracing the lower boundary of the Sarmatian.

The remaining more than 70 m of the section belong to the same biozone, with recurrent abundances of *A. dividens* and changes in assemblages' composition. The clear ciclicity with regressive (with gypsum and reworkings) and transgressive (with buliminids and globigerinids – also observed by Filipescu & Silye, 2008) trends seems to have a good correlation potential at basinal or even regional scale.

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ORAL

Stable isotopes on ostracods indicate marine incursions in the Dacian Basin during Upper Miocene and Pliocene

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Keywords: Ostracoda, Stable Isotopes, Upper Miocene, Pliocene, Dacian Basin.

Introduction

The Dacian Basin was a part of the Paratethys Sea (Laskarev, 1924) that stretched over Eurasia during Miocene to Pliocene. During those times the Paratethys experienced large variations in its connections to the Ocean that hampered correlation of events to the global ones. The high degree of biota endemism limited the possibility for $\delta^{13}C$ & $\delta^{18}O$ isotope methodology.

Aim and Methods

We present the first stable isotope ($\delta^{18}O$ and $\delta^{13}C$) data of the Dacian Basin spanning the latest Miocene to Pliocene. Next to mollusks, the ostracods are the groups of organisms that provide the only time-continuous biogenic carbonates in the Dacian Basin and were used for obtaining the here presented $\delta^{18}O$ & $\delta^{13}C$ records. These data were obtained from the 2300 m thick Slanicul de Buzau reference section, with available high resolution ostracod biochronology (van Baak et al., 2015).

Results

The new $\delta^{18}O$ and $\delta^{13}C$ data provide a first order reconstruction of the most significant paleogeographic and climate changes affecting the basin during 6.3 to 3.3 Ma time interval. These data were furthermore compared to the strontium isotope data from the same Slanicul de Buzau section (Grothe, 2016). To minimize the effects of species dependent biosynthetic fractionation on the $\delta^{18}O$ and $\delta^{13}C$ values we target single specimen measurements, preferentially on *Cyprideis* sp., and *Tyrrhenocythere* sp.

Conclusions

The $\delta^{18}O$ and $\delta^{13}C$ records from Slanicul de Buzau show both very large variations, in order of 13‰ (from around -11‰ to 2‰) over the sampled 3 Myr interval. Such large changes cannot be explained only by species or interspecies dependent variations in the biosynthetic fractionation. They must indicate important changes in the Dacian Basin water properties. There are two intervals recording much heavier $\delta^{18}O$ values (up to 0 and +2 ‰) when compare to the rest of the record. The older one is at ~5.4 Ma and coincides with so named 'Bosphorian Flood', interval that is also marked by elevated $^{87}Sr/^{86}Sr$ values close to those recorded in the oceanic waters at that time (Grothe, 2016). We interpret the interval as a time when an influx of saltier, possibly also warmer water, affected the Dacian Basin. The second one, at around 3.4-3.3 Ma, is also marked by somehow higher $^{87}Sr/^{86}Sr$. Because the timing of this younger interval heavier $\delta^{18}O$ values coincides with the Mid Pliocene Warm period we speculated that an influx of warmer, possibly also saltier water, affected the Dacian Basin. The $\delta^{13}C$ data do not follow the trends of the $\delta^{18}O$. At 5.5 Ma (during the 'Bosphorian Flood') the heaviest $\delta^{13}C$ are recorded (+2 ‰). After this interval, until the end of our record at 3.3 Ma, with some fluctuations, there is a consistent decrease in the $\delta^{13}C$ values (up to -11 ‰). We interpret this $\delta^{13}C$ decrease as a steady change in the environmental conditions of the Dacian Basin, from more eutrophic at 5.5 Ma to more oligotrophic towards the 3.3 Ma.

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ORAL

The echinoids of the K/T boundary Moravitsa section (Western Fore-Balkan, Bulgaria)

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Keywords: Echinoidea, Maastrichtian, Danian, Moravitsa, W Fore-Balkan

Introduction

The Moravitsa section is located SSE of the homonymous village, SW of the town of Mezdra (Vratsa District, southern part of north-west Bulgaria), near an affluent of the Iskar river. It is part of the southern limb of the Mezdra syncline (West Fore-Balkan) that comprises, from base to top, the following Upper Cretaceous lithostratigraphic units: Dârmanci (=Darmantsi) Formation, Kunino Formation, Mezdra Formation, and Kajlâka Formation (Jolkičev, 1986; 2006).

The section is mostly represented by sandstones (Darmantsi Formationpassing into glauconitic nodular limestones (Kunino Formation) in the lower part, and a thick cyclic carbonate sequence including chert levels and thin-bedded limestones with abundant chert concretions (Mezdra Formation), some of them echinoids themselves, in its upper part. It keeps a register of the K/T boundary, based on an iridium anomaly (Sinnyovski, 1998, 2003). This fact has favoured the study of the occurring micro- and macrofauna, especially in the last decades (e.g. Stoykova *et al.*, 2001). In the last two years, the current authors have developed an integrated biostratigraphic framework based on its ammonites, inoceramids and echinoids that will soon be submitted. This is an advance of its echinoids chapter.

Results

Up to now, the echinoids species present in the Moravitsa section are only representative of the Orders Holasteroida (Family Echinocorythidae) and Spatangoida (Families Micrasteridae, Hemiasteridae and, Aeropsidae): *Echinocorys scutata* forma *ovata*, *E. edhemi*, *Cyclaster vilanovae*, *Isaster aquitanicus*?, *Hemiaster stella*, *Coraster vilanovae* and *Homoeaster evaristei*.

Echinocorys scutata forma *ovata* (Leske, 1778) is the only echinoid identified below the K/T boundary and so, the only one whose Lower Maastrichtian age has been calibrated by means of ammonite and inoceramid occurrences. *Echinocorys edhemi* Böhm, 1927 occurs in the upper half of the section and was originally described from the Danian of north-west Turkey. *Isaster aquitanicus* (Grateloup, 1836) was originally described from the Danian of south-western France but is also common in the Danian to Thanetian of north and south eastern Spain, Turkey, Crimea and Mangyshlak peninsulas. *Hemiaster stella* (Morton, 1830) is probably the most puzzling species not only by its wide palaeogeographical distribution but also by its stratigraphical range, from the Early Maastrichtian of Zululand to the Late Thanetian of New Jersey (USA) from where the holotype comes. Finally, *Cyclaster vilanovae* (Cotteau, 1886), *Coraster vilanovae* Cotteau, 1886 and *Homoeaster evaristei* (Cotteau, 1886) were all three first described from the same locality and stratigraphic levels, the uppermost Maastrichtian and lowermost Danian (Gallemí *et al.*, 1995) of the Alicante province (SE Spain); these are widespread species across the Tethyan domain, from East Greenland to Dagestan or from Bavaria to Mozambique (Smith & Jeffery, 2000).

Conclusions

The ages of the echinoid species present at Moravitsa section range from the Uppermost Lower Maastrichtian to the early Late Danian NP3 Zone. From a palaeobiogeographic point of view, during these times their distribution was widespread across central Tethys with the exception of *Echinocorys edhemi*, seemingly restricted to its eastern side.

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POSTER

Early and Middle Miocene microfauna and nannoplankton assemblages from Totea – Valeni Area (Southern-Central Getic Depression, Romania)

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Keywords: Early Miocene, Middle Miocene, microfauna, nannoplankton, Getic Depression

Introduction

The Miocene sedimentary sequences from the Southern - Central Getic Depression have been extensively drilled for oil and gas accumulations. The Lower and Middle Miocene sedimentary deposits were intercepted inTotea, Colţeşti, Rădineşti and Văleni areas, situated westwards of the Olt River.

Methodology

For micropaleontological and nannoplanktonical analyses, we selected 25 cores and 40 cuttings from 8 wells. Microfauna and nannoplankton analyses were madeon these rock samples according to the I.C.P.T. Campina Geological Laboratory procedures. In order to obtain foraminifera, the samples were reduced to piecesand left in water for 12 hours, after that they were washed under water on sieves and handpicked under the stereo microscope Olympus SZX10 and photographed with Olympus UC30. For nannoplankton, the samples were boiled with hydrogen peroxide for 20 minutes and after that the resulting mud is filtered and washed with distillate water. The washed mud is placed in Berzelius glass with distillate water and exposed to ultrasounds for 3 minutes. A few drops of this solution were put on a glass slide and cooked on a hot plate. The identification and photographing of the taxa were performed using Olympus BX 51 polarized microscope.

Results

The oldest deposits(Aquitanian - EarlyBurdigalian)were crossed by TO-4 well and wererepresented by blackish gray, greenish gray and brownish gray clays and marls, with thin intercalations of calcareousmedium granulated sandstones. The age of these deposits was established based only on the calcareous nannoplankton.We identified an assemblage that containstaxa like: *Calidiscus leptoporus*, *Helicosphaera carteri*, *Umbilicosphaera jafari*, *Coccolithus miopelagicus*, *Sphenolithus conicus* and *Cyclicargolithus abisectus*.

The Early Burdigalian deposits, crossed by the TO-2, CO-1, RA-1 and VA-2 wells, were dated by the foraminifera assemblage with *Globigerinoides trilobus* and by the presence of nannoplankton taxa: *Discoaster druggii*, *Sphenolithus belemnos* and *Helicosphaera ampliaperta*, that indicate NN 2 - NN 3 Zone (Martini, 1971).

The Late Burdigalian deposits were intercepted in CO-1, VA-2 and RA-1 wells. They are represented by gray and reddish brown marls and clays, gray siliceous fine granulated sandstones, with mixed binder or calcareous cement. The foraminifera assemblage with *Paragloborotalia mayeri* and Heterohelicidae established this age for the samples from CO-1 and VA-2 wells. The presence in the calcareous nannoplankton assemblage of the *Calcidiscus leptoporus*, *Calcidiscus macintyrei*, *Reticulofenestra pseudoumbilica* and *Sphenolithus conicus* species, estimating the upper part of the NN 3 Zone (Martini, 1971), confirm the presence of the Late Burdigalian formations in the RA-1 well.

The Middle Miocene is represented by the Middle-Late Badenian and Volhynian deposits. The classical succession of the Badenian formations includes four horizons: the *Globigerina* Marls Horizon, the Evaporitic Horizon, the Radiolarian Shale Horizon, and the *Spirialis* Marls Horizon (Mutihac et al., 2004). These were intercepted by wells in Totea and Rădăineşti areas.

The foraminifera assemblage from the TO-2 well is characterized by the abundance and diversity of the Globigerinidae species, indicating the *Globigerina* Marls Horizon. The nannoplankton assemblage contains taxa as *Sphenolithus heteromorphus*, *Umbilicosphaera* and *Helicosphaera walberdorfensis* which are specific for NN 5 Zone (Martini, 1971) and were encountered in the samples from the TO-1, TO-2 and TO-3 wells.

The Radiolarian Shale Horizon has been identified by a microfauna assemblage rich in Radiolaria taxa in the samples from RA-1 and TO-3 wells.

The presence in a large number of *Limacina* sp.,in the microfauna associations found in the samples collected from the TO-1 well, argues the presence of the *Spirialis* Marls Horizon. For these samples, the nannoplankton assemblage indicates NN 6 Zone (Martini, 1971) by the presence of the index taxon *Discoaster exilis*.

The Volhynian deposits are lithologically represented by gray marls with sandstone and sand intercalations The microfauna *Anomalinoides dividens* Zone defining the Early Volhynian was identified only in the TO-1 well. For the same samples, the nannoplankton assemblage is formed by of a large number of small-size reticulofenestrids, along with *Calcidiscus leptoporus*, *Calcidiscus macintyrei*, *Coccolithus miopelagicus*, *Umbilicosphaera jafari* and *Syracosphaera pulchra*. A similar assemblage was described by Mărunţeanu (1999) in the Carpathian Flysch area, for the NN 7 Zone (Martini, 1971). An assemblage with a predominant small-size reticulofenestrids has also been identified in samples from the VA-1 well.

The Volhynian is well represented in VA-1 well by frequent species of Miliolidae. The most important taxa at this level are *Varidentella reussi*, *Varidentella sarmatica* and *Pseudotriloculina angustioris*. Other species found in this well that have been reported close to the border of Early to Middle Sarmatia (ter Borgh et al., 2014), are *Elphidium hauerinum* and a large number of fragments belonging to *Articulina problema*. For these samples, the nannoplankton assemblage identified the NN 8 Zone (Martini, 1971) with the occurrence of the index taxa *Catinaster coalitus*. Aside from the index taxa, occurrences of *Isolithus semenenko* and *Noelaerhabdus bozinovicae* appear, specific for the Central Paratethys basin (Galović Young, 2012).

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ORAL

Palaeobiogeographic differentiation and phylogeny of the Oxfordian (Upper Jurassic) perisphinctid ammonites in the Submediterranean Province and its implications for the intra- and interprovincial biostratigraphic correlations

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Keywords: ammonite biochronology, provincialism, bioevents, correlations

Jurassic zonal schemes are based on ammonite biochronology. Late Jurassic provincialism resulted in several individual zonal schemes in Europe (Cariou et al., 1997, Matyja, Wierzbowski, 1995, Sykes, Callomon, 1979, Wierzbowski, Rogov, 2013, Wright 2001). To correlate them, rich ammonite collections are needed, gathered from individual horizons in long-ranging stratigraphical successions (Matyja et al. 2006). The Submediterranean Oxfordian sections of southern Poland meet these terms being developed in a potent series of uniform pelagic limestone and, except of the basal Mariae Zone, missing gaps or condensations (Kutek, 1994, 2001). There in these sections the ammonite fossils are plentiful; dimorphic counterparts occur in single horizons and shells with preserved apertural modifications are common. A good state of taphonomic preservation and a precise stratigraphic control of the ammonite assemblages down to horizon level resulted in precise recognition of their taxonomic and phylogenetic relationships (Brochwicz-Lewiński, 1976, Głowniak, 2002, 2006a, Malinowska, 1972). Collections in question (IGP.UW.A.36 and ZI/37 housed in the Faculty of Geology of the University of Warsaw) consists of approximately two thousand ammonite specimens collected from in situ, bed by bed, and their main constituent are perisphinctids (Submediterranean ammonite faunas), with some Mediterranean either (Sub)Boreal ammonite taxa which co-occur with the former ones in certain stratigraphical intervals.

A monophyletic lineage consisting of successive morphospecies of the genus *Perisphinctes* Waagen has been interpreted in terms of ancestral – descendat forms (Głowniak 2002). Based on shell morphology characters first appearing at certain stratigraphical horizons, the revised perisphinctid taxa have been used as zonal or subzonal boundaries in the Middle-Upper Oxfordian zonation of Central Europe as proposed by Głowniak (2006a). It has been further correlated with the Oxfordian zonal schemes of NW (Subboreal) and SW (Submediterranean) Europe by means of co-occurring Boreal either some Submediterranean taxa of limited geographical distribution (e.g *Larcheria*). The correlation has been made by comparison with ammonite successions in the intermediate areas of northern Switzerland, Spain and northern Germany; these areas represent type areas of index and guide species used in various Oxfordian zonal schemes (Gygi, 2001, Salfeld, 1914, Sykes, Callomon 1979, Wright, 2001). The main conclusions relevant for biochronological correlations are the following ones:

1) Evidencing a diachronous position of the lower boundary of the Transversarium Zone of the Middle Oxfordian zonal schemes (Głowniak, 2006b);
2) Establishing of the lower boundary of the Bifurcatus Zone at the base of the Wartae Subzone (absorbed into the overlying Bifurcatus Zone as a basal Subzone) (Głowniak 2006a);
3) Pointing out the lower boundary of the redefined Bifurcatus Zone as a convenient lower boundary of the unified Submediterranan Upper Oxfordian substage, closely correlating with the lower substage boundary in the Sub- and Boreal Oxfordian zonal schemes (Głowniak, 2005, 2006a).

The family Prososphinctinae Głowniak, 2012 has been erected to distinguish a separate perisphinctid lineage recognized within the Oxfordian perisphinctids. Material from Polish sections revealed that the lineage leads from a genus *Prososphinctes* (Early Oxfordian), and higher up to *Platysphinctes* and *Liosphinctes* (early Middle Oxfordian), *Larcheria* and allied forms (early Late Oxfordian) and eventually gives rise to Late Oxfordian and Early Kimmeridgian Subboreal Aulacostephanidae (Głowniak, 2000, 2012). The lineage has Mediterranean roots and represents a group of generalists. The contribution of the studies on Prososphinctinae lineage proves its limited correlation potential in Submediterranean Europe.

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ORAL

150 years from the publication of Carl Ferdinand Peters' monograph on the geology of Dobrogea – the palaeontological legacy

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Keywords: Carl Ferdinand Peters, geology of Dobrogea, palaeontological legacy

Introduction

The Austrian geologist Carl Ferdinand Peters (1825-1881) has been the first who did geological investigations of the whole territory of Dobrogea. His monograph on the geology of Dobrogea, published in 1867, is accompanied by an artistically-drawn geological map. Although this map has only a 'geognostic pattern', lacking any figured tectonic elements as those known today, it established the general outline of the geology of Dobrogea. Looking on this map, it can be seen that Peters, with only few exceptions, had examined in the field almost all regions in Dobrogea where rocks are exposed.With all this in mind, one can rightly say that **Carl Ferdinand Peters** is the **Father of Geology of Dobrogea**. His monograph on Dobrogea has also a first part that refers to the geography of Dobrogea, in which very important data on the history and demography of this territory are to be found. Even for those times, when Dobrogea was ruled by the Ottoman Empire, it is obvious that the Romanian population was the majority in this territory.

Remarkable is that in Peters' geological monograph there are numerous palaeontological data by means of which the ages of the described rocks have been dated. Although in some cases the taxonomic assignments and the ages considered have since been revised, in many other cases the palaeontological data and the dating are perfectly valid.

On the life and countless scientific contributions of Carl Ferdinand Peters the readers have to refer to Hubmann (1996, 1999, 2000), Hubmann & Schedl (1999), Hubmann & Bojar (2002).

The impetus to talk about Peters' remarkable contribution to our present knowledge on the geology of Dobrogea, with special emphasis to his palaeontological legacy, is that in 2017 a centenary and a half after the publication of Peters' valuable monograph ought to be remembered and celebrated. Our present account is a contribution to this end.

Discussions and Conclusions

I will discuss only Peters' palaeontological legacy as concerns the Triassic and the Jurassic of North Dobrogea. The Triassic fossils mentioned in Peters'monograph are from the Cataloi village (then Katalui) and from the Popina-Island (Popin-Insel). From the first locality, Peters mentioned the presence of daonellid bivalves. From the Popina-Island brachiopods have been described and illustrated, with the newly described species *Rhynchonella orientalis* nov.sp. (p.162, fig.12), to which gastropods and an ammonoid (? *Ammonites Aon* Münster) have been also added. The Triassic of Cataloi village from which Peters'daonellid bivalves originated has been later dated as Ladinian (Simionescu, 1925). The fauna from the Popina Island came from the Wetterstein-type limestones dated as late Ladinian to Carnian (Grădinaru, 2000). The dating by Peters of other rocks in North Dobrogea as Triassic is based only on the lithological similarity with the rocks of this age from the Alps. As regards the presence of the Lower Jurassic (Lias) in North Dobrogea, the ammonoid fauna collected by Peters in the so-called "*rothen Ammonitenmarmor*" from the Bașchioi (now Nicolae Bălcescu) village, and compared by him with the Alpine "*Adnether Schichten*", it was later proved by Redlich (1896) and Kittl (1908) that this fauna is comparable to the Middle Triassic "*Schreyeralmschichten*" of Alps. For the so-called "*sandige Kalkstein*" from Frikazé (now Frecăței) village that Peters dated as Lias only by his intuition (p.173), it has been later proved as correct (Grădinaru, 1984). As regards the Middle Jurassic age assigned by Peters to the so-called "*Klippenkalk*" from Jenisala (now Enisala), it was proved that the age is Vraconian (latest Albian) by Grădinaru (2004). As for the so-called "*mitteljurassischen Versteinerungen*" from the Kardschelar (now Cârjelari) village it has been proved that their age is Late Jurassic (Grădinaru, 2006).

The most important part of Peters' palaeontological legacy is his mentioning of the so-called "*Planulatenkalksteins vom Kara-bair am Dunavez*", assigned to the Upper Jurassic (*Obere Jura*) (p.189). From these limestones Peters listed *Rhynchonella lacunosa* Schlotheim, *Ammonites colubrinus* Reinecke, *A. biplex* Sowerby, *A. tortisulcatus* d'Orbigny, and *Lima* sp. As he had no time to visit the place from where the inhabitants of the Beibudschuk (now Plopu) village took the limestones used to line their hand-dug water wells, Peters finished the short paragraph devoted to the Upper Jurassic from Carabair with the hope that his finding will contribute to the success of the further investigations in the region - "*Möge meine Recognoscirung einiges zum Gedeihen künftiger Untersuchungen beitragen !*".

Peters' hope has been fulfilled only after more than 100 hundred years when the present author finally found in July 1971 the outcrop of the "*Planulatenkalksteins vom Kara-Bair*" (Grădinaru, 1984). If the occurrence of the Upper Jurassic from Carabair had been identified in time, as Peters hoped, then the subsequent conceptions of the geological evolution of North Dobrogea would have been differently conceived (Grădinaru, 2006b).

The present author made relentless attempts to find out where in Austria the palaeontological material collected by Peters during his 1864 field work in Dobrogea is stored. I was finally informed on 30th March 2012 by the NHMW curators in the Department of Geology & Paleontology that two lots of palaeontological material collected in Dobrogea had been donated by Peters, on 10th October 1865 and, respectively, on 1st June 1866, to the Naturhistorisches Museum Wien, as noted in *Inventarbuch of K. K. Mineralien-Kabinet*, at position 1865 XL.

Instead of **Conclusions**, I add the saying by the well-known Swiss geologist Rudolf Trumpy ***"A bad fossil is more valuable than a good working hypothesis''*** (Trumpy, 1971), to underlay of how important it is to have good fossil-based age control in interpretations of stratigraphy, paleogeography and tectonic histories.

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ORAL

Tubiphytes-microbial facies, a chemosynthetically-driven oasis in the Bithynian (Anisian, Middle Triassic) of North Dobrogea (Romania)

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Keywords: *Tubiphytes* facies, chemosynthetically-driven habitat, Middle Triassic, North Dobrogea

Introduction

The occurrence of the peculiar *Tubiphytes*-microbial facies in the Bithynian Anisian, Middle Triassic) of North Dobrogea has been documented for the first time by Popa et al. (2014). *Tubiphytes*-microbial buildups were widely distributed during the Middle Triassic, such as in the Great Bank of Guizhou in south China (Enos et al., 2006; Lehrmann 1999; Payne et al., 2006; Kelley et al., 2017), in the Camorelli Bank and Concarena Platform in the Italian Lombardic Alps (Gaetani & Gorza, 1989; Berra et al., 2005; Seeling et al., 2005), in the Latemar and Marmolada platforms and the small mounds in the Dont Formation in the Italian Dolomites (Harris,1993; Emmerich et al., 2005; Marangon et al., 2011), the carbonate mounds of Nakhlak in Central Iran (Berra et al., 2012), and the Aggtelek reef in northeast Hungary (Velledits et al., 2011).

Results

The Bithynian *Tubiphytes*-microbial buildup is exposed in the northeastern sector of the Mahmudia Quarry that extracts limestone from the Middle Triassic of the Caeracul Mare Hill. The vertically standing succession, more than 200 m thick, occurs as a steep, rugged stony wall that is locally covered by dumped quarried material. The *Tubiphytes*-microbial buildup represents an *in-situ* accumulation with a massive appearance, lacking any obvious bedding at the outcrop scale. The microfacies framework has been studied in detail by Popa et al. (2014). The outstanding abundant occurrence of the problematic organism *Tubiphytes* that is a common fossil of the Anisian reef assemblages (Senowbari-Daryan, 2013) is the most prominent feature in the Bythinian microbial buildup in the Mahmudia Quarry. In thin sections, the *Tubiphytes* tubes, probably a wormtube as already assumed by some authors, show laminated walls that resulted from successive microbial mat encrustations (Popa et al., 2014). Synsedimentary microbially-mediated cement crusts represent at some levels the most common cement within the boundstone packages in the *Tubiphytes*-microbial buildup from the Mahmudia Quarry. On rock samples one can see that the *Tubiphytes* tubes, which are several cm-long, cross also the cement crusts. When crashed, the rock releases a foul odor of rotten eggs, typically for the hydrogen sulfide**.** The boundstone packages dominated by microbially-mediated cement crusts are richly fossiliferous in various groups of macrofossils, including bivalves, gastropods, brachiopods, ammonoids, nautiloids, sponges and crinoids. The macrofossil conchs, being enveloped by the cement crusts generated by syndepositional microbial mats, preserve minute details of ornament, and sometimes even the primary colour pattern of some gastropod conchs. From only 1.5 cubic meter there have been recovered several hundred specimens of bivalves, gastropod and brachiopods.

Discussion

The *Tubiphytes*-microbial buildup from North Dobrogea is among the few lower Middle Anisian (Bithynian) bioconstruction from the Tethysian realm and the only known in the western part of the Paleo-Tethys Ocean (Popa et al., 2014). The Middle Triassic *Tubiphytes*-microbial buildups represented the last "pure" M-type Triassic carbonate factory, before the transition toward the T-type factory, induced by the appearance of the scleractinian corals. From a compositional point of view, the *Tubiphytes*-reef is a microbial reef, one of the eight major compositional reef types distinguished by Flügel (2002). Senowbari-Daryan et al. (1993) and Enos et al. (2006) stated that the *Tubiphytes* micro-encruster enabled the stabilisation of carbonate sediments and allowed cement-rich reefs to flourish in the early Middle Anisian.

Conclusions

We assume that the *Tubiphytes*-microbial facies in the Bithynian from North Dobrogea represented a chemosynthetically driven-oasis for various groups of macroinvertebrates. It is the by-product of the high mass mortality that assured a high richness in organic matter in the carbonate sediment in which *Tubiphytes* thrived. The breakdown of organic matter by specific chemosynthetic microbial consortia enabled the richness in nutrients for the extremely abundat macroinvertebrate biota in the Bithynian *Tubiphytes*-microbial facies of North Dobrogea. So, the Middle Triassic *Tybiphytes*-facies is another type of a chemosynthetically-driven habitat alongside the actual or older ecologically distinctive habitats related to the hydrothermal venting and methane seepage (e.g. Campbell, 2006; Kiel & Tyler, 2010; Kaim, 2010; Bernardino et al., 2012).

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ORAL

Spathian to Bithynian (Early to Middle Triassic) brachiopods from North Dobrogea (Romania)

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Keywords: Brachiopods, Systematics, Palaeogeography, North Dobrogea

Introduction

We describe the brachiopods obtained from several localities in North Dobrogea. The Upper Spathian and the Aegean were sampled from the red nodular limestone along the section of Deșli Caira, proposed as GSSP for the base of the Anisian (Grădinaru et al., 2007). The Bithynian brachiopods originate mostly from the *Tubiphytes* reefs in the Mahmudia quarry (Popa et al., 2014), and also from the red nodular limestone of Agighiol and Orta Bair. The ages are supported by the ammonoids collected from the same beds.

Results

The Late Spathian assemblage consists of three Rhynchonellid species, all new. The Aegean assemblage equally consists of three new Rhynchonellid species.

The Bithynian assemblages are the most differentiate fauna, with not less than 14 species. In the *Tubiphytes* facies of Mahmudia, the assemblage is numerically dominated by forms belonging to Mentzeliids and Dielasmatids, forming the 70% of the whole assemblage. Minor components are Spiriferinids and Rhynchonellids. At Agighiol and Orta Bair instead, the Norellids of Rhynchonellida prevail.

Conclusions

The assemblages here described have poor counterpart in the western Tethys. The Late Spathian assemblage has some equivalent with the Mangyshlak brachiopod fauna in Kazakhstan (Zakharov & Popov, 2014). The Bithynian assemblage is very different from the age equivalent assemblage described from the stratotype of the substage in Turkey (Gaetani, 2016). In Dobrogea the carbonate substrate, in clear and agitated waters supports an assemblage with high diversity. On the opposite, in Bithynia the brachiopod community was dwelling of softer and muddier substrate, with higher density and less diversity. On the northern shores of Palaeo-Tethys, the locality of Aghdarband also delivered Bithynian brachiopods, forming another different assemblage (Siblik 1991).

The recovery and radiation of brachiopods after the P/T crisis is discussed in the frame of the Palaeo-Tethys palaeogeograhy. The described fauna consists mostly of new species. The fauna of North Dobrogea is by far the richest described in the Western Palaeo-Tethys, especially as the Bithynian (Early Anisian) brachiopod assemblages are concerned. The radiation of brachiopod expanded in the overlaying Pelsonian (Middle Anisian), in which about 50 species were described.

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ORAL

Neohoploceras submartini (MALLADA, 1887) - a key occurrence for timing the intra-Valanginian stratigraphic gap in the Dâmbovicioara Zone (Southern Carpathians, Romania)

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Keywords: Valanginian (Lower Cretaceous), stratigraphic gap, hardground, Dâmbovicioara Zone, Southern Carpathians

Patrulius (1963, 1969, 1976) underlined for the first time that in the Dâmbovicioara area the Neocomian series, which starts with a glauconite-bearing limestone, unconformably overlies here the Upper Tithonian-? Berriasian Stramberk-type limestone along an indurated surface with lithophagous perforations, and he identified it to be a hardground. The above mentioned author relying on the biostratigraphic data at hand at the time interpreted that a discontinuity exists in the stratigraphic succession. The corresponding stratigraphic gap was assumed to cover the time-interval from the Berriasian and at least a part if not all of the Valanginian. Therefore Patrulius claimed the Neocomian series in the area starts with the Hauterivian. Later on, Patrulius & Avram (1976) stated that a Valanginian age may be inferred for the lowermost part of the Dâmbovicioara Formation, described as the Cetatea Neamțului Member. Only non-age-diagnostic fossils have been quoted from the Cetatea Neamțului Member, i.e. gastropods, from which *Pseudomelania* cf. *jaccardi* Pictet et Campiche is the most abundant, bivalves (*Grammatodon* sp.), echinoids, and a few cephalopods with *Duvalia* sp. ex gr. *D. dilatata* (Blainville), *Haploceras (Neolissoceras) grasianum* d'Orbigny, and one nautiloid specimen. Based on these fossil data, in the table of ammonite biozones identified in the Dâmbovicioara area, which were correlated to those of France (Bulot & Thieuloy, 1994), Patrulius & Avram (1976, p. 152) questionably assigned the Cetatea Neamțului Member to the uppermost Valanginian, with the Verrucosum Zone at the top of the stratigraphic gap. As a consequence, the Valanginian-Hauterivian boundary has been placed at the base of the overlying Dealul Sasului Member.

More recently, Patrulius & Avram (2004), based on the taxonomic revision of the ammonites in the Popovici Hatzeg's collection hosted at the Geological Museum in Bucharest, have documented a Berriasian age for the Stramberk-type massive limestones underlying the Dâmbovicioara Formation. On the other side, based on newly collected ammonite faunas, the same authors established that the lower part of the Dealul Sasului Member is latest Valanginian in age, with representatives for the Trinodosum and Callidiscus zones. On these data, the age of the Cetatea Neamțului Member, for which no conclusive biostratigraphic data were further provided by Patrulius & Avram (2004), is lowered in the early late Valanginian.

The field work carried out in the Dâmbovicioara area by the co-authors of the present paper (IL, AA and MG) enabled them to recover a specimen of a small-sized phosphatized ammonite from the phosphatic sediments (phosphatized bioclastic packstone-wackestone) lying at the base of the Cetatea Neamțului Member and covering the topmost part of the Cheile Dâmbovicioarei Formation.

These phosphatic sediments (0.3 to 10 mm thick) contain also fragments of pectinid bivalves and rare rhynchonellid brachiopods, and benthic shark teeth. This is the only ammonite ever recovered in the base of the glauconitic limestone in the Dâmbovicioara area. The specimen is identified as *Neohoploceras submartini* (Mallada), and it is the first reported occurrence of this ammonite in the Lower Cretaceous deposits in the Southern Carpathians (Grădinaru et al., 2016). The specimen is preserved as a concretionary internal mould slightly compressed, the shell is phosphatized and the infill is in continuity with the sedimentary matrix (phosphatized bioclastic packstone-wackestone and bioclastic glaucony-rich wackestone). The ventral and one lateral part of the shell is well preserved showing the diagnostic features of the nominated species, such as a medium-sized, seminvolute shell, body chamber ornated by robust ribbing that not cross the ventral side and showing multiple branching from strong umbilical or lateral tubercles, deep constrictions bordered by higher ribs that bear marked adapical lappets on venter.

Fig. 1 *Neohoploceras submartini* (Mallada, 1887) indicative for the late Valanginian, Verrucosum ammonite Zone; x 2.

Having in view the biostratigraphic range of the ammonite *Neohoploceras submartini* (Mallada) (e.g. Company, 1987; Baraboshkin & Mikhailova 1994, 2000; Aguirre-Urreta, 1998) and other additional biostratigraphic data, it is proved the stratigraphic gap at the above mentioned locality has a definitely intra-Valanginian position, while the underlying hardground is set up somewhere before and/or within the time interval of the late Valanginian Verrucosum ammonite Zone.

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POSTER

Late Anisian (Middle Triassic) nautiloids from Cristian (Braşov Mountains, Southern Carpathians, Romania): stratigraphic distribution and paleobiogeographic connections

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Keywords: nautilids, orthoceratids, Triassic, taxonomy, paleobiogeography

Introduction

Middle Triassic nautiloids in the Braşov Mountains have been previously described by Jekelius (1936) from the Ladinian-Upper Carnian Wetterstein-type limestones occurring in an old quarry located inside the Braşov City. These are represented only by a few taxa, such as *Orthoceras campanile* Mojsisovics, *Orthoceras* sp. and *Pleuronautilus marmolatae* Mojsisovics.

During the field works carried out by the first author in the 1970s a rich cephalopod material has been collected from the Middle Triassic successions, which were well exposed in that time or were excavated during the mining works for extraction of refractory clays in the Cristian region. Ammonoids and nautiloids have been collected both from the dumped materials and from outcrops (Grădinaru, 2005; Grădinaru & Sobolev, 2007). Data on lithostratigraphic succession and ammonoid biostratigraphy for the Anisian in the Cristian region have been given by the first author in an internal report of the Geological Institute of Romania (Grădinaru, in Patrulius et al., 1977) or are found elsewhere (Dumitrică, 1991). The purpose of the present account is to provide an updated review on the taxonomy of the late Anisian (Middle Triassic) nautiloids from the Cristian region and to discuss on their paleobiogeographic significance.

Results

Diverse nautiloids, both coiled and orthoconic forms, are represented in cephalopod fauna of the Paraceratites trinodosus Zone in the Upper Anisian limestones of “Reifling-type” from the Cristian region in the Braşov Mountains. Nautiloid fauna includes specimens of *Trematoceras campanile* (Mojsisovics), *T. multilabiatum* (Hauer), *T.* sp., *Pleuronautilus mosis* Mojsisovics, *Holconautilus semicostatus* (Beyrich), *Trachynautilus* cf. *nodulosus* (Arthaber), *Mojsvaroceras* cf. *neumayri* (Mojsisovics), *M.* ex gr. *neumayri* (Mojsisovics), *M.* cf. *polygonium* (Hauer), *M.* cf. *patens* (Hauer), *Germanonautilus* sp. [aff. *G. salinarius* (Mojsisovics)], *G.* sp., *Sibyllonautilus pertumidus* (Arthaber); alongside them *Germanonautilus cristianus* sp. n. and *Grypoceras pseudoquadrangulum* sp. n. are new.

Conclusions

Except the two new species, the others nautiloids are known mostly from equivalent Middle Triassic deposits of the Alpine-Dinaride area. Some of the species in the Paraceratites trinodosus Phase had a wider paleobiogeographic distribution. From the Balaton Highland are noted *Trematoceras campanile* (Mojsisovics) and *Trachynautilus nodulosus* (Arthaber) (e.g. Vörös, 2001). The first species is also recorded in deposits of the same age of Northern Dobrogea, Eastern Peloponnese, Western Anatolia, Himalaya and Nevada (e.g. Mojsisovics, 1882; Toula, 1896; Kittl, 1908; Simionescu, 1913; Kummel, 1953; Silberling & Nichols, 1982). From the Eastern Peloponnese *Trematoceras multilabiatum* (Hauer) and *Pleuronautilus mosis* Mojsisovics are recognized. The latter species is also known from Polish Eastern Carpathians (Holly Cross Mts). Species *Holconautilus semicostatus* (Beyrich) is described from the Paraceratites trinodosus Zone of Upper Silesia and the North Caucasus (e.g. Schastlivtseva, 1988). As shown by the paleobiogeographical analysis, the nautiloid species identified in the Cristian region were distributed exclusively within the

Tethyan paleobiogeographical realm during the Paraceratites trinodosus Phase of the Late Anisian and were characteristic of this paleobiochory at that time.

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ORAL

Geochemical and mineralogical microbial signatures recorded within Jurassic ferruginous stromatolites from the Romanian Carpathians

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Keywords: ferruginous stromatolites, iron isotopes, rare earth elements, Romania

Introduction

Microbial activity plays an important role in precipitation of iron compounds and in formation of the ferruginous stromatolites that are interesting for their relative stratigraphic scarcity, and for their disputed biogenic or diagenetic origin (cf. Burkhalter, 1995; Préat et al., 2000). Iron mineralization related to the activity of microbial mats had long been a subject of many controversial discussions and continues to be a topic of high research interest. Iron stable isotopes provide powerful indicators of biologic processes, being extensively studied to trace the history of microbial metabolisms and the redox evolution of the oceans (Busigny et al., 2014). Moreover, metabolic activity and biomineral precipitation of iron bacteria have an important role both, in the mineralisation process and in trace rare earth elements (TREEs) precipitation and fractionation, providing valuable tools for investigating palaeoenvironmental signatures (cf. Ferris et al., 2000; Heim, 2010).
Well-preserved ferruginous stromatolites (Fig. 1 a, b) associated with condensed Middle Jurassic deposits are recorded within different geotectonic units from the Romanian Carpathians.

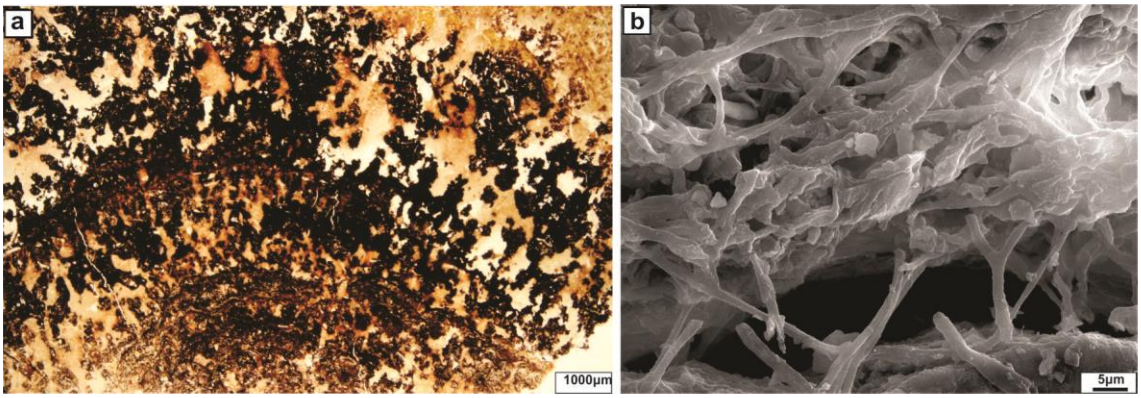

Fig. 1 a Microphotograph showing the microstructure of the ferruginous stromatolites; **b** SEM image showing the networks of dichotomic filaments forming the iron rich laminae of the ferruginous stromatolites

Three Bathonian-Callovian condensed sections, containing ferruginous stromatolites, located in the Southern Carpathians (from Getic and Danubian units) have been studied in the present research.

The aim of the present paper is to reports new data concerning the detailed geochemical and mineralogical studies, iron isotopes and rare earth elements (REEs) recorded within the ferruginous stromatolites associated with heterochronous Bathonian-Callovian condensed beds from the Southern Carpathians.
Methodology of this study is based on complementary sedimentological, geochemical and mineralogical approaches. The ferruginous stromatolites were investigated in thin-sections under petrographic microscope. The chemical and mineralogical composition of the ferruginous stromatolites laminae was determinate by X-ray fluorescence analysis and X-ray diffraction data. Samples containing ferruginous stromatolites were examined directly under the scanning electron microscope (SEM) using backscattered electron (BSE) imaging and energy dispersive X-ray (EDX) spectros-

copy microanalysis. Rare earth element (REE) concentrations of the representative samples were analyzed by inductively coupled mass spectrometry. Fe-isotope values are reported relative to the Fe isotope standard IRMM-14 using the conventional delta notations. In addition, samples were analyzed for carbon and oxygen-isotope analysis.

Results

The compositional features of the ferruginous stromatolites forming the macro-oncoids cortex and crusts (microstromatolites) covering the discontinuity surfaces associated with heterochronous condensed beds are presented. The ferruginous stromatolites samples from all the studied sections consist mainly of iron rich carbonates with iron concentrations that reach high values of up to 69.33 % by weight. Other main components are CaO (11.6%), SiO_2 (9.36%), Al_2O_3 (6.38%), P_2O_5 (1.87%), MgO (0.58%), MnO (0.55%) and K_2O (0.33%). The X-ray diffraction data of the ferruginous stromatolites showed that goethite is the most ferriferous mineral phase. Hematite and magnetite are subordinate, being less frequently iron oxide phases. Mineralogical data also revealed the presence of calcite, quartz and low fluorapatite for all the studied samples. The principal clay minerals are identified by the XRD patterns obtained from oriented aggregates showed the presence of illite, kaolinite, chlorite and montmorillonite. Total organic content (TOC) of the studied ferruginous stromatolites are generally low, with values ranging from 0.22% to 2.62%, with an average of 1.10%. The isotopic composition of all ferruginous stromatolites show that $\delta^{13}C$ values exhibits a positive trend which varies between 1.64 to 2.95 ‰, while $\delta^{18}O$ values fluctuates between -0.41 and -4.34‰, showing a trend of slight increase, corresponding to different stages of diagenetic alteration. Ferruginous stromatolites contain moderate negative Ce anomalies and from small negative to moderate positive Ce anomalies, respectively. The studied samples shows a large range of $\delta^{56}Fe$ values, from -0.76 to +0.66‰ but contain predominantly positive values suggesting that there was partial Fe^{2+} oxidation maintained by the iron-oxidizing microbial consortium (cf. Planavsky et al., 2009).

Conclusions

In this contribution we performed detailed multidisciplinary analysis of ferruginous stromatolites to decipher whether the ancient microbial consortium including iron-oxidizing bacteria, could be considered as the primary producers. The studied stromatolites have normal marine $\delta^{13}C$ values, being consistent with precipitation in equilibrium with marine waters. We found a gradually shift in Ce anomalies, which indicates that the ferruginous stromatolites were formed under oxic-dysoxic to anoxic conditions, where the iron-oxidizing bacteria could have precipitated ferric oxyhydroxides contributing to the formation of the stromatolites. We remark a predominance of positive $\delta^{56}Fe$ values of the studied ferruginous stromatolites that could reflect partial oxidation of Fe^{2+} to Fe^{3+} precipitation in poorly oxygenated environment by bacterial Fe-oxidation (cf. Planavsky et al., 2009). Therefore, a detailed geochemical, mineralogical, petrographical and morphological examination of the studied samples, provide valuable information indicating the preservation of signs/markers suggesting bacterial involvement within the original genesis of the ferruginous stromatolites.

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ORAL

Callovian ammonite assemblage from the Rucăr area (Southern Carpathians, Romania)

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Keywords: Ammonites, Taxonomy, Callovian, Southern Carpathians, Romania

This paper presents the Callovian ammonites fauna discovered by the authors in the Rucăr area in 2010. The studied section is located on the western part of the Rucăr-Bran zone, in Purcărete Valley, a left-side tributary of Râuşor Valley.

The first detailed lithostratigraphy and microfacies analyses of the local Middle–Upper Jurassic studied succession was published by Lazăr and Grădinaru (2014) and the first research concerning the ammonite fauna from the same location was presented by Grigore et al. (2015).

The aim of this study is to present the detailed taxonomy of the ammonite fauna recovered from the Callovian unit of this succession.

The ammonite fauna presented here is similar (and probably coeval) with the ammonite fauna described by Simionescu (1899) from another section located on a nearly valley (Lupului Valley/Gruiul Lupului).

The ammonites association confirms the Middle Callovian and base of Upper Callovian for these condensed deposits. It is worth mentioning the absence of macrocephalitides (at the bottom of the succession) and cardioceratides/ peltoceratines (like *Quenstedtoceras* - at the top). It is also important noting the presence of representatives of Kosmoceratidae in the lower part of the Callovian beds, as being the most abundant level with Kosmoceratidae from Romania. The next ammonites taxa have been identified: *Reineckeia anceps* (Reinecke), *Reineckeia* cf. *douvillei* Steinmann, *Rehmannia* cf. *segestana* (Gemmellaro), *Erymnoceras baylei* (Jeannet), *Subgrossouvria famula* (Bean), *Binatisphinctes hamulatus* (Buckman), *Homoeoplanulites* cf. *difficilis* (Buckman), *Kosmoceras proniae* (Teisseyre), *Kosmoceras* cf. *mrazeci* Simionescu, *Kosmoceras* sp., *Lissoceras voultense* (Oppel), *Hecticoceras zieteni* De Tsytovitch, *Hecticoceras punctatum* (Stahl), *Hecticoceras* cf. *bannense* Elmi, *Paralcidia* sp., *Calliphylloceras demidoffi* (Rousseau), *Holcophylloceras indicum* (Lemoine), *Sowerbyceras subtorisulcatum* (Pompeckj).

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ORAL

Review of the Jurassic micro- and macro faunal assemblages from the Cetăţii Valley Formation (Râşnov, Southern Carpathians, Romania)

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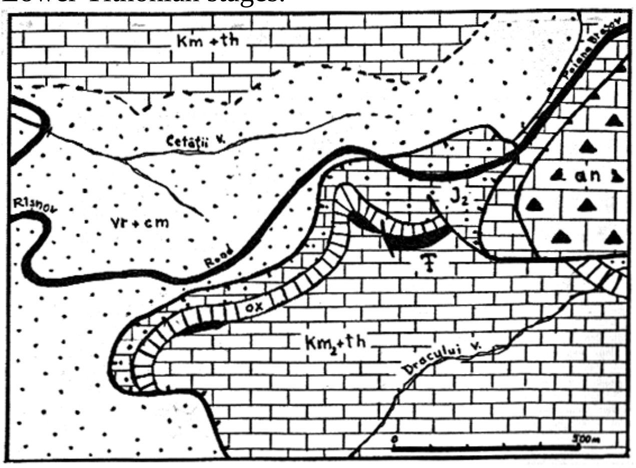
Keywords: Middle-Upper Jurassic, lithostratihraphy, biostratigraphy, Southern Carpathians, Romania

The lithostratigraphy and biostratigraphy of the Cetății Valley Formation (Middle-Upper Jurassic) is described in detail in the present paper. Previous reports concerning this formation were accomplished by Grigore (1987, 2000), Pop et al. (1996, 1997 and unpublished data).
This formation comprises few considered olistoliths that crop out in the Cetăţii Valley, Râşnov – Brașov area, in the western side of the Postăvaru Mountains. The Middle and Upper Jurassic deposits from these occurrences are part of the Getic Nape (Săndulescu, 1964, 1984).

The reviewed map and the lithostratigraphic column of this formation and, the biostratigraphic distribution of the micro- and macrofaunal assemblages are presented. The ammonite assemblage from the Upper Member of this Formation was partially presented by Grigore (2000), without biostratigraphic correlation with the micro fauna assemblage.

The integrated biostratigraphy of the Valea Cetăţii Formation is presented: the Lower Member is represented by detritic deposits (sandstones, marls and jasper) and contains a rich fauna of belemnites, aptychus, rhyncholites, crinoids, holoturids, and foraminifera; the Upper Member is represented by calcareous sequence (nodular limestone and Stramberk) and contain a rich fauna of ammonites and foraminifera. The sequence attested for these deposits are from Upper Bathonian to Lower Tithonian stages.



Outcrop of Valea Cetății Formation – geological sketch

Crussoliceras tenuicostatum GEYER

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ORAL

Vertebrate Paleontology at the University of Bucharest

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Keywords: Vertebrate Paleontology, teaching, collections, scientific research

Although very rarely present in the regular curricula for geologists at the University of Bucharest, Vertebrate Paleontology was one of the main subjects both in teaching and scientific research, since the establishment of the Faculty of Sciences within the University of Bucharest in 1864. This paper presents the main teachings and researches on fossil vertebrates developed at the University of Bucharest, starting with the forerunners of Geology and Paleontology, Gregoriu Ştefãnescu and Sabba Ştefãnescu, followed by Ion Simionescu. A special part in the presentation regards the formation of the vertebrate paleontology collection at the University of Bucharest,among which the Neogene and Pleistocene continental and marine mammmals, Oligocene fishes and Late Cretaceous reptiles including dinosaurs and pterosaurs are the best represented, including specimens of international reference. Although after 1944, which represent the end of the foreruners activity, new important specimens were added to the fossil vertebrate collections, the organization and maintenance decreased considerably and this affects their valorization. Causes of this situation and solutions for improvement are suggested at the end of the paper.

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ORAL

SEM comparative analysis of eggshell biomineralization in megaloolithid (*Megaloolithus siruguei*) dinosaur eggs from the Maastrichtian of the Haţeg Basin and recent birds

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Keywords: eggshell ultrastructures, membrana testacea, mammillary zone, palisade zone, EDS

The paper discusses aspects of the dinosaur eggshell growth based on comparative SEM analysis of three dimensional ultrastructures of *Megaloolithus siruguei*, the common eggshell type in the Maastrichtian of the Haţeg Basin, and eggshells from seven domestic birds. The ultrastructural aspects are followed in the three main zones of the eggshell architecture: shell membrane, mammillary and palisade, and the calcite biomineralization processes are interpreted.

The presentation is focused on processes taking place in the two layers of the eggshell membrane (*membrana testacea)* - a network of organic fibres, representing the interface among organic and mineral domains, where the calcite crystals develop from the collagen matrix. The compared ultrastructural aspects of the eggshells document the similarity of the reproductive biology between dinosaurs and birds. The taphonomic changes in the eggshell chemical composition of the megaloolithid eggs are interpreted by comparative EDS (Energy Dispersive Spectroscopy) analysis with the recent birds.

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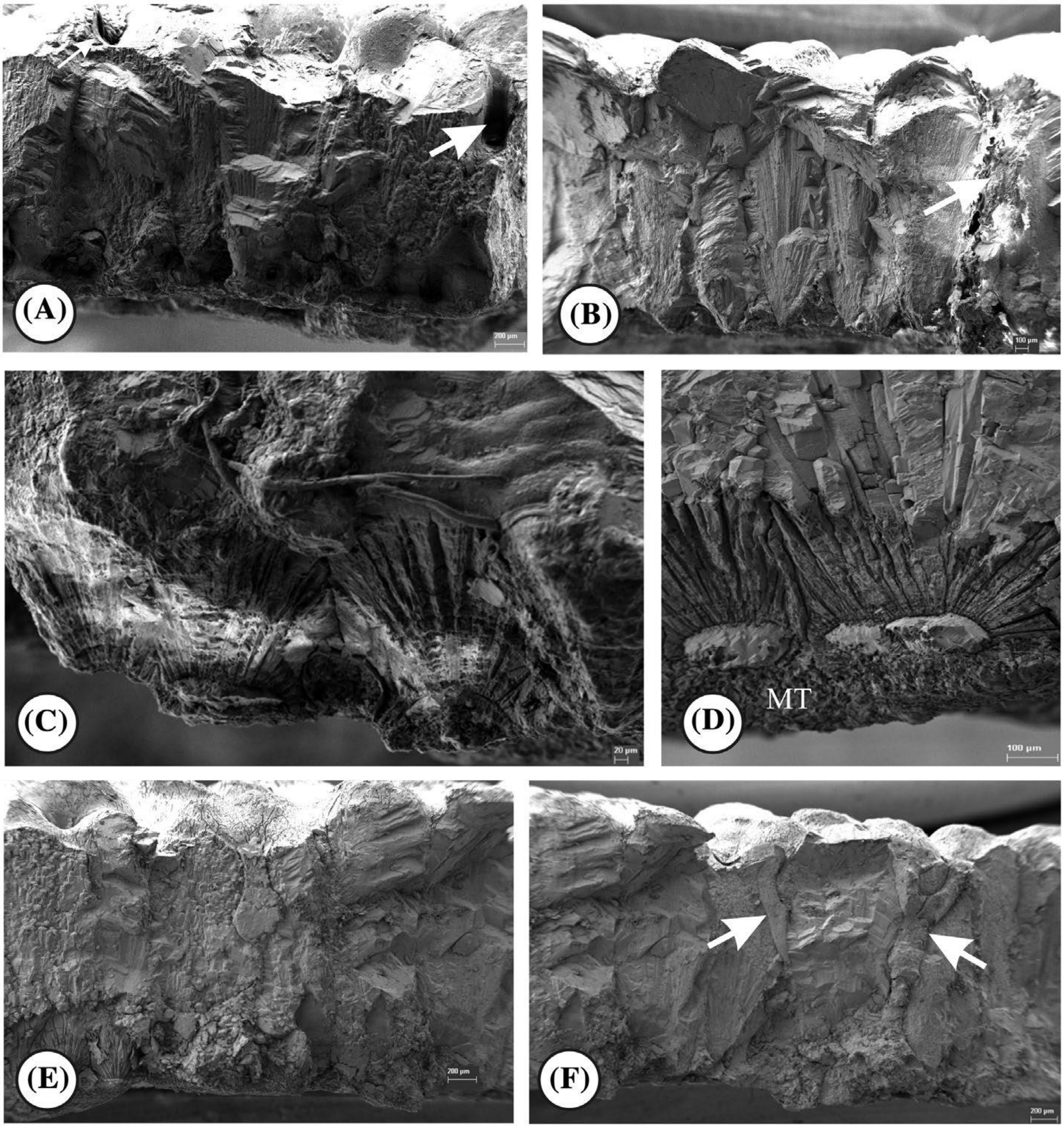

Fig. 1 *Megaloolithus siruguei*. SEM radial sections. (**A**) Radial-tabular ultrastructure of the spherulitic shell units. Note the pore openings (arrows) (FGGUB2100). (**B**)The radial ultrastructure prevails on the tabular ultrastructure displayed by the transverse striations. Note the pore canals (arrows) (FGGUB2093). (**C**) Radiating acicular crystals of the basal cap. Note the transversal, respiratory channels, part of the pores network. (FGGUB2095) (**D**) Detail view of the mammillary layer with irregular shaped structures (*eisospherites*) at the base of the shell units; below the calcified fibrils of membrana testacea. (**E**) and (**F**) Pore canals shape: 'bottleneck type' (FGGUB2097), Y shaped and twisted pore canals (F) (FGGUB2092)

ORAL

Climate change and human influence in the control of vegetation dynamics in the Eastern Romanian Carpathians

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Keywords: pollen analysis, turnover, pollen richness, rate of change, resilience

Introduction

The Carpathians in Eastern Europe encompass the largest continuous temperate forest ecosystem on the continent (UNEP, 2007). However, these ecosystems are particularly fragile and susceptible to climate conditions and more recently to anthropogenic impact. Disturbances, both human-induced and natural, shape the forest systems by influencing their composition, structure and functional processes. In the Eastern Carpathians (Romania), forest disturbances are mainly due to illegal logging, which increased exposure and caused remaining forests to be additionally impacted by wind-throws (Knorn et al., 2012).We present a record of changes in vegetation over the past 8700 years, from Tăul Muced peat bog from the Rodna National Park and Biosphere Reserve, Eastern Carpathians. Specifically, we aim to determine the resilience of the forest ecosystem to main drivers of change (climate and fire, human impact, herbivores) throughout the Holocene, and to explore the plant communities concurrent with phases of apparent stability of the ecosystem.

Methodology

Changes in the Holocene vegetation communities were inferred from the analysis of the percentage pollen diagram, which was divided into local pollen assemblage zones (LPAZ) using the CONISS program of Grimm (1987). Detrended canonical correspondence (DCCA), rarefaction and rate of change analyses were undertaken on the pollen data. Microscopic charcoal particles (10-150 μm) were used to reconstruct the regional fire history. The stomata identified were used as indicators of the local presence of trees.

Results

Three distinct periods were identified based on the pollen record and statistical analyses of the pollen data at Tăul Muced: a) an interval with low to moderate changes in vegetation composition between 8700 and 5500 ka; these changes were concurrent with the expanding and dominance of *Picea abies* forests in the region, scattered occurrences of *Fagus sylvatica* and *Carpinus betulus* and the first occurrence of anthropogenic indicators (ca. 7300 ka - Cerealia, *Secale cereale*, *Plantago* sp.); b) a period of low compositional change in the vegetation and thus, the apparent landscape stability between 5000 and 1750 ka; this interval captured the whole deciduous forest transgression phase from *Carpinus betulus* dominated forests (5500-2750 ka) to *Fagus sylvatica* dominance, associated decline of mixed oak taxa (*Ulmus*, *Quercus*, *Tilia*) and increasing abundances of anthropogenic indicators; c) a period of moderate to high change in vegetation composition (1750 ka to present), with a distinctive sharp increase in changes during the last four decades, mainly connected to human-induced changes on the landscape (e.g., fragmentation, management, exploitation, reforestation): decline of *Picea abies* and *Fagus sylvatica* forests, expansion of secondary successional taxa (*Betula*, *Alnus*, *Corylus avellana*) and associated increased abundance and diversity of anthropogenic indicators.

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POSTER

New mammoth material from the Moldavian Platform (eastern Romania)

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Keywords: mammoth, molar, Quaternary, Moldavian Platform

As in all Europe, Pleistocene large herbivores fossils are rather common in Romania. Among them, remains of the mammoths (i.e., representatives of the *Mammuthus*) are the most frequent. This fact is not unexpected as long as the deposits accumulated in the last Pleistocene glacial (Weichsel) are widespread in Romania, originating from a wide range of environments (cave fillings, river terraces, loess etc.). Under such circumstances, it is rather unusual that Pleistocene large mammal remains extremely poor documented in northeastern Romania (Simionescu, 1930; Macarovici, 1963; Apostol, 1968). The present work focuses on the discovery of new paleontological localities with mammoth osteological material from the Moldavian Platform.

Pleistocene deposits are widely exposed in Moldova (Eastern Romania) along the Siret Valley, on the terraces of Siret and its tributaries. The taxonomy, measurements, lamellar frequency, as well as the enamel thickness and calculation of the hypsodonty index follows Maglio (1973) and Lister (1996). The first Pleistocene locality to be mentioned is Corni (15 km east of Botoșani city) that yielded two molars of *Mammuthus primigenius*. The second locality with *Mammuthus primigenius* fossil remains is Lespezi (15 km north of Pașcani city). Finally, teeth and a mandible referable to *Mammuthus primigenius* were also found in Șcheia village (20 km south of Pașcani city).

The rocks from which these fossils were extracted are diverse: clays, sand and gravels, exposed on the right banks of the rivers. All these sites represent new occurrences for this species in the Moldavian Platform.

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ORAL

New trees in the Late Cretaceous Petrified Forest from South Apuseni Mountains, Romania

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Keywords: petrified wood, palaeoxylology, Late Cretaceous

Seven years ago a synthesis about the petrified forests described in Romania was presented as "Trésors du fond des bois d'autrefois" (Iamandei & Iamandei, 2011). Now, a new stage of research is reached and new results are presented to complete the arboreal composition of the Late Cretaceous Petrified Forest from South Apuseni Mountains and their palaeoenvironmental and palaeoclimate significance. Our last palaeoxylotomical studies revealed the presence in the region of the following taxa: *Agathoxylon* (*Dammaroxylon) formosum* (Iamandei & Iamandei) new comb., *Laurinoxylon vinti* n. sp., *L. oleiferum* n.sp., *Laurinoxylon (Perseoxylon) aromaticum* (Felix) new comb., *Quercoxylon (Castanoxylon) bostinescui* (Iamandei & Iamandei) new comb., *Sapotoxylon* sp.(?), *Manilkaroxylon* sp.(?), *Platanoxylon tyleradiatum* (Iamandei & Iamandei) new comb., P. *miristicoides* n. sp., *P. crystallophorum* (Greguss) new comb., *Euphorbioxylon remyi* Greguss, *Sapotoxylon* sp., *Manilkaroxylon* sp., *Palmoxylon auriferum* n. sp. (Iamandei & Iamandei, 2011).

These newly described or reviewed species complete the list of arboreal taxa from this region with numerous fossiliferous sites where petrified wood is the most frequent fossil can yield numerous research surprises as it needs protection.

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ORAL

New Trees in the Mid-Miocene Petrified Forest from South Apuseni Mountains, Romania

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Keywords: **Talagiu island, Badenian petrified wood, phytoecological analysis, Mesophytic Forest Lauraceae, palaeoclimate**

As subject of a PhD Thesis defended 15 years ago (Iamandei, 2002), the Mid-Miocene Petrified Forest from Zarand, Apuseni Mountains remained an important topic of further researches even after numerous field trips in the region. Thus, many hundreds of petrified wood samples were prepared and studied, and much of them are still in various stages of study. Their identification has increased the number of fossil trees from the Badenian forest of the Talagiu island. This study supports a more precise palaeoenvironmental and palaeoclimatic reconstruction. The geological evolution of the Talagiu caldera allowed the best conditions for silicification of the Mid-Miocene forest occurring on the slopes of the volcano. Over 40 identified tree species allowed a phytoecological analysis, revealing the plants' thermal tolerance, the soil and air humidity, the palaeoaltitude, the relationships and interactions within the biocoenosis, the palaeophytocoenosis itself, the succesion of phenophases in a mixed coniferous forest, and the dynamics of the local vegetation during the Badenian. The paleoclimate analysis is related to the neighborhood of the Paratethys, where the Zarand Basin evolved. The forest was a mixed mesophytic forest, attitudinally storied, with remains of pre-Miocene sempervirent vegetation of paratropical or subtropical climate, suggesting a Miocene pluvial mixed mesophytic forest of warm-temperate climate. This mixed mesophytic forest with Lauraceae and Conifers, include the following genera: *Tetraclinoxylon, Thujoxylon, Chamaecyparixylon, Cupressinoxylon, Taxodioxylon, Sequoioxylon, Pinuxylon, Magnolioxylon, Cinnamomoxylon, Platanoxylon* (not *Icacinoxylon*), *Liquidambaroxylon, Eucaryoxylon, Rhysocaryoxyton, Pterocaryoxylon* (?), *Fagoxylon, Fagoxylon, Quercoxylon, Alnoxylon, Populoxylon, Salicoxylon, Nyssoxylon, Paraphyllanthoxylon, Piranheoxylon, Aceroxylon, Fraxinoxylon, Rhizopalmoxylon*, taking into account new palaeoxylotomical identifications. The absence of sclerophyllous vegetation excludes a subtropical paleoclimate, and the occurrence of some tropical elements in the identified association excludes a cold palaeoclimate. The growth conditions are further confirmed by the absolute thickness of the growth rings, which is generally quite high in the studied flora. False growth rings rarely appear, due to some frosts outside the winter. The ratio of early / late wood indicates an increased level of summer precipitation. The ratio of arctotertiary / palaeotropic taxa is 84/16 and it is included in the known parameters of the Middle Miocene vegetation representing a mixed mesophytic forest with conifers and deciduous dicots. Some sempervirent types also occur, similar to the warm temperate climate forests in eastern China and in southern United States. This association indicates that during the Badenian in the Zarand basin the average annual temperatures (MAT) were between 12^0 and 17^0 degrees. Taking into account the island palaeogeographic distribution of the Carpathian land within the Mid-Miocene Paratethys, the relatively uniform palaeoclimate was marked by a low mean annual rainfall (MAR), and by a precipitation regime (MAP) between 1100-1500mm per year. These parameters suggest a subtropical to warm-temperate climate, fairly damp according to the island mountainous relief, where the altitudes probably did not exceed 1200 m.

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POSTER

The biostratigraphic, mineralogical and sedimentological significations regarding the evolution of the East-Carpathian Foreland in-between the Suceava and Moldova Valleys (Eastern Carpathians)

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Keywords: **Foreland basin, Moldavide, petrofacies, source areas, geotectonics, paleoclimate**

Introduction

The geotectonic instability recorded between Cretaceous and Miocene led to effects common to the entire Carpathian foreland region, causing significant changes in the palaeoenvironmental, palaeoecological and geochemical conditions of the basin, as well as in the geomorphology and palaeoclimate of the source areas. The system of the retention/foreland basins appears during the Lower Cretaceous, as a reflex of the Neocominan distensions and Moldavian crust shortenings. During the Neocomian, the extentional cycle of the External Dacides reaches its end and subsequently the Moldavidic basins are formed outside the *perimoldavic cordillera* (Săndulescu, 1984; Grasu et al., 1999). Unlike Grasu et al. (1999), and taking into account the tectonic classification of basins (Dinu et al., 2007), we consider the following evolution for the East-Carpathian foreland: (1) the ***pre-Laramide basin***, ending its evolution with the Laramide crustal shortening (Early Cretaceous-Danian); (2) the ***post-Laramide basin***, reconfigured during the Styrian-Moldavic shortenings; (3) the ***post-Styrian basin*** (≈ the new foreland basin, sensu Grasu et al., 1999). Our research aimed to identifie a series of palaeoevents recorded in the Eocene sedimentary sequences (Ypresian-Lutetian), accumulated in the post-Laramide basin. Geographically, our study area is comprised within the hydrographic basins of the Suceava and Moldova rivers.

Methodology

The interpretation and the analysis of the results was made according to the following models: (a) *basin analysis* (Grasu et al., 1999; Juravle et al., 2015, among others); (b) *biostratigraphic analysis* (Okada & Bukry, 1980, among others); (c) *analysis of the palaeovents in the uplifted areas* (Dickinson et al., 1983, among others); (d) *analysis of the palaeoevents in the sedimentation basin* (Roser & Korsch, 1986; Weltje et al., 1998, among others).

Results

The analyses led to the description of a series of palaeoevents characteristic to the source areas and the sedimentation basin. The deposits which were investigated belong to the *Runcu* (**RF**), *Izvor* (**IF**), *Straja* (**StF**), *Sucevița* (**SF**), *Scorbura* (**ScF**) and *Tazlău* (**TF**) Formations.

(**1**) ***Biostratigraphy***. The calcareous nannoplanktonand foraminifera associations, allowed us to estimate the age of the formations, as follows: (a) **RF** – Danian (NP1-NP4: *Biantolithus sparsus*, *Cruciplacolithus* cf. *primus*, *Neocrepidolithus* cf. *fossus*; the *Rzehakina fissistomata* Zone); (b) **IF** – Selandian-Early Ypresian (NP5-NP11: *Fasciculithus tympaniformi*, *Discoaster falcatus*, *Sphenolithus anarrhopus*); **StF** – Middle Ypresian-Early Lutetian (NP12-NP13: *Discoaster lodoensis*, *Chiasmolithus eograndis*, *Rheticulophenestra dictyoda*; the *Saccamminoides carpathicus* Zone); **SF**, **ScF**, **TF** – Late Ypresian-Late Lutetian (NP13-NP16: *Discoaster gemmifer*, *Chiasmolithus solitus* Deflandre, *Braarudosphaera bigelowii*; the associations with *Karrerulina* sp. and *Glomospira* sp.).

(**2**) ***Biofacies***. For the analysis of biofacies and its significations we used agglutinated foraminifera aasemblages that provide important palaeoenvironmental information, for the heteropic Lutetian formations (**SF**, **ScF** and **TF**). These are included among the flysch-type associations, characteristic to the turbiditic systems in the deep-sea environments. In the Doamna Lithofacies, to the East, the dominant forms belong to the morphogroups M2 and M2b (*Psammosphaera* and *Recurvoides*), and to a lesser extent to the M1 morphogroup. However, in the median lithofacies (Scorbura and Tazlău), the predominant forms are characteristic to the M1 morphogroup. The foraminifera associations are dominated by tubular forms (M1): *Nothia*, *Hyperammina*, *Psammosiphonella*. The morphogroups indicate a significant variation of the bathymetry of the marine depositional environment, from bathyal-abyssal to a continental shelf depositional environment. (**3**) ***Petrofacies***. Sedimentologically, the sedimentary series include debritic sequences (Lowe) alternating with turbiditic ones (Bouma), in arenaceous, silto-lutitic and heterolitic facies. From a lithofacial point of view, the two formations can be distinguished through the different quantitative participation of arenaceous sequences in relation to the silto-lutitic ones. The petrographic types were classified according to the Boggs ternary diagram, resulting in the following distribution: litharenites field - 53,85% (among which: sandstones-litharenites = 85,71% and phyllarenites = 14,29%), feldspar-litharenites field - 7,69%, sub-feldspar-arenites field - 7,69% and lithic arkoses field - 7,69%. (**3**) ***The geotectonic regime and the petrographic constitution of the source areas*** were analysed applying the following models: Dickinson et al. (1983), Dickinson & Suczek (1979) and Dickinson & Valloni (1980) ($Q_tF_tL_t$ and $Q_mF_tL_t$ diagrams). The analysed samples are projected onto the field of recycled orogenic associations, consistent with the evolution model corresponding to the Estern Carpathians (Săndulescu, 1984) and the connected basins. The Cretaceous-Paleogene geotectonic dynamics led to a post-Laramide foreland basin with an heterogenous basement, of both Carpathian and platform type. The tectonic regime was established through plotting the analysed samples in the Roser & Korsch (1986) geochemical diagram. According to the diagram, the basin is situated on an active continental margin. (**4**) ***Morphoclimate***. For the morphoclimate study we used the Weltje et al. (1998) diagrams among others. The climatic indicators describe the shift from a humid tropical climate to a temperate one, with marine to continental transitions, within a geological setting of moderate height mountains and hills.

Conclusions

Corroborating bio- and petrofacial, sedimentologic, geotectonic and morphoclimatic data, we consider the separation of the Early Paleogene-Early Miocene ***post-Laramide basin*** from the East-Carpathian foreland basins system to be sufficiently argumented. The basin configuration occurs against the background of successive crust shortenings during Austrian-Laramide tectogenetic phases, with significant bathymetric and morphological changes in the basin and the source areas (the petrographic heterogeneity is increased through the addition of the External and Teleajen Dacidic areas, followed by land morphographic and morphometric modifications and changes in palaeoclimatic conditions).

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ORAL

Winding and branched terebellid-like burrows from Upper Jurassic and Lower Cretaceous limestones (Dobrogea, Rarău Mts. and Dâmbovicioara zone, Romania)

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Keywords: trace fossils, worms, microbial peloids, microbial dolomite

Tubular burrows have been recognized in shallow water limestones in the Oxfordian of the Central Dobrogea (Bărbulescu, 1974; Herrmann, 1996), the lower Aptian of the Rarău Mountains (Eastern Carpathians; Popescu & Patrulius, 1964) and Barremian–lower Aptian of the Dâmbovicioara zone (Southern Carpathians; Săsăran *et al*., 2011).

Burrows display a wall, winding course (Fig. 1A) and branches (Figs. 1B, 2A). In some samples only circular and oval transverse sections of burrows are visible (Figs. 2B, 3). The burrows are mostly 5–8 (up to 14) mm in diameter and the wall is mostly 0.8–2 mm thick. Segments between branches are maximum at least 100 mm long. The burrows from the Rarău Mountains and the Dâmbovicioara zone are filled with cement and/or sediment, while the burrows from the Dobrogea are unfilled or filled with usually soft marly sediment.

The wall commonly shows micropeloidal fabric (Figs. 1C, 2C, 3A). Additionally, in samples from the Central Dobrogea, abundant calcite pseudomorphs after dolomite occur in the wall (Fig. 1C), although the surrounding sediment does show any evidence of dolomitization. Some modern burrowers, e.g. polychaetes of the family Terebellidae, produce burrow linings that are attractive microenvironment for microbial communities. Mucous burrow linings are geochemically important for metal adsorption and mineral nucleation, including dolomitization (Gingras *et al*., 2004; Lalonde *et al*., 2010). Some micropeloidal fabrics may result from in situ synsedimentary diagenesis as a result of bacterially mediated precipitation (see Riding & Tomás, 2006).

It is proposed that the burrows from Romania represent a new ichnotaxon produced probably by worms (some worms produce branched burrow systems – e.g. Ekdale & Bromley, 2003). The ichnogenus *Balanoglossites* Mägdefrau shows similar morphology, but it has no wall (see Knaust, 2008). Transverse sections of small burrows show some similarities to tubes of *Terebella lapilloides* Münster (Late Triassic–earliest Cretaceous), and perhaps some of them have been incorrectly ascribed to this species. However, *T. lapilloides* was produced by encrusting, not burrowing worms; its tube is agglutinated, much smaller in diameter, and never branched. Moreover, *T. lapilloides* occurs mostly in low-energy and dysoxic environment, for example in microbial and sponge-microbial reefs (Kaya & Altiner, 2014).

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Fig. 1 Burrows from the Oxfordian of the Central Dobrogea. Winding course (**A**) and branches (**B**) in the burrows. **C**. Micropeloidal fabric of the burrow wall with abundant calcite pseudomorphs after dolomite.

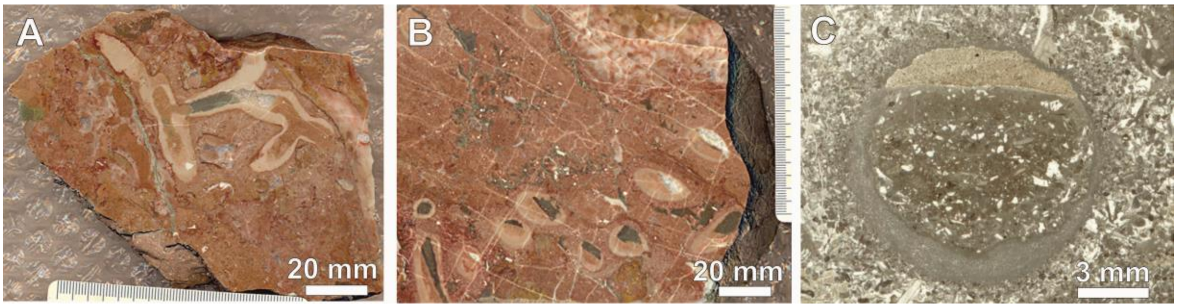

Fig. 2 Burrows from the lower Aptian of the Rarău Mountains. **A**. Branches. **B**. Circular and oval transverse sections of geopetally filled burrows showing well developed wall. **C**. Micropeloidal fabric of the wall.

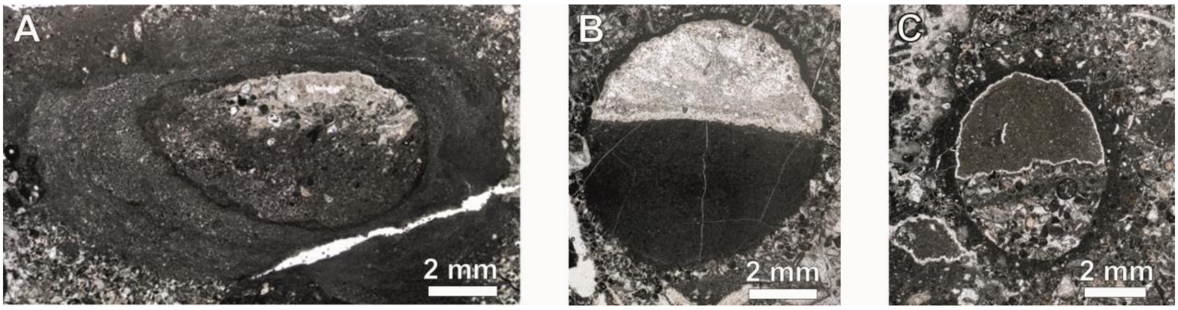

Fig. 3 Burrows from the Barremian–lower Aptian of the Dâmbovicioara zone. **A**. Thick wall showing micropeloidal fabric. **B–C**. Geopetally filled tubes. In **C**, note diffused boundary between the wall and the surrounding sediment. Some grains are agglutinated in the wall.

ORAL

Paleoecology of tabulate corals from Aferdou el Mrakib (eastern Anti-Atlas, Givetian, Morocco)

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Keywords: Tabulata, corals, Devonian, Paleoecology

Within the Middle Devonian succession of the Mader basin in the eastern Anti-Atlas, multiple carbonate build-ups occur which were exposed due to erosion in the dry Saharan climate. They exist today as isolated elevations, towering above the plains of Mader. Reaching 130 metres in height, Aferdou el Mrakib is the largest among them. It is a part of the Jebel el Mrakib ridge, which constitutes the southern boundary of the Mader basin. The Givetian build-up of Aferdou el Mrakib is considered a reef mound, a reef in the broad meaning of this term. The main part of the reef was not preserved - the top of the succession was eroded, while the core parts of the reef mound were dolomitized. The faunal assemblage of Aferdou el Mrakib was only preserved as the redeposited material in the form of a talus, surrounding the dolomitized core (Kaufmann, 1998).

The tabulate assemblage of Aferdou el Mrakib can be roughly divided into two groups, based on the coral growth form. First group consists of large (up to 1 m in diameter), massive, spherical, sub-spherical and irregular coralla. They are taxonomically poorly diversified, dominated by only two species: *Heliolites* aff. *porosus* and *Favosites* cf. *goldfussi*. Their position in the sediment (commonly shifted or overturned) documents their redeposition. The second group consists of small (up to a few centimetres in length or diameter), delicate coralla which are strongly fragmented. They represent thin-branching, thin-platy, ramose and reptant growth forms. This group is characterized by a larger taxonomic diversity, consisting of pachyporids (genera *Striatopora*, *Thamnopora*, *Taouzia*), favositids (*Favosites*, *Crenulipora*), auloporids (*Aulopora*, *Bainbridgia*, *Cladochonus*), alveolitids and coenitids. Tabulate corals co-occur with solitary and colonial rugosans (genera *Heliophyllum, Acanthophyllum, Cystiphylloides, Hexagonaria, Phillipsastrea*), large stromatoporoids, crinoids and trilobites, as well as brachiopods, with some local monospecific assemblages of *Devonogypa* sp. and *Ivdelinia pulchra* (Kaufmann, 1998; Franchi et al., 2012; Halamski & Baliński, 2013), in form of large blocks, which are most likely olistoliths.

In the original paleoenvironmental interpretation of Aferdou el Mrakib, Kaufmann (1998) inferred a relatively deep water environment, below the euphotic zone, and under a low hydrodynamic setting. He based his interpretation on the prevalence of micritic matrix and the lack of calcareous algae. The characteristics of the tabulate assemblage seem to contradict this, at least partially. The dominance of large, massive growth forms, relatively resistant to wave action, as well as their poor taxonomic diversity, suggests that the environment was rather unfavourable for corals poorly adapted to high energy conditions. Small sizes and the state of preservation of the delicate tabulate corals seem to confirm that. Large, meter-sized coralla, overturned in the sediment, co-occurring with fragmented thin-branching and thin-platy corals, as well as the presence of large olistoliths, indicate on redeposition with high energy. Aferdou el Mrakib was most likely an elevation reaching depths shallow enough to be affected by high-energy events. The isolated elevation could provide favourable conditions of nutrient supply and light, in the context of the hypothesis of photosymbiosis in tabulates (e.g. Wood, 1998; Zapalski, 2014). Large, massive tabulate corals such as *Heliolites* aff. *porosus*, *Favosites* cf. *goldfussi*, as well as rugosans *Phillipsastrea* and *Hexagonaria* could thrive in such conditions, while the high energy setting restricted the development of more delicate corals. They could inhabit the deeper parts of the slopes of Aferdou el Mrakib, as well as places protected from the wave action by the presence of large, massive colonies. The ecosystem of the reef was mainly controlled by the hydrodynamic setting and high energy events, which could cause the redeposition of large coral colonies and even lithified blocks up to several metres in size.

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ORAL

Late Triassic brachiopod *Halorella* assemblages from paleokarst cavities near Vașcău, Apuseni Mountains, Romania

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Keywords: Brachiopods, *Halorella*, paleokarst cavities, Late Triassic, Romania

Introduction

We report on the occurrence of the Triassic rhynchonellide brachiopod *Halorella* from the infilling of paleokarst cavities developed in late Carnian-Norian Dachstein Formation carbonates near Vașcău, Apuseni Mountains, Romania, part of the Codru Nappe System (Grădinaru, in Kovacs et al., 2011). *Halorella* is typically considered a Late Triassic indicator (Late Carnian-Norian) (e.g., Manceñido et al. 2002).

Neptunian dykes containing Late Triassic brachiopods, including *Halorella*, have been known for some decades, first described from the Alps (e.g., Fischer, 1964). The origin of neptunian dykes may be tectonic (fracturing) or erosional (karstic solution weathering in "limestone country"), or a combination of both. Tectonic fracturing may also act as a conduit for hydrothermal solutions and processes. Hydrothermal solutions have recently been implicated in the development of Jurassic brachiopod-bearing neptunian dykes (Matyszkiewicz et al. 2016); whereby they provided a milieu on the seafloor suitable for brachiopod colonization in the vicinity of the dykes and the rhynchonellides were subsequently washed into these depressions. We have not as yet ascertained any hydrothermal or hydrocarbon contributions in the development of the carbonates and faunas that infill the neptunian dykes near Vașcău. Ager (1965) considered the occurrences of the brachiopods *Halorella* and *Halorelloidea* in neptunian dykes from the Swiss Alps (in Fischer, 1964) to have been washed into these fractures (Ager 1965, considered these as brachiopods from sublittoral non-depositional sea floors).

Results

There is a broad-scale development of karstification into the late Carnian-Norian Dachstein reefal limestones (Dachstein Formation) in the vicinity of Vașcău, Apuseni Mountains, Romania. These karstified limestones were subsequently flooded by marine transgression. During this transgression *Halorella* was probably an early colonizer of the sea-floor including the dykes and paleokarst cavities. Shells of this brachiopod are found in the sedimentary infill of the paleokarst cavities in the Dachstein limestone. The brachiopods do not occur as tightly packed masses of shells but in low enough numbers that they are separate and supported by the sedimentary infilling matrix that is laminated in places. In addition a lack of mass-flow sedimentary structures also supports relatively slow sedimentation rates in the dykes and/or paleokarst cavities. The majority of the brachiopod specimens are well preserved with original shell, articulated, and the shells are neither decorticated nor eroded. Of the specimens, 80% are partially filled with the same red sediment as the surrounding matrix (iron rich micropeloidal carbonate) and sequentially nucleated by early radiaxial fibrous calcite that postdates a first generation of isopachous fibrous cements followed by late blocky cements resulting in geopetal structures. The geopetal structures have the same orientation, confirming that specimens have not been transported. A wide range of brachiopod shell sizes is preserved, indicating successive generations/biocoenoses. The only bioclasts associated are represented by numerous ostracod shells. Ostracods are numerous as seen in thin sections, but are difficult to be extracted from the limestone matrix by chemical processing (hot acetolysis). Disarticulated valves are visible but only complete carapaces have been extracted, which further confirms that the assemblage might have experienced only limited transport. All ostracods are small and poorly preserved with their external surfaces seemingly dissolved. Nevertheless, several taxa can be differentiated, including the genus *Polycope*, and members of the Bairdioidea, Cytheroidea and Cypridoidea.

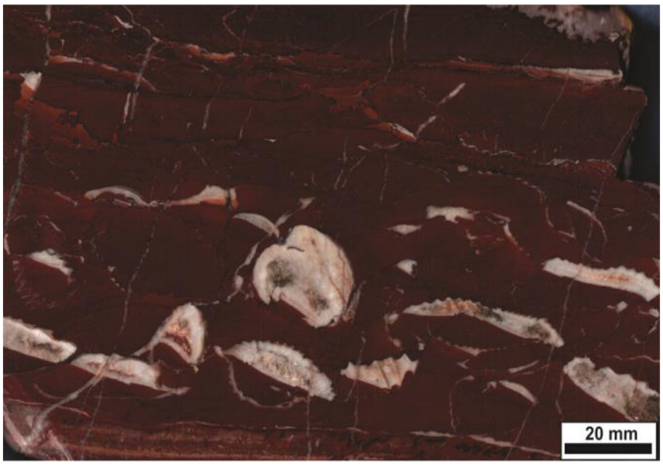

Fig. 1 *Halorella* shells completely or partially filled with geopetal carbonate mud and calcite cements; note the same orientation of the geopetal structures (polished surface).

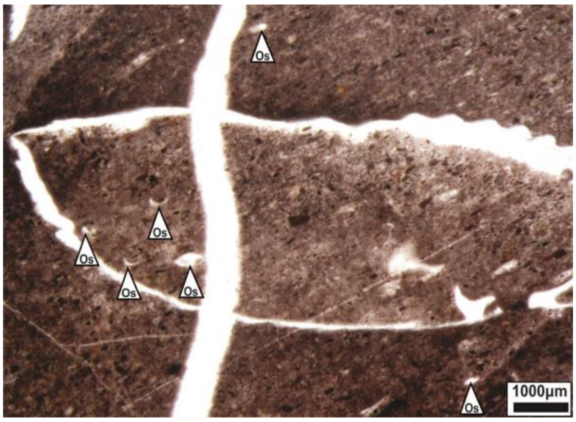

Fig. 2 *Halorella* shells are filled with the same red sediment as the surrounding matrix (iron rich micropeloidal carbonate). The only bioclasts associated are represented by numerous ostracod shells (arrows) (thin section).

Conclusions

The presence of what could be considered in-situ "mass occurrences" of *Halorella* near Vașcău, had initially led us to speculate that the *Halorella*-hosting paleokarst cavities could perhaps represent an environment associated with chemosynthesis-based environments, such as cold seeps. This had been the case with another mass-occurrence of *Halorella* – in methane seep deposits comprising incredible numbers of specimens packed into shell-beds, from the Late Triassic of Oregon, U.S.A. (Peckmann et al. 2011). However, petrographic and stable carbon isotope analyses (δ^{13}C: +3.1 to +3.4‰, n = 6) of samples from Vașcău do not support this Romanian *Halorella* occurrence as being associated with methane seepage. Rather, we favour the idea that the brachiopods associated with numerous ostracods were living in the neptunian dykes and submarine paleokarst cavities in what could be considered a cryptic habitat.

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POSTER

Turonian-Coniacian (Upper Cretaceous) succession of the Babadag Basin (North Dobrogea); microfacies succession and integrated biostratigraphy

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Keywords: microfacies, inoceramids, ammonites, foraminifers, biostratigraphy, palaeoenvironments

Biostratigraphic, bioecological and microfacial analyses of the upper Turonian – middle Coniacian (Upper Cretaceous) succession of the Babadag Basin (Dobrogea, south-eastern Romania) were performed. The study is based on the material collected from the quarries near Visterna, Caugagia and Baia localities. The Cretaceous succession of the Babadag Basin has been studied earlier Szasz (1985); Szasz and Ion (1988); Ion and Szasz (1994).

The dominant rock types in the studied area are varied from very shallow to open marine calcarenites, calcareous mudstones and marls. The succession is poorly to moderately fossiliferous. Biostratigraphically the oldest ammonite and inoceramid faunas come from the lowermost upper Turonian, and continue through the middle Coniacian. Inoceramids are best documented from the basal upper Turonian and from the lowermost Coniacian. The ammonites occur sparsely throughout the succession, however, the good material comes only from the middle Coniacian of the Baia section. Other macrofauna is rare, being represented by non-inoceramid bivalves, gastropods, sponges and echinoids. Only foraminifers were studied from among microfossils; these are rich to moderately abundant throughout the succession. Moreover, collected planktonic foraminifera data confirms, that the *Helvetoglobotruncana helvetica* standard foraminiferal Total Range Zone should have been expanded at least up to the lowermost upper Turonian stage.

Microfacial analysis from all localities, based on c. 100 thin sections, enabled recognition of three main microfacies: **I** – sedimentary breccia; **II** – non- to poorly-fossiliferous packstone / wackestone; and **III** – fossiliferous packstone / wackestone. The latter may further be subdivided into four microfacies: (**IIIA**) bioclastic packstone / wackestone; **(IIIB)** foraminiferous packstone / wackestone, abundant in other faunas; (**IIIC)** foraminiferous packstone / wackstone; and (**IIID)** algae dominant, or algae – spongious packstone / wackestone. The subdivision of microfacies **III** on basis of the occuring fauna is important for further palaeoenvironmental interpretations.

The co-occurrence of open-marine, keeled planktonic foraminifers, and shallow-marine, agglutinated benthic foraminifers (both groups well-preserved, disproving their significant transportation) locates the studied area in open-marine sedimentary environment (albeit in a proximity to coastal zone). Such location made the basin very sensitive for any sea-level changes, with terrigenous input appearing during shallowing intervals. Besides minor transgressive-regressive fluctuations inferred from microfacies and foraminiferal analyses, one major shallowing (?emersion) pulse is suggested for the early late Turonian part of the succession. This pulse is recognized in the lower half of the Visterna section, marked by a transition from open- to very shallow-marine environment.

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POSTER

Planktonic and benthic foraminieral assemblage of Bisericani Formation, Tarcău Nappe (Eastern Carpathians, Romania)

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Keywords: Eocene, biostratigraphy, agglutinated foraminifera, calcareous foraminifera, paleoecology

Introduction

The studied deposits belong litho-stratigraphically to Bisericani Formation (Athanasiu, 1921 in Athanasiu et al., 1927), and tectono-stratigraphically to the external Moldavides (Tarcău Nappe). This formation is represented by arenito-siltolutitic flysch deposits. Ionesi (1971) based on lithological and faunistical considerations separates the Bisericani Formation in three informal members: the red and green shale, the greenish-gray mudstone and „*Globigerina* Marls". Other lithostratgraphic and petrografic studies on this formation have been carried out by Micu (1981), Grasu et al. (1988) and Juravle (2007). In the studied area, the Bisericani Formation belongs to the Doamna lithofacies and is located on the Voroneţ Valley at about 170 m from the confluence with the Moldova river, (N43°32'17,27"/E 25°51'59,77"). Having a thickness of about 17 m, the outcrop belongs to the lower member of the Bisericani Formation and consists mainly of red and green shales with sandstone interlayers.

Results

In the analyzed samples we have identified a foraminiferal assemblage dominated by agglutinated foraminifera that belongs to the "flysch type" biofacies. We have identified all morphogroups of agglutinated foraminifera, Kaminski and Gradstein (2005), the most common being the tubular forms (M1 morphogroup) such as *Psammosiphonella cylindrica*, *Nothia* div. sp., followed by M2b morphotype - *Recurvoides* div. sp., M3a morphotype - *Glomospira* div. sp., and M3c morphotype with *Paratrochamminoides* sp., and *Trochamminoides* sp. forms. Two samples collected from the green shales in the lower part of the section revealed calcareous benthic (*Dentalina* div. sp., *Stilostomella* div. sp., *Nodosaria* div. sp., *Cibicides* div. sp., etc.) and planktonic (*Hantkenina* div. sp., *Subbotina* div. sp., *Globigerina* div. sp., etc.) forms being more abundant than the agglutinated foraminifera. The presence of calcareous benthic and planktonic foraminifera together with some calcareous-cemented species (*Popovia* div. sp.) suggests that this assemblage belongs to the "mixed" low-latitude calcareous-agglutinated slope marl biofacies (Kaminski & Gradstein, 2005) and indicates a middle-lower bathyal marine environment for this type of biofacies.

The biostratigraphical data was provided by the planktonic and some agglutinated forms. The presence of the *Hantkenina* div. sp. allows us to assign the Middle Eocene age for the studied deposits.

The Middle Eocene age can also be assigned based on the agglutinated species *Reticulophragmium amplectens* and *Ammodiscus latus*. The first occurrence of these species in the Middle Eocene is well known and documented (Morgiel & Olszewska, 1981; Olszewska, 1997; Geroch & Nowak, 1984; Kaminski et al., 1988; Kaminski & Gradstein, 2005, Waśkowska, 2014; Bindiu et al., 2016).

Also, specimens of *Popovia beckmanni* of Middle Eocene of the Polish Carpathians have been described as coarser and made exclusively from quartz grains as those identified by us on the Voroneţ Valley.

Conclusions

The distribution of the agglutinated foraminifera morphogroups and the presence of M3b (*Ammolagena clavata*) morphogroup indicates a bathyal deep-water environment. This depositional marine environment is also suggested by the "mixed" low-latitude calcareous-agglutinated slope marl biofacies (Kaminski & Gradstein, 2005). Also, the installation of a climate with lower temperatures, which is suggested by the appearance of some foraminifera such as *Hantkenina* div. sp. and *Ammodiscus latus*, can be noted (Pearson & Coxall, 2014; Waśkowska & Kaminski, 2017).

The Middle Eocene age for this interval was established based on the presence of planktonic and agglutinated foraminifera.

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ORAL

Solving biostratigraphical issues of the Oligocene-Miocene interval in Romania based on calcareous nannoplankton analysis

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Keywords: Oligocene, Miocene, calcareous nannoplankton, Romania

The Oligocene-Miocene interval encloses the main oil source and reservoir rocks in Romania. These sediments are mainly represented by bituminous shales, very scarce in macro and microfossils, and also by turbidite succession, which may contain rarely in-situ microfossils, but also significant reworked taxa. The issue in attributing an accurate age of the Oligocene and Miocene successions are encountered both in the Romanian Carpathians and Transylvanian Basin.

Calcareous nannoplankton represents a group of marine organisms found in any type of marine deposits. On the other hand, the small size of the coccoliths, usually between 2 and 10 microns, allow them to be easily reworked. Even so, the calcareous nannofossils have proved their utility in determine the age of the Oligocene-Miocene deposits of the Romanian Carpathians and Transylvanian Basin.

The 'classical' biozonation schemes of the Oligocene-Miocene interval (Martini, 1971; Okada & Bukry, 1980; Raffi et al., 2006) generally used marker species that may be easily recognized in open-marine settings and in the low latitudes. Besides, these zonations are based on the study of hemipelagic deposits, mostly from Atlantic and Mediterranean, in which reworked taxa are very few; that is why the last occurrences of the nannofossils have been largely used in defining biozones. For these reasons, these schemes are very difficult to apply in biostratigraphical investigations of the Oligocene-Miocene interval of the Paratethys Domain, including the Romanian territory.

Last decades, new calcareous nannoplankton biostratigraphical schemes have been established for the biostratigraphy of the Oligocene-Miocene deposits of Romania, which may be applied also in all the Carpathian regions (Mărunțeanu, 1992; Melinte, 1998; Melinte, 2005 and this paper). These new zonations used as much as possible the first occurrence of the taxa. For the early Oligocene interval (i.e. Rupelian) and Middle Miocene (especially Sarmatian), where endemic nannofossils occur, species related to the Paratethyan realm have been considered.

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ORAL

Cyclic sedimentation of the Uppermost Jurassic-Lowermost Cretaceous limestones from the Piatra Craiului Massif

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Piatra Craiului Massif is located in the easternmost part of the Southern Carpathians, Romania. The carbonate succession from this area forms a 20 km long, NE-SW oriented calcareous ridge. It consists of an Upper Jurassic-Lower Cretaceous prograding megasequence which has an average thickness of 800 m. Kimmeridgian-Tithonian limestones are forming the basal part of the carbonate succession. They are defined mainly by the presence of coral-microbial-microencruster boundstones and bioclastic rudstones. By contrast, the middle and upper part of the megasequence comprises peritidal Berriasian- ? Lower Valaginian limestones (Pleş et al., 2013; Mircescu et al., 2014).

Litostratigraphic interval I (Kimmeridgian-Lower Tithonian) is defined by alternating coral-microbial boundstones and bioclastic intraclastic rudstones. Corals are encrusted by different associations of encrusting organisms (*Lithocodium*/*Bacinella* type structures), worm tubes and calcareous sponges (*Calcistella jachenhausenensis* Reitner). The sedimentology of this lithostratigraphic interval is documented in detail by Pleş et al. (2013).

Litostratigraphic interval II (Lower Tithonian) includes the entire package of carbonate deposits between 290 and 408 meters of stratigraphic thickness. The main facies type is coarse biointraclastic grainstones with gastropods, dasycladalean algae, sponges, echinoderm fragments, corals and foraminifera. Intraclasts are represented at some levels by various-sized black pebbles (mm to cm). They are frequent in the uppermost part of this litostratigraphic interval. Some grainstone levels are pigmented with iron oxides. Cavities are borded by dog-tooth type cement. Micritic mensiscus cement is frequent between various carbonate particles. Available isotope data (negative $\delta^{13}C$ values, from -1.19 to -1.37‰) may indicate an increase of the organic carbon content (cf. Saltzmann and Thomas, 2012) within these black pebble bearing, iron oxide pigmented grainstone levels. Depleted $\delta^{13}C$ values (-0.69 to -1.92‰) may be associated with freshwater input and early meteoric diagenesis (Allan and Matthews, 1982; Moore, 2001; Patterson and Walter, 1994).

Litostratigraphic interval III (Upper Tithonian-Berriasian-Lower Valanginian) consists mainly of peritidal deposits which are defined by well exposed beds which exhibit thickness variations ranging from decimeters to centimeters. The carbonate beds are almost vertical in the basal part of the Ciorânga Mare-Vf. Ascuţit-Padinile Frumoase section. Decimeter to centimeter thicknesses are common. In the Upper Vlăduşca section, the carbonate beds are forming decimeter thick banks with high dip. In terms of facies, the following types of lithologies are common: intraclastic peloidal grainstone with *Rivularia* type cyanobacteria (facies type A), ooidic grainstone (facies type B), alternating peloidal grainstone and laminoid fenestral wackestone (facies type C), oncoidic wackestone with *Rivularia* (facies type D), fenestral laminoid wackestone (facies type E), fenestral wackestone with *Rivularia* (facies type F), intraclastic mudstone/wackestone with rare foraminifera [*Anchispirocyclina lusitanica* (Egger)] (facies type G), non-fossiliferous homogeneous mudstone (facies type H), microbial-cyanobacteria mats (cyanobacteria bindstone) (facies type I) and mudstones with calcrete features (facies type J).

Facies type A characterises subtidal environments, facies types B-F characterise intertidal environments while facies types G-J are defining supratidal depositional settings. In terms of vertical stacking patterns, the entire succession is characterised by the repetition of distinct sets of 3-4 beds where the transition from subtidal to supratidal environments is evident. Microfacies analysis indicates that such depositional settings (subtidal, intertidal, supratidal) were represented by tidal channels, ponds, beaches and swamps. A general vertical transition from tidal channels to shallower ponds or swamps is common within each bedset composed of 3 to 4 carbonate beds. In the upper part of the succession, some bedsets are caped by mudstones with calcrete features.

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POSTER

Taphonomic assessment of MIS 3 cave bear bone assemblages using GIS techniques. Case studies: Muierilor and Urșilor caves, Romania

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Keywords: vertebrate palaeontology, kernel density analysis, spatial analysis, MIS 3, Romania

Introduction

This study reports preliminary data regarding the depositional patterns of the vertebrate assemblages and the degree of bone breakage from Muierilor and Urșilor caves using GIS techniques. The objectives of this taphonomic approach were to assess the type of accumulation and the main polarity of the long bones. These caves are representative European MIS 3 paleontological sites bearing significant cave deposits (including fossil remains, sediments and speleothems).

Materials and methods

Spatial orientation and density estimation analyses were performed on the long bones, extracted from the digging trench representing the first two levels of the excavations (~ 20-25 cm below "0" datum). The analyzed faunal samples belonging to *Ursus spelaeus* were recorded, photographed and surveyed on the excavation grid and on a 10 × 10 cm sub-grid for each quadrant. The spatial distribution of 291 bones and bone fragments from Muierilor and 393 from Urșilor, represented by humeri, ulnae, tibiae and femora, was assessed within the paleontological excavation and referencing the digging trenches at 50 cm radius between points. This was done for the kernel density analysis to generate the density map with the highest concentration of damaged bones. We classified the specimens from the excavation in 3 categories of degradation, based on their degree of weathering and we analyzed them with kernel estimation algorithm in ArcGIS 10 (Fig. 1). The first type includes long bones with epiphyses and diaphysis preserved, the second one groups bones without epiphyses (and with a medium degree of weathering along the diaphysis), and the third one contains only fragments of epiphyses or diaphysis with substantial deterioration (Kos, 2003). We analyzed the deterioration process as a sum of bone breakage by fluvial transportation, sediment-induced compression and trampling. The orientation was calculated only for long bones with good preservation state, represented by humeri (n=34), ulnae (n= 20), tibiae (n =20) and femora (n=31) for Muierilor, respectively humeri (n=136), ulnae (n=71), tibiae (n=94) and femora (n=92) for Urșilor. The bone survey was performed using high-resolution pictures and measuring the azimuth was done with a compass (ST=5º), the results being plotted as rose diagrams with bi-directional data distribution. We used the kernel estimation algorithm and spatial orientation to test for the inferred

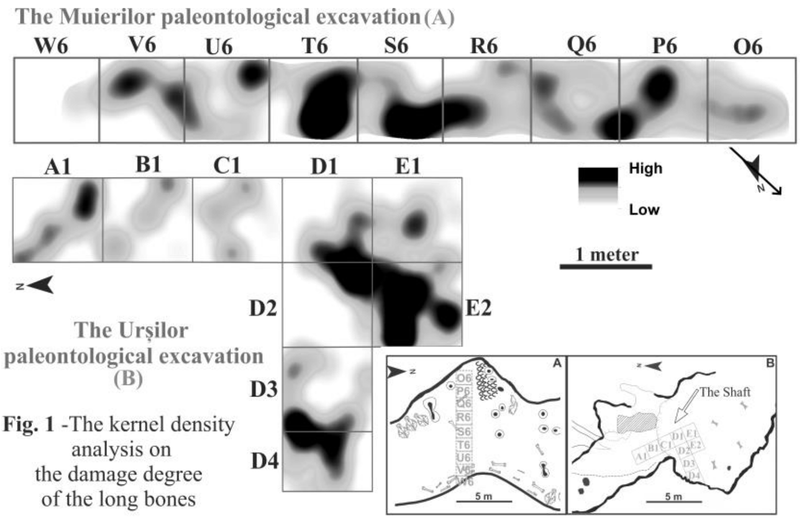

Fig. 1 -The kernel density analysis on the damage degree of the long bones

fluvial transportation.

Results and discussions

The kernel density tool was used to identify where clusters of damaged bones showed highest concentrations within the paleontological excavations. The kernel density result for Muierilor shows high concentrations of degraded bones in the median area of the Urșilor Passage, over the central squares of the paleontological excavation, the rest of the digging trench yielding medium or low concentrations of degraded remains. The result of the kernel density analysis suggests a fluvial transportation in the central part of the paleontological excavation. The concentration of degraded remains correlated with the number of faunal remains converged in T6, S6 and R6 squares (40.3% of the total samples analyzed) can delineate a former stream bed. Unlike in Muierilor, the Urșilor kernel density analysis shows a low frequency of degraded remains (within the third weathering category, only 25% of degraded remains were recorded at Urșilor, in contrast with 40% for the same category at Muierilor). A high concentration of degraded remains is located in the D1-E2 squares and corresponds with the limit of the Shaft (20 m height), an observation that may suggest the presence of pitfall entrapment (Fig. 1). The low percentage of degraded remains correlated with the results of bone orientation suggest that we cannot consider the fluvial transportation as the main bone concentrating mechanism for Urșilor Cave. For the Muierilor paleontological excavation, we can delineate a NNW-SSE main orientation of the long bones, that is in accordance with the general paleo-flow direction. The examined femora (n= 31) show a primary orientation NNW-SSE (320-140º N). The surveyed humeri (n=34) from the digging trench show a random pattern of orientation, the mean vector being NNE –SSW (33-213ºN). The tibiae (n=20) have a main pattern of polarity and a mean vector of E-W (90-270ºN). Like the humeri, the ulnae (n=20) have a random pattern of orientation with the average vector as NNE-SSW (54-234º N). The horizontal distribution of the long bones from Urșilor Cave reveals a random arrangement with multiple groups of bone orientations (Robu, 2016). The humeri (n=136) show a random orientation with a general direction of NW-SE (344-164º N). The main orientation of ulnae (n=71) is NW-SE (302-122º N). The surveyed femora (n=92) have a random direction, but the general direction is WNW-ESE (296-116º N). The general direction for tibiae (n=94) is WNW-ESE (315-135º N). In conclusion, the spatial distribution analysis carried out in both excavations reveals extensive evidence for fluvial transportation in Muierilor Cave and an *in situ* deposition at Urșilor Cave.

Conclusions

The kernel density analysis indicates a high hydraulic activity involved in the concentration of the degraded faunal remains within the central area of the paleontological excavation, and allows a possible delineation of paleo-flow drainage for the Muierilor Cave. When compared to Muierilor, Urșilor shows a low abundance of degraded fossil bones and random distribution patterns, although the high concentration of degraded remains that was found below the Shaft (D1-E2 squares) suggests a pitfall entrapment mechanism.

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POSTER

Microfossil assemblages and facies associations in Upper Jurassic calcareous olistoliths from the Perşani Mountains (Eastern Carpathians)

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Keywords: Kimmeridgian-Tithonian, calcareous sponges, encrusting micro-organisms, carbonate platforms

The present study focuses on the microfacies and micropalaeontological analysis of the Merești olistolith composed mainly of Upper Jurassic shallow-water carbonates with a large variety of microfossils. Since very few studies were accomplished on these carbonates (Patrulius, 1965; Kovacs, 2001) most of the identified taxa represent species previously unreported from this region.

Located in the northernmost part of the Perșani Mountains, the Merești olistolith was included in the Berriasian-Aptian wildflysch deposits (Săndulescu, 1984). The Perșani Moutains are characterized by a complex geological structure. The main structural units identified in this region are the Transylvanian and Bucovinic Nappes. Along with the Rarău Massif and Hăghimaș Mountains they form the so-called Crystalline-Mesozoic Zone of Eastern Carpathians. The exact stratigraphic position of the studied olistolith is difficult to determine. Săndulescu (1967, 1984) includes it in the Hăghimaș Nappe, while Patrulius et al. (1966) includes it in the Perșani Nappe.

The sampling was made along the Vârghiș Valley which cuts the Meresti olistolith forming 2 km long gorges. Considering the NW-SE direction of the Vârghiș Valley, along with a 330 degree strike and 30 degree dip of the limestone deposits, the samples were taken perpendicular to its layering.

In terms of facies and sedimentary setting, most of the studied carbonates are represented by small coral-sponge bioconstructions and skeletal debris with a significant contribution of microencruster and microbial carbonates (crustose/clotted fabrics). Coral-stromatoporoid-microencruster boundstone and coarse bioclastic grainstone/rudstone represent the main microfacies types. The micropalaeontological association is represented by foraminifera (*Labyrinthina mirabilis*, *Protopeneroplis striata*, *Nautiloculina broennimanni*, *Lenticulina* sp., *Reophax* sp.), calcareous algae (*Clypeina sulcata*, *Salpingoporela pygmaea*), calcified sponges (*Neuropora lusitanica*) and encrusting organisms (*Crescentiella morronensis, Koskinobullina socialis, Lithocodium aggregatum*, *Radiomura cautica*, *Iberopora bodeuri*). They certify a Kimmeridgian-Tithonian age for the studied olistolith.

Based on the morphology and nature of the main bioconstructors (calcified sponges, corals, micro-encrusters and microbial structures) the boundstone levels were most probably developed as patch-reefs on the marginal areas of the carbonate platform (cf. Pleș et al., 2013). This is also supported by the lack of a rigid framework and by the presence of poor-sorted coarse-grained sediments between these boundstones (skeletal debris). The encrusting activity of many micro-organisms have enforced the platform-margin carbonates and favored the development of small bioconstructions. Such features were frequently described from many Upper Jurassic carbonate deposits from Europe defined by the same morphostructural features (e.g. Schlagintweit and Gawlick, 2008, Leinfelder et al., 1993; Kaya and Altiner, 2015).

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ORAL

Needles in the haystack - sauropod teeth from the uppermost Cretaceous of Iharkút (Santonian, Hungary) and Haţeg (Maastrichtian, Romania), and latest Cretaceous sauropod diversity in central-eastern Europe

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Keywords: Titanosauriformes, Titanosauria, odontology, 'Sauropod Hiatus', faunal heterogeneity

Sauropod dinosaurs rank among the largest terrestrial animals known, and form one of the longest-living and specious dinosaur clades, with a rich fossil record that extends from the Late Triassic to the latest Cretaceous, distributed across all landmasses (Upchurch et al., 2004). At the peak of their higher-level taxonomic diversity, during the Late Jurassic-Early Cretaceous, sauropods were represented by such iconic animals as the diplodocids *Diplodocus* and *Brontosaurus*, or the brachiosaurid *Brachiosaurus*, but their diversity declined severely after the 'mid'-Cretaceous, when sauropods became represented exclusively by the members of the sole surviving clade, the Titanosauria. In the latest Cretaceous, the greatest diversity and abundance of titanosaurs is recorded in Gondwanan continents, where they were present as top herbivores of their respective palaeocommunities, but were rare and ecologically subordinate in the northern landmasses. The only exception to this pattern is southern Europe, where titanosaurs were not only present (Le Loeuff, 1993), but were dominant members of some of the local ecosystems in southwestern Europe, the so-called Ibero-Armorican Landmass (Vila et al., 2012; Csiki-Sava et al., 2015). In other parts of Europe, however, titanosaur sauropods were quasi-absent, with the exception of the Transylvanian landmass; here, titanosaurs were moderately common and second most abundant to rhabdodontids among dinosaurs (Csiki-Sava et al., 2015). Due to their large body sizes and robust, massive skeletal elements (especially their limb bones), remains of titanosaurs have high chances of preservation, and these are easily spotted in the field, recovered and identified at least at higher taxonomic levels. In contrast, their cranial remains (with their lightweight and often fragile bones) and minute teeth, which are often diagnostic, are very rare among the latest Cretaceous continental vertebrate fossils. In the southwestern European areas, isolated sauropod teeth are nonetheless not uncommon, and their morphological diversity (Díez-Díaz et al., 2013) reflects the mophological (and underlying taxonomical) diversity documented by their cranial (Díez-Díaz et al., 2012; Knoll, 2015) and postcranial (Vila et al., 2012) remains. Sauropod dental remains are even more uncommon in the Transylvanian area of eastern Europe, although such discoveries were first reported more than 40 years ago (Grigorescu et al., 1985). Furthermore, sauropod remains were completely unknown from other eastern European areas with uppermost Cretaceous continental deposits, including the Santonian strata from western Hungary, the lower Campanian beds from eastern Austria, or the upper Campanian-Maastrichtian sites from the Adriatic and Balkan regions (reviewed by Csiki-Sava et al., 2015). The lack of sauropod remains in these areas were cited to suggest their absence in the corresponding local ecosystems, emphasizing the high degree of faunal provincialism that characterized the Late Cretaceous European Archipelago. In recent years, screenwashing of fossiliferous matrix from several fossil microvertebrate bonebeds across the Haţeg Basin (especially the Fântânele locality near Vălioara) has revealed the presence of very diverse microvertebrate assemblages (Vasile & Csiki, 2010). In the large sample of isolated teeth from Fântânele, several specimens are characterized by an elongated, pencil-like morphology with pointed tip, and often present a slight curvature along their length. First identified tentatively as pterosaurian in nature (Csiki et al., 2009), these are now recognized as sauropod teeth, somewhat reminiscent of certain titanosaurian mophotypes from France (Díez-Díaz et al., 2013a) and also of that reported by Grigorescu et al. (1985) from Pui. Their derived titanosaurian nature is consonant with the somhospondylan affinities of the Transylvanian sauropods (Csiki et al., 2010). More surprising is, in this respect, the recent discovery of an isolated tooth in Santonian deposits from Iharkút, western Hungary (Ősi et al., 2017). This tooth shows a slightly spatulated morphology with labially recurved tip that departs from that known in most derived titanosaurs, in Europe and elsewhere. Instead, its features suggest that it has a more basal, titanosauriform affinity, akin to some Early to 'mid'-Cretaceous titanosauriforms from western Europe, Brazil and China. The identification of this isolated tooth documents the presence of sauropods in the Iharkút assemblage as well. It also suggests an even higher taxonomic diversity of the group in Europe during the Late Cretaceous than previously recognized, and further emphasizes the high degree of faunal endemicity and provincialism present across the Late Cretaceous European Archipelago. More importantly, the Santonian age of the Hungarian titanosauriform makes it an extremely important addition to the European sauropod fossil record that was characterized previously by the a 'Sauropod Hiatus' during the middle part of the Late Cretaceous (Le Loeuff, 1993; Mannion & Upchurch, 2011), similar to that reported previously in North America by Lucas & Hunt (1989).

The Hungarian record (along with scanty remains from the peri-Adriatic area) now starts to fill this hiatus, suggesting that sauropods (despite being as yet virtually undocumented by fossil remains) continued to thrive in southern Europe during the entire Late Cretaceous, and that the extreme rarity of their remains is probably the result of a taphonomic bias and/or inland habitat preference rather than that of a real disappearance.

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ORAL

The microfacies study of the Piatra Arsă carbonate olistolith

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Keywords: carbonate olistolith, microfacies, flysch deposits, Bucegi Mountains

The eastern part of the Bucegi Mountains is mainly composed by flysch deposits belonging to the Sinaia Formation and conglomerates and sandstones belonging to the the Bucegi Conglomerates Formation (Murgeanu et al., 1963; Patrulius, 1969). The flysch deposits were accumulated during the Tithonian – Neocomian interval (the Sinaia beds) and the Barremian – Aptian interval (the Barremian – Aptian flysch) (Murgeanu et al., 1963; Patrulius, 1969). The Bucegi Conglomerates Formation age is Albian (Murgeanu and Patrulius, 1957; Murgeanu et al., 1963; Patrulius, 1969; Melinte and Jipa, 2007). All these formations are part of the Ceahlău Nappe (Outer Dacides) (Săndulescu, 1984) and include dozens of limestone olistoliths, some measuring hundreds of meters in length (Patrulius, 1969).

The present study describes the microfacies types identified in the Piatra Arsă quarry which digs into a carbonate olistolith embeded in the Lower Cretaceous (Barremian-Aptian) marly – sandy flysch deposits (Patrulius, 1969). Melinte and Jipa (2007) and Briceag et al. (2009) refer to these latter deposits as turbidites. Based on sedimentological and paleontological characteristics, Patrulius (1969) asserted that this olistolith originated in the sedimentary cover of the eastern Leaota Massif.

From the collected samples 20 thin sections were studied under stereomicroscope and petrographic microscope for sedimentological characterization. The microfacies types were identified and described based on the textural descriptions, according to Dunham's (1962) classification, extended by Embry and Klovan (1971).

According to the compositional and textural features of the studied thin sections, the identified microfacies are: bioclastic packstone-grainstone; bioclastic packstone; bioclastic grainstone; peloidal oncoidal bioclastic packstone-grainstone; peloidal bioclastic grainstone; peloidal bioclastic packstone-grainstone.

The identified microfacies indicate that the studied olistolith originated in a shallow water subtidal depositional environment.

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POSTER

Oligocene and Miocene *Pronephrium stiriacum* from Romania

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Keywords: *Pronephrium stiriacum*, Petroșani Basin, Oligocene, Bozovici Basin, Miocene

Pronephrium stiriacum (Unger) Knobloch et Kvaček 1976 (Filicales, Thelypteridaceae) is described from Oligocene deposits of the Petroșani Basin and from Miocene deposits of the Bozovici Basin, the latter representing a new occurrence for Romania. Its morphological variation such as leaf size, venation and margins are considered significant for this species in the Oligocene – Miocene time interval in Romania.

The characters of the fossil specimens indicate their affinities within the family Thelypteridaceae, while the detailed morphologically aspects of both occurrences indicate several differences between them. The material from Oligocene deposits from the Petroșani Basin is characterized by very elongated pinnules with no hair bases occuring along the midbrib. The marginal teeth are falcate and sharp and the interconnecting veins are very weak. The Miocene Bozovici material is characterized by short pinnules and visible hair bases along the midbrib. The marginal teeth are symmetrical and slightly rounded. Its margin shows a median inflexion between the apex and the sinus, and the interconnecting veins are prominent.

In Romania, *Pronephrium stiriacum* was described by Givulescu (1996) under the name *Pronephrium stiriacus* from Petroșani Basin (Aninoasa and Vulcan localities) and by Petrescu et al. (1997) under the name *Pronephrium stiriacum* from both Petroșani Basin and Transylvanian Basin (Jac and Coruş). In Europe *Pronephrium stiriacum* was described by Konbloch & Kvaček (1976) from the Miocene deposits of Bohemia and by Kvaček & Hurnik (2000) from the Miocene of the Dobrčice locality, Czech Republic. Kovar-Eder et al. (2004) described *Pronephrium stiriacum* from the Miocene of Austria and Hably (2013) illustrated *Pronephrium stiriacum* from Hungary, from Ipolytarnoc, Csolnok and Wind localities.

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ORAL

Encrusting organisms from the Urgonian limestones of Rarău Mountains

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Keywords: Lower Cretaceous, Aptian, encrusting micro-organisms, red algae

The present study report the occurrence of a diversified assemblage of encrusting organisms (*Crescentiella morronensis*, *Radiomura cautica*, *Koskinobullina socialis*, *Pseudorothpletzella schmidi*, *Lithocodium aggregatum*, *Calcistella jachenhausenensis*, *Neuropora lusitanica*) identified within lower Aptian (Bedoulian) limestones from Rarău Massif (Eastern Carpathians). Also, non-geniculate red algae (*Sporolithon rude* and *Polystrata alba*) represent important elements of the main encrusting assemblage.

The important characteristic of this assemblage is given by its taxonomic individuality for an Urgonian-type facies. The species diversity together with the morpho-structural traits resemble many Upper Jurassic encrusting communities of the Tethyan (Schlagintweit and Gawlick, 2008; Pleş et al., 2013; Kołodziej, 2015; Kaya and Altiner, 2015). Even if the stratigraphic range of some encrusting species is not strictly limited to the Upper Jurassic, occurrence of this association in lower Aptian carbonates was not previously reported. Several encrusters described in the present study (*Pseudorothpletzella schmidi*, *Calcistella jachenhausenensis* and *Neuropora lusitanica*) are for the first time mentioned from lower Aptian.

The main facies types (coral-algal-rudist boundstones and bioclastic packstones) indicate a platform-margin sedimentary setting characterized by different hydrodynamic episodes. The studied encruster consortium represents a unique record of palaeoecosystems recovery throughout environmental changes. Most of the species identified here have entered into a community decline at the end of the Jurassic period. Starting with the Hauterivian–Barremian interval, the encrusting communities experienced a recovery event which led to the appearance of a diversified assemblage in the upper Lower Cretaceous carbonates of Rarău Massif. This can be explained by the development of similar climate, water temperature and nutrients which also favored the Late Jurassic micro-encruster blooming event.

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ORAL

The Early Jurassic flora from Mehadia, South Carpathians, Romania

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Keywords: systematics, phytostratigraphy, paleoecology, Early Jurassic, Mehadia, South Carpathians

The Lower Jurassic (Hettangian - Sinemurian) flora of the Mehadia area (Presacina Basin, Danubian Units, South Carpathians, Romania) is described, illustrated and interpreted from stratigraphical, palaeoecological and palaeogeographical points of view. Such interpretations were possible after detailed fossil collecting together with stratigraphic and sedimentological surveys of a 200m thick, un-named, continental formation yielding plant fossils, and after correlating in detail paleobotanical and sedimentological data. These deposits in Mehadia are traditionally known as the "*Laccopteris* beds", outcropping mainly along the Greațca Valley. The palaeoflora is compressive, represented by Sphenophytes (*Schizoneura* sp., *Equisetites* sp.), Dipteridaceae ferns (*Dictyophyllum nilssonii*), Incertae sedis ferns (*Cladophlebis denticulata*), Cycadales (*Nilssonia undulata*), Bennettitales (*Otozamites graphicus*, and a rare reproductive structure: *Weltrichia* sp.), and Incertae sedis conifers (*Elatocladus* sp.). The distribution of this flora within the succession shows swamp dwellers (horsetails and conifers) next to near-swamp shore plants (ferns and bennettitaleans), both growing on organic rich, coaly mudstones. The sedimentological context of the palaeoflora indicates overbank areas close to an active, braided river system and a series of crevasse channel sequences. The plant communities were disturbed periodically by floods which may be related to monsoonal climate conditions. Due to its Lower Jurassic outcrops with terrestrial sequences rich in fossil plants, Mehadia represents a highly important plant locality of the Danubian Units in the South Carpathians.

POSTER

Paleontological and sedimentological data of the Middle Miocene from Holdea (Făget Depression, Romania)

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Keywords: mollusks, foraminifera, calcareous nannoplankton, Badenian, Făget Basin

Introduction

The studied section is located near Holdea, in the central-eastern part of the Făget Basin, that represents an eastern extension of the Pannonian Basin. The stratigraphic record in the area consists of Badenian, Sarmatian, Pannonian and Pontian formations. There are some classical fossiliferous sites, like Lăpugiu de Sus, Coştei, and Nemeşeşti, at the border of Făget Basin, where well preserved Badenian foraminifera, calcareous nannofossils and mollusks occur in large proportions.

Results

The studied outcrop consists of fossiliferous marls, which have a bluish-grey color in the lower part and a yellow-grey color above. The main facies from the lower part of the succession is dominated by mudstone/claystone. It contains planktonic assemblages (foraminifera and gastropods), benthic foraminifera, echinoid spines and terrigenous silt-sized material (quartz fragments, mica and coal fragments). In the middle part of the succession, sandy claystones contain a mixture of planktonic and benthic assemblages (fragments of molluscs, agglutinated foraminifera, echinoid spines). The silty claystone facies dominates the upper part. It contains predominantly planktonic fauna (foraminifera and gastropods) and terrigenous silt-sized material (quartz fragments, mica and coal fragments). Although the mollusks specimens are well preserved, the assemblages are less abundant and diverse compared to the assemblages from the periphery of the basin. In the basal part of the exposure (samples 1, 2, 3), the small gastropods (*Euchelus*, *Cingula*, *Nassarius*, *Mangelia*, *Odostomia*, *Chrysallida*, *Turbonilla*) dominate the assemblages. In the next part of the outcrop (samples 4, 5, 6, 7) juvenile bivalves (*Glycymerisi*, *Cubitostrea*, *Cardium*, *Tellina*, *Loripes*, *Lucinoma*) are the most prominent elements of the assemblages. *Turritella* and *Euspira* are represented by juvenile specimens, and in some samples even pteropod shells are present.

Foraminifera assemblages are very diverse, with dominant planktonics (mainly *Globigerinoides trilobus*), large proportions of lagenids (*Lenticulina, Dentalina, Amphicoryna, Dimorphina* etc.), buliminids (*Bulimina, Uvigerina, Sphaeroidina* etc.), and rotaliids (*Heterolepa, Hansenisca, Cibicidoides, Nonion, Melonis, Lobatula* etc.), while agglutinated forms (*Spirorutilus, Martinottiella*) and miliolids (*Pyrgo, Sigmoilinita, Adelosina*) are less represented. The assemblage suggests moderate depths on the shelf, normal salinity and a quite stable environment.

The highest abundances of calcareous nannofossils are noticed at the base of the section (sample 1), as well in the middle to the upper part of the section (sample 5). The assemblage contains 24 species belonging to 15 genera (*Sphenolithus*, *Reticulofenestra*, *Helicosphaera*, *Discoaster*, *Coccolithus*, *Calcidiscus*, *Cyclicargolithus*, *Syracosphaera*, *Pontosphaera*, *Holodiscolithus*, *Umbilicosphaera*, *Rhabdosphaera*, *Braarudosphaera*, *Micrantholithus*, *Triquetrorhabdulus*). The discoasterids are very rare, while the reticulofenestrids, sphenoliths, helicospheres, *Coccolithus pelagicus*, and *C. miopelagicus* are very frequent. Sometimes entire coccospheres of *Reticulofenestra pseudoumbilicus*, *Coccolithus pelagicus*, and *Braarudosphaera bigelowii* occur. Thoracospheres and ascidian spicules are also present.

Biostratigraphically, the investigated section belongs to the early Badenian (Langhian), corresponding to the *Orbulina suturalis* Biozone (foraminifera) and NN5 *Sphenolithus heteromorphus* Biozone (calcareous nannoplankton).

POSTER

Fossiliferous outcrop Podari (Dolj County, SW of Romania): valuation and capitalization results

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Keywords: Romanian, Oltenia, tourist circuit, environmental protection

Podari Village (Dolj County, SW of Romania) is placed on the right bank of Jiu River, 8 km South of Craiova. From the geological point of view, this area is part of Moesian Platform. The Podari fossiliferous point is located North-West of Podari Village, 500 m from the bank of the Jiu river, on Solomon hill (Valea Hoțului slope), on a former sand quarry. The site is 20 m high and around 100 m in length and is oriented N-S, parallel to the European road E76, which crosses the locality. From bottom to top the outcrop exposes greyish-blueish clays rich in gastropods fossils (*Viviparus* sp.), followed by fine to coarse yellow sands, with lenses of gravels with cross-bedding structure. Overlaying are fossiliferous clay beds and fine gray sandstone. The section is continued by greenish sands and clays and a fossiliferous decimetric strip of coaly clay. The section ends by sand beds, considered by Bandrabur (1971) as "Frătești strata". The fossiliferous Podari beds were described first by Bandrabur (1971). Experts from the Institute of Speology "Emil Racoviță", the Geological Institute of Romania and the Museum of Oltenia, Craiova, have undertaken researches between 1993 and 1997 and the results were published later : Rădulescu et al., 1993; Rădulescu et al., 1999; Știucă et al., 2003. The author and Paraschiv from Geological Institute of Romania are continuing since 2015 the research in the same area. Paraschiv (in press) described plants remains, as well as the radius of a large mammal (in study). The fish teeth discovered were examined by Trif et al. (2016). A large mammal radius and a number of micromammal teeth are presently under study. The researches will continue during the following years. The fauna discovered here consists in bivalves, gastropods, nanogastropods - new genera and species, fish, reptiles, micromammals, large mammals is extremely rich and important, and allows us to consider that the fossiliferous outcrop Podari has a great scientific value. The site has a great potential for new studies on palinology, ostracods, reptiles and large mammal fossils. Its location near E76 and a forestry road makes the access quite easy. In order to enhance the value of the fossiliferous outcrop Podari the first step will be to collect all the previous papers and data and to publish a monography dedicated to paleontological heritage. The results of new studies will be published in scientific papers in peer-reviewed journals, either national or international. In the frame of an European funded project partnerships with Bulgarian entities will be established and first management, interpretation and promotion activities will be undertaken. Panels, dioramas, interpretation board and leaflets will contribute to public awareness. We are considering this geological site has a great scientific importance and a great potential for research, education and tourism promotion a local and national level.

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POSTER

Triassic (Olenekian – Norian) Foraminifera from the Carbonate Deposits of the Median Dacides Nappes of the Eastern Carpathians (the North compartment of the Crystalline – Mesozoic Area)

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Keywords: limestone, dolomite, microfacies, Triassic, foraminifera.

Introduction

Triassic deposits outcropping in the North compartment of the Crystalline – Mesozoic Area of the Eastern Carpathians belong to the system of the Median Dacides Nappes (the Central-East-Carpathian Nappes): Infrabucovinian Nappes, SubBucovinian Nappe and Bucovinian Nappe (Săndulescu, 1984). The last one, that has the higest extention, supports the carbonate klippes belonging to the Transylvanian Nappes.

The lower tectonic units of the Bucovinian Nappe, respectively of the Infrabucovinian Nappes and of the Subbucovinian Nappe, occur discontinuously, cropping out in several halfwindows.

The Triassic sedimentation in the Median Dacides Nappes started by an Induan detrital level without microfauna. The Induan deposits are overlain by Olenekian - ?Norian carbonate deposits consisting of limestones and dolomites.

Methodology

The investigated areas, situated in the Rarău and Hăghimaş Synclines, spread on about 200 km distance measured in a bee line between the Lucava brook, northwards, and the Trotuş brook, southwards. In this stage, we followed the observation of the stratonomic characteristics and sampling of the carbonate deposits on 24 profiles.

Triassic foraminiferal assemblages were found in carbonate rocks that crops out in 19 locations: 11 of them located in the Rarău Syncline (Northern part of the studied area) and 7 in the Hăghimaș Syncline (Southern part of the studied area).

The carbonate microfacies analysis focused on 120 thin sections. Among these thin sections, 80 contain foraminifera and alga associations.

Results

The biostratigraphically detailed study of carbonate deposits centred on the identification of the micropaleontologic associations that complete the macro and microfossil inventory mentioned by previous studies.

Foraminifera assemblages determined in the Early Anisian massive dolomites of the Central-East-Carpathian Nappes are very scarce. Absence of macrofauna in massive dolomites generated the inexact conclusion on their primary genesis.

The Olenekian stratified dolomite level from the base of the Early Anisian massive dolomites from the Gura Dămucului outcrop (Hăghimaș Syncline, Subbucovinian Nappe) contains the singular foraminifera assemblage from the subjacent units of the Bucovinian Nappe. The Olenekian association includes the species: *Earlandia amplimuralis* Pantić, *Earlandia tintinniformis* Misik, *Earlandia gracilis* Elliott, *Glomospira* aff. *roensingi* Blau, Wenzel, Senf & Lukas, *Glomospira* sp., *Diplotremina* sp.

The same stratified level, consisting of limestones and dolomites, with the same stratigraphical position, also appear in the Bucovinian Nappe. The carbonate level from the Rarău Syncline does not contain microfauna. The Olenekian foraminifera assemblage comes exclusively from well bedded carbonate deposits located in the base of the Early Anisian massive dolomites of the Hăghimaș Syncline. The foraminifera association consist of: *Meandrospira pusilla* Ho; *Meandrospira iulia*

Premoli Silva, *Frondicularia woodwardi* Howchin, *Nodosaria skyphica* Efimova *Ammodiscus parapriscus* Ho, *Ammodiscus incertus* d'Orbigny, *Earlandia tintiniformis* Misik, *Earlandia dunningtoni* Elliott, *Earlandia gracilis* Pantić, *Earlandia amplimuralis* Pantić, ?*Dentalina* sp., *Nodosaria* sp., *Glomospirella* sp., *Glomospira* sp., *Nodosinella* cf. *rostrata* Trifonova and *Nodosinella* sp.

The massive dolomites of the Bucovinian Nappe are covered by the Pelsonian – Ladinian white limestones containg a rich foraminifera and calcareous algae association including the species: *Trochamina almtalensis* Koehn-Zaninetti, *Agathammina austroalpina* Kristan–Tollmann & Tollmann, *Meandrospira dinarica* Kochansky-Devidé & Pantić, *Meandrospira* sp., *Glomospira* sp., *Nodosinella* sp., *Earlandia tintinniformis* Misik, *Earlandia amplimuralis* Pantić, *Earlandia gracilis* Elliott, *Diplopora annulata* Schafhäutl, *Diplopora annulatissima* Pia, *Diplopora* sp., *Julpiaella subtilis* (Pia) Bucur & Enos, *Physoporella pauciforata* Gümbel, *Physoporella pauciforata pauciforata* Bystricky, *Physoporella* sp., *Oligoporella pilosa* Pia, *Oligoporella prealpina* Pia, *Oligoporella* sp., *Macroporella alpina* Pia, *Macroporella* sp. (Popescu, 2008, Popescu, 2004).

The carbonate sedimentation in the Bucovinian facies ended with red limestones and dolomites in Carnian-?Norian. The presence of these rocks was only remarked on the inner flank in the central part of the Hăghimaş Syncline (Băncilă, 1941; Săndulescu, 1969, 1975; Grasu, 1971; Grasu et al., 1995). The microfauna association found in red limestones consisting of crinoids, radiolarians, ostracods, *Lagenidae* and microgastropods is characterized by a scarcity of index fossils.

Conclusions

The carbonate microfacies study from the Median Dacides reveals the presence of the benthic foraminifera in the Olenekian-?Norian stratigraphic interval and the predominance of the allochemic facies in limestones and of the ortochemic facies in Early Anisian massive dolomites.

The Foraminifera families with important index taxons in Triassic carbonate stratigraphy, mainly for the Olenekian – Ladinian interval are: ***Ammodiscidae*** (*Glomospira, Glomospirella, Pilammina, Ammodiscus*), ***Meandrospiridae*** (*Meandrospira)*, ***Ophthalmiidae*** (*Ophthalmidium*), ***Variostomidae*** (*Diplotremina*), ***Earlandinidae*** (*Earlandia=Aeolisacus*), **Fischerinidae** (*Agathammina*), ***Nodosariidae*** (*Frondicularia, Nodosaria, Dentalina*), ***Trochamminidae*** (*Trochammina*), ***Lituolidae*** (*Ammobaculites*), ***Nodosinellidae*** (*Nodosinella*).

The studied foraminifera assemblages are similar to those of the Triassic carbonate deposits of various sections of the Tethys.

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ORAL

Middle Triassic bony fishes from Lugașu de Sus, Bihor, Romania

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Keywords: Actynopterygian, *Gyrolepis*, *Saurichthys*, *Birgeria*

Previous work on the Middle Triassic fish fauna from Lugașu de Sus, Bihor, Romania revealed the presence of the actinopterygian *Colobodus* sp., represented by a single scale (Jurcsak, 1978) and the chondrichthyans *Palaeobates* sp. and *Lissodus* sp. (possibly *Lissodus cf. cristatus)*, represented by several teeth (Posmoșanu, 2015 a, b). Taphonomical analyses indicate that the marine fauna at Lugașu de Sus has been deposited in a low energy, shallow marine environment (Posmoșanu, 2013).

The material under study belongs to the Triassic Collection of the Țării Crișurilor Museum Oradea, and was collected during the French-Romanian field campaign in 1995 (Posmoșanu, 2015 b). Samples from four of the eight lithological layers from Locus Huza – Lugașu de Sus were subjected to acid preparation and analyzed under stereomicroscope. The recovered material was separated according to species whenever possible, or simply grouped in different anatomical categories: scales, denticles, unidentified teeth or bone fragments, when taxonomic identification was not possible.

Three taxa of bony fish were identified from Lugașu de Sus, all previously known from Peștiș (Jurcsak 1977, 1978), the Middle Triassic locality situated near Aleșd, Bihor.

One of the most abundant tooth morphotype belonged to the Palaeoniscidae, respectively to *Gyrolepis* sp. The samples from the collection are disarticulated teeth that vary in size from 1.4 to 1.7 mm. The teeth are cone-shaped, with a slight curvature. The sharp apical cap is enamel-covered, translucent, having a smooth surface. The apical cap is relatively short, does not exceed 25-30% of the tooth's total height. The root increases in diameter downward from the cap and possesses fine striations, similar to the fusiform ganoin ornamentation mentioned by Delsate and Duffin (1999) on the root of *Gyrolepis* teeth. *Gyrolepis* has been identified in the Lugașu de Sus assemblage on the base of some scales as well.

Other actinopterygian teeth recovered from Lugașu de Sus can be grouped into two types: the *"Saurichthys"* morphotype and the "*Birgeria"* morphotype, both similar to teeth reported from other Triassic localities (Delsate and Duffin, 1999; Ősi et al., 2013).

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ORAL

A Miocene – Early Pliocene ostracod fauna from the Denizli Basin (southwestern Anatolia) and its regional paleogeographic implications

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Keywords: Turkey, Neogene, Pontocaspian, Paleoecology, Paratethys

The Miocene-Pliocene sedimentary succession of the Denizli Basin in southwestern Anatolia (Turkey) displays a unique record of undisturbed stratigraphy and provides an excellent opportunity to study paleoecological changes in a previously poorly investigated Paratethyan-like ostracod fauna. In this study we further focus on the sedimentary successions of the Basin to elucidate the role of the region as a source/sink-area of Pontocaspian ostracod biota. The so-called Pontocaspian ostracod fauna is characterized by their endemicity, morphological diversity originated from a variety of paleoecological domains inside the Paratethys and a Pannon Lake origin.

The ostracods studied have been recovered from 106 samples collected during 2015 and 2016 fieldtrip campaigns from two different outcrop localities of Miocene – Early Pliocene age. The lower part of the studied succession (possible middle Miocene) consists of a Pannonian type microfauna represented by brackish ostracods.

The assemblage is dominated by candonids associated with few observations of leptocytherids and loxoconchids. Morphological similarities between the studied fauna and ostracods of Pannon Lake origin are obvious, but the migration patterns are still questionable. The existence of an unknown intra-Turkish gateway between the Denizli Basin and the Paratethys is not to be excluded, even if there are no clear evidences found yet. An alternative hypothesis would be the assumption of long distance dispersal (LDD) of ostracods via water birds. Avian dispersal proved to be an important dispersal mechanism for introducing aquatic microorganisms into new habitats (Wesselingh et al., 1999). Therefore we assume that ostracods might have been transported from the Paratethys (Pannon Lake) to the Denizli Basin, where similar ecological conditions encouraged the spreading of an endemic fauna that is remarkably similar to the one from the Central Paratethys.

The ostracod fauna in the upper part of the section (possible Late Miocene-Early Pliocene) suggests a pronounced change of the pre-existing paleoecological conditions. A shift towards a low brackish to freshwater setting is marked by the evolution of an endemic fauna dominated by *Candona* species. This development can be related to the progressive isolation of the Basin and the formation of a terminal lake, coeval with the restoration of shallow lakes in adjacent Basins of the area (Alçiçek, 2009).

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POSTER

The Sarmatian littoral environment from South Dobrogea: an overview

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Keywords: Carbonate platform, shallow water biota, bioconstructions, Sarmatian

Introduction

The littoral formations and more particularly the bioconstructions of the Sarmatian have incontestably particular characteristics. From the beginning of the Sarmatian, large groups such as echinoderms and brachiopods have disappeared from coastal settlements. Whole families of molluscs are no longer represented, such as Pectinidae for bivalves or Conidae for gastropods. The coral constructions have also completely disappeared to give way to other types of buildups of varying size but of great extension, known throughout the area. In addition to various building organisms such as calcareous algae, foraminifera (nubecularids), bryozoans and serpulids, there is a strong participation of microbial organisms, which can constitute the framestone of the constructions. This period thus marks in a "marine" environment an essential stage in the evolution of the constructive microbial communities. The participating communities of this original ecosystem, especially of abundant molluscs, constitute an element of appreciation of the evolution of the palaeoenvironmental parameters of Paratethys. However, the palaeontological archive also testifies to the settlement of a vertebrate fauna near the shores. Until now, there has been no overall representation of this unique ecosystem. In order to achieve a reconstitution as plausible as possible, it is therefore necessary, without claiming to be exhaustive, to restore a coastal landscape from all paleontological and sedimentological data. This is the main objective of this work.

The Sarmatian life

The sedimentary dynamics of the Sarmatian shallow platforms in the southern Dobrogea can be read partially through the well exposed sedimentary structures in the Albeşti-Cotu Văii sector. The presence of intertwined stratifications had already been reported and considered to be a benchmark level. However, the geometry of the sedimentary bodies is in fact more complex and several sets of oblique stratifications, sometimes of large scale, can follow one another. Similarly, sedimentary structures are relatively varied in terms of size, characteristics and interpretation. These sedimentary bodies with oblique laminations materialize prograding lines and/or submarine dunes suggesting reliefs whose reconstruction of the underwater depths must be taken into account. It should be noted that slumping phenomena can dramatically affect the already structured sedimentary bodies. This configuration was the framework for the installation and evolution of a characteristic biota.

The seabed of the Sarmatian was densely populated, as evidenced by the fossilized remains abundantly represented in the various types of sediments. Unfortunately, except in the clayey levels, shells of molluscs, badly preserved, are mainly represented by internal and external molds. The precise identification is then delicate, although the silicone moldings allow to visualize certain characteristics of the original shells and their arrangements. Moreover, the assemblages vary according to the environmental conditions and it is difficult to represent uniformly the settlement of the Sarmatian Sea. In the most diverse accumulations chosen for reconstitution, gastropods, abundant, mainly include several species of Trochidae (*Calliostoma*, *Gibbula*...) and Nassaridae (*Duplicata*). In some areas dominate *Duplicata* and Potamidae shell accumulations that are excellently preserved with their residual colored patterns. The bivalves are generally represented by Cardiidae, Mactridae, Veneridae, Solenidae and Mytilidae. However, it should be noted that the upper part of the Sarmatian series is mainly marked by dense accumulations of small Mactridae shells, which then become largely dominant.

Bryozoan constructions, similar to those described in the Hungarian Sarmatian, constituted scattered underwater masses, probably covered with algae and microbial films. They were mainly due to the development of *Schizoporella* colonies that constitute multilamellar clusters. Other more or less cylindrical morphologies related to the development of nubecularid crusts, algae and lithified microbial carpets showed flanks rather abrupt.

Quartzose and oolitic sands may contain bioturbation systems attributable to invertebrates. These include the ichnogenre *Thalassinoides* with its burrows developed in networks of vertical cylindrical tubes with characteristic branched lateral extensions. It is generally accepted that such bioturbations are the result of the activity of prairie shrimps of the Callianassidae type.

The Sarmatian Sea also lodged, in the open water or on the shores, a whole population of vertebrates, some fossil records of which are recorded in the sediments of South Dobrogea, notably in well-exploited deposits in the Credinţa-Ciobaniţa sector. Three main habitats and their settlement were identified: 1) a coastal environment characterized by disseminated islets inhabited by seals and other semi-aquatic mammals; 2) a neritic environment with fish (Sparidae); and 3) a sublittoral-epipelagic environment with fish (Clupeidae), cetaceans (dolphins and cetothers) and sea turtles. Although the presence of seals attests a coastal palaeogeography, the remains of birds are undoubtedly an excellent testimony of a sea dotted with islands from which the behaviors of the avian communities were probably organized between diet and nesting. Pelicans, albatrosses, ducks, cranes, and storks were all there.

Finally, the reconstruction of original landscape also incorporates an underwater flora probably represented by seagrass beds of phanerogams and algae. This presence, which has left no tangible traces, is suggested in particular by the lifestyle of certain molluscs.

Certain elements of the continental gastropod population may be deduced from shells undoubtedly floating and deposited in the seabed and from the more pronounced lacustrine intercalation content of lakes. These are different terrestrial gastropod species of the genus *Helix* and aquatic gastropods close to the planorbs.

Conclusion

Although the Sarmatian Sea in the southern Dobrogea undoubtedly exhibited certain peculiar characteristics due to a more pronounced isolation from the world ocean, it nevertheless housed a whole littoral population whose proposed reconstruction offers an unprecedented vision. Based on necessarily partial information, it nevertheless shows the mosaic of environments and therefore of stands that mark the spatio-temporal evolution of an increasingly isolated sea. The fauna of marine invertebrates was distinguished in the first place by a rather small biodiversity, mainly composed of molluscs (bivalves, gastropods), in the absence of echinoderms, brachiopods, cephalopods... However, the vitality of this coastal ecosystem is proved by an important biomass. The density of some shell accumulations shows an optimal use of space and nutrient resources. The vertebrate fauna, on the other hand, seems to be quite diverse, suggesting an underwater, terrestrial and aerial life very complete and also very modern, even if some species are endemic.

ORAL

Unexpected occurrence of marine diatoms in amber

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Keywords: Diatoms, fossil resin, Cretaceous, taphonomy

Introduction

The fossilization of diatoms prior to the Cenozoic is rather infrequent, due to the sensitivity of opaline silica to alkalinity and to effects of burial. The first known record of diatoms in sediments dates from the Jurassic period around 190 Ma (Rothpletz, 1896). Unfortunately the material disappeared and it was no longer possible to find the original sediment. The first well-preserved fossils of vegetative cells and resting spores are known from marine upper Aptian to lower Albian deposits from Antarctica (Gersonde & Harwood, 1990). Until now it was considered that there was a gap between this lower Cretaceous fossil record and well preserved diatoms from Late Cretaceous. So, the diatoms discovered in Cretaceous ambers open a new window into the knowledge of diatom evolution. The association between amber and diatoms does not appear to be straightforward, especially when it comes to marine diatoms. If exceptional fossilization processes can restore the biological wonders of the past, it seems unlikely to look for evidence of the evolution of the diatomaceous world in a fossilized tree resin. Fortunately, on several occasions, and in several places, which can be very distant, marine diatoms have been trapped in amber. The discovery of three (even four) cases of preservation of diatom frustules in ambers of various ages provides valuable information on the history of diatoms and also offers interesting elements concerning the taphonomic processes of organism inclusions in the original resin.

Diatom records in amber

The oldest amber bearing diatom dated from the Jurassic-Cretaceous boundary (-145 million years ago) from Thailand (Philippe et al., 2005) contains a clearly identifiable specimen of *Hemiaulus*, which retreats the date of first occurrence of 45 million years. The presence of this marine form opens up a debate on the environment of ancient diatoms due to contradictory data of the same age acquired in Korea (Chang et al., 2007).

The occurrence of remains of marine organisms, including diatoms, in the Lower Cretaceous amber (90 million years) of Charente Maritime (France) was already an unusual case for fossil material to fill a gap and to move forward the known age of first occurrence in the fossil record of several kinds of diatoms (Girard et al., 2008, 2009). The described diatoms, all colonial, represent a very characteristic assemblage of this time: *Basilicostephanus*, *Stephanopyxis*, *Melosira*, *Coscinodiscus*, *Trochosira*, *Hemiaulus*, *Skletonema*, *Paralia*, *Aulacoseira*.

Two amber fragments from Upper Cretaceous sediments of Vendée (France) provided magnificent specimens of a diatom belonging to the *Corethron* genus, characteristic by the presence of crowns of mobile spines. This precedes the earliest known occurrence of this form over 65 million years (Saint Martin et al., 2015). Moreover, the presence of iridescences provoked by the impact of spines in the still liquid resin proves an aerial origin of inclusion (winds spray).

Additionally, it is quite probable that a microinclusion of Charente Maritime amber considered as a testate amoeba (Girard, 2012) is really another older example of *Corethron*, which would then push back even more the first occurrence of this genus.

Conclusions

Passing from the shade of ancient foliage in the light of knowledge, ancient fossilized diatoms bring a rare but valuable message. In general, the diatoms recorded in amber correspond to forms whose frustule is heavily silicified. It should be noted that some of the present genera, for example

Hemiaulus or *Rhizosolenia*, have developed special survival strategies which have allowed them to experience a large longevity by their ability to overcome periods of crisis.

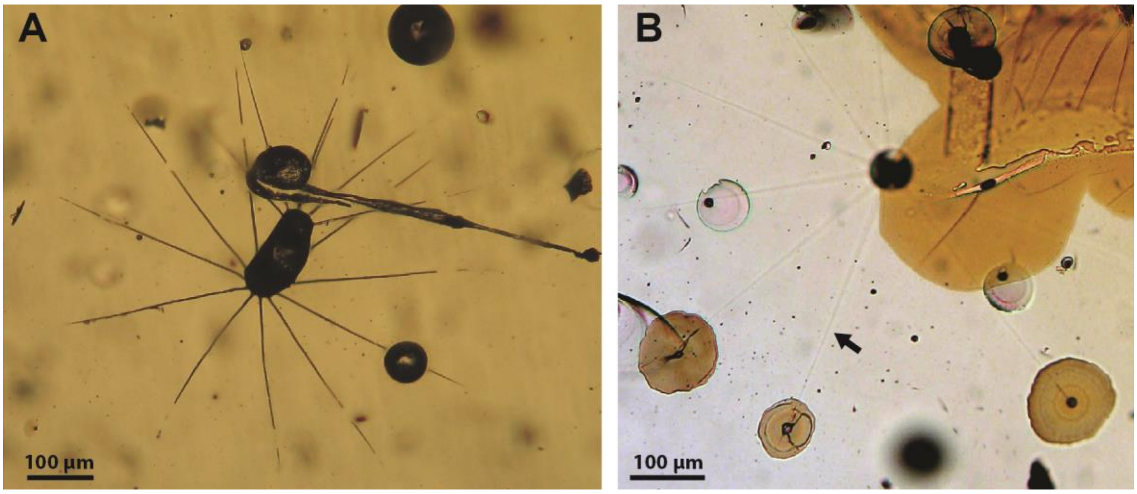

Fig. 1 *Corethron* in Cretaceous amber. **A**. Frustule with crowns of spines. **B**. Contact aureole resulting from the impact of the spines (arrow) into the liquid resin.

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ORAL

The Cheile Dâmbovicioarei Formation: facies and sedimentary evolution

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Keywords: microfacies analysis, depositional environments, Tithonian-Lowermost Valanginian limestones, Dâmbovicioara Gorges

Introduction

The Mesozoic deposits of the Dâmbovicioara area belongs to the eastern part of the Getic carbonate Platform, sedimentary cover of the Getic Nappe (The Median Dacides). Jurassic and Cretaceous deposits are the only sediments occuring in the southern area of the Dămbovicioara zone. The Jurassic sediments generally comprise Bajocian conglomerates and sandstones, Bathonian marls, Callovian marly-limestones and Oxfordian limestones and radiolarites. The uppermost Bajocian, Bathonian and lower Callovian represents an interval marked by harground and inherited rockground surfaces, and condensed levels (Lazăr et al., 2013). The limestones overlying the radiolarites develop a general regressive succession, begins with slope carbonate deposits, continues with platform-edge deposits, and ends with platform interior and peritidal deposits. The upper part of these limestones was separated by Patrulius et al. (1980) as well as Patrulius & Avram (1976) as Cheile Dâmbovicioarei Limestone, and Cheile Dâmbovicioarei Formation respectively. An intra-Valanginian unconformity exists between the Berriasian-lowermost Valanginian limestones and the late Valanginian-lowermost Hauterivian limestones known as Cetatea Neamţului Member of the Dâmbovicioara Formation (cf. Patrulius and Avram, 1976). A detailed study of this unconformity was recently provided by Grădinaru et al. (2016). Patrulius (in Patrulius et al., 1980) defined the limestones from Cheile Dâmbovicioarei as the “Cheile Dâmbovicioarei limestone” (= Cheile Dâmbovicioarei Formation; Patrulius & Avram, 1976). The type section of these carbonate deposits is located between Podu Dâmboviţei and Dâmbovicioara localities. The Cheile Dâmbovicioarei Limestones are well bedded and form extensive outcrops which have a total thickness of 400 m (Patrulius et al., 1980).

Carbonate facies and microfacies

The carbonate succession from the Dâmbovicioara Gorges consists of uppermost Tithonian-Berriasian-lowermost Valanginian limestones. Approximately 70 m thick reef limestones are forming the lower part of the succession. These bioconstructions pass gradually into 50 m thick black pebble bearing granular limestones which are well exposed near the road crossing the Dâmbovicioara Gorges. The contact with the peritidal limestones is located approximately 175 linear meters, upstream from the gorge exit. In terms of lithological units, the Dâmbovicioara Gorges section consists of three distinct packages: 1) reef limestones; 2) granular bioclastic banks and 3) peritidal limestones

1. Reef limestones

Coral, coral-sponge and coral-microbial bioconstructions form massive structures which are typical for environments associated with the upper reef slope, near the proximal shelf margin. Such bioconstruction organisms were colonising the substrate while the reef framework was consolidated by microbial and microproblematic encrusters. Microbial deposits formed the ideal substrate for the subsequent colonisation with corals and sponges.

2. Granular bioclastic banks

These limestones form the transition from reef to peritidal depositional settings. Meter-decimeter thick beds contain calcirudites, coarse bioclastic grainstone and intraclastic bioclastic packstone facies types. The clast morphology suggests deposition under high energy conditions, in an agitated environment, with carbonate material being sourced either from reef settings or from inner platform areas. These deposits gave rise to outer platform bioclastic banks which were accumulating as bioclastic shoals at the platform margin. Subsequent reworking of paleosoils is indicated by the presence of black pebbles, highlighting the importance of these intraclasts to indicate subaerial exposure.

3. Peritidal limestones

Peritidal limestones consist of centimeter-decimeter to meter thick carbonate beds. In some cases, milimeter to centimeter thick sets of laminae are present. Each lamina has a distinct granulometry. Fenestral structures are parallel with the bedding planes. Depositional subenvironments comprise an ideal sequence which evolves from subtidal to supratidal units. The facies evolution indicates a transition between subtidal, intertidal and supratidal environments. This transition can be observed at bed or bedset scale by following the deposition of carbonate material in lagoons and ponds, beaches, tidal bars, tidal plains, swamps, lakes or algal microbial mats.

The uppermost part of the Cheile Dâmbovicioarei Formation is well exposed in the Padina Braşoavei area (Patrulius et al., 1980). This section is located in the northen part of the Deaslul Sasului area (Urdăriţa Horst), approximately 2 km east from the Dâmbovicioara Gorges. In terms of age constraints, Patrulius (in Patrulius et al., 1980) identified a foraminiferal association considered to characterise the Valanginian interval. Moreover, the same authors indicates the presence of a Berriasian-Valanginian discontinuity in this section. These limestones form a 10 m thick succession which is located on the border of Braşov-Câmpulung Muscel national road. Patrulius et al. (1980) mentioned two distinct breccia levels. The present study show that pedogenetic processes acted as the main trigger for the formation of these brecciated features with structures and textures resembling palustrine limestones. There is a strinking microfacies similarity between the breccia clasts and the underlying limestones. This feature indicates an *in situ* brecciation.

Conclusions

Reefal limestones are present in the lower part of the Cheile Dâmbovicioarei carbonate succession. They pass gradationally into granular limestones which are overlain by peritidal carbonate deposits. A gradational boundary marks the transition from reefal to granular limestones. Such evidence indicate a continuity of sedimentation in this part of the carbonate platform. Reworked blackened bioclasts originate mainly from shallow or coastal platform areas. These depositional settings were dominated by topographically elevated areas where terrestrial plant colonisation was common. These deposits are overlain by hundreds of meter thick peritidal limestones. This transition can be explained by the progradation of coastal deposits (lacustrine/brackish water swamps) over marine intertidal/supratidal carbonates. Another hypothesis may include the lateral migration of tidal litoral facies belts. Incipient regional sea-level fall is clearly marked in the upper part of the carbonate succession. In this case, two distinct levels of pedogenetically brecciated limestones form good outcrop exposures in the Padina Braşoavei area (Urdăriţa Horst). A platform scale discontinuity caps the topmost part of this limestone unit (Grădinaru et al., 2016). In conclusion, the associated carbonate depositional environments point to an important progradation of the Upper Tithonian-Lowermost Valanginian Getic Carbonate Platform. The accomodation space became increasingly reduced in the upper part of the succession, as indicated by the outer platform-peritidal facies transition. As a consequence, the carbonate platform started to migrate/shift laterally.

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POSTER

Reviewing of the rudist type species described from the Upper Cretaceous deposits from Romania

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Keywords: rudist holotypes, revision, taxonomy, Upper Cretaceous, Romania.

The Upper Cretaceous rudist assemblages from Romania have been investigated over time by numerous authors thus 21 new rudist-species and subspecies were described and introduced into the rudist taxonomy belonging to the following families: Plagioptychidae Douvillé (1888), Radiolitidae d'Orbigny (1847) and Hippuritidae Gray (1848). Most of the rudist holotypes (18 of 21) arise from the Upper Cretaceous deposits of the Apuseni Mountains as follows: Lupu (1971) established 1 new genus (*Klinghardites*), 11 new species (*Plagioptychus maestrei* Lupu, 1976; *Plagioptychus borodense* Lupu, 1976; *Biradiolites alatus* Lupu, 1976; *Biradiolites biplicatus* Lupu, 1976; *Colveraia secunda* Lupu, 1970; *Gorjanovicia polsaki* Lupu, 1973; *Joufia silvaeregis* Lupu, 1975; *Klinghardites musculosus* Lupu, 1971; *Lapeirousia (Lapeirousella) remetiana* Lupu, 1969; *Osculigera kuehni* Lupu, 1967; *Pseudopolyconites milovanovici* Lupu, 1975) and 3 subspecies (*Vaccinites gosaviensis acicularis* Lupu&Lupu, 1960; *Vaccinites oppeli pironaeiformis* Lupu&Lupu, 1961; *Hippurites (Orbignya) nabresinensis acuticostatus* Lupu, 1969); Patrulius (1974) described two new genera (*Durandelgaia* and *Miseia*) and four new species (*D. hirsuta, Miseia pajaudi, M. costulata, M. vadensis*); Also, from the Eastern Carpathians Lupu (1972, 1982) described a new genus and species (*Orestella oresti*) and from Cenomanian deposits of Haţeg area (Southern Carpathians) Lupu (1966) identified 2 new rudist species (*Durania conectens* and *Sphaerulites astrei*).

Currently, an updated phylogenetic classification of rudist bivalves was established by Skelton (2013) based on the phylogenetic analyses made by rudist workers in the last 20 years. Thus, for taxonomical review of the rudist holotypes we applied the latest proposed scheme of rudists phylogeny and classification. In order to obtain an accurate reviewing of the twenty-one rudist holotypes, all type-specimens have been analysed and new investigations in the type-localities were undertaken. As a result, of the twenty-one studied rudist holotypes, five are considered as valid species and thirteen resulted to be synonymous with other senior species. The taxonomical status of *Miseia* genus (Patrulius, 1974) remain an important issue for debate because it was proposed as junior synonym of *Joufia* (Böhm, 1897) by Skelton (2013, fide Özer, in preparation) but this assumption still demands more detailed investigations and comparisons with other similar specimens described from coeval deposits.

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POSTER

Ostracod assemblages around the Spathian-Anisian (Lower-Middle Triassic) boundary in the Deşli Caira GSSP candidate (North Dobrogea, Romania)

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Keywords: Ostracoda, Spathian-Anisian boundary interval, North Dobrogea

The Deşli Caira section is located 6 km east of Mihail Kogălniceanu village, and 8 km west of Agighiol village, at 28°48'08"E, 45°04'27"N coordinates.

The Deşli Caira section exposes a Hallstatt-type limestone sequence, approximately 60 m thick, consisting of micritic limestone, variously coloured, from pink to red-brick, to which *Posidonia* coquina are added mainly in the lower part of the sequence. The Deşli Caira section straddles the Spathian-Anisian stage boundary, respectively the Lower-Middle Triassic series boundary, which is fairly documented on the study of ammonoids and conodonts (Grădinaru, 2000; Grădinaru & Sobolev, 2006; Grădinaru et al., 2006, 2007; Orchard et al., 2007).

For the study of the ostracod fauna, 10 samples distributed around the Spathian-Anisian boundary have been processed by hot acetolysis. As compared to the previous data (Sebe, 2013), the updated taxonomic study allows the identification of 19 families, with 14 genera and 38 ostracod species. The most common are the Bairdiidae and Polycopidae families, which together reach up about 80% of the assemblages. The Bairdidae family has a maximal abundance (80% - 100%) above the Spathian-Anisian boundary. The Acratiidae, Cytherideidae, Bythocytheridae families and Cypridoidea superfamily together account for less than 22% of the assemblages.The maximum of abundance and diversity of ostracod faunas is present in samples 821A (Upper Spathian) and 822 (Lower Anisian) that bracket the Spathian-Anisian boundary.

The Deşli Caira section is the most important candidate for the nomination as GSSP (Global Stratotype Section and Point) for the Olenekian/Anisian stage boundary, respectively for the Lower-Middle Triassic series boundary (Gradstein et al., 2012). In this framework, the study of the ostracod fauna, alongside the ammonoids and conodonts, represents an additional useful biostratigraphic tool for identifying the Spathian-Anisian boundary.

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ORAL

Scientific and educational values of the geological heritage of Dobrogea

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Keywords: geodiversity, fossil site, nature reserve, Natura 2000

Introduction

Except for the Danube Delta Biosphere Reserve of international importance, there are 72 protected areas of national interest in Dobrogea. Most of them declared under the law 5/2000 or GD 2151/2004, 1851/2005 and 1143/2007, protected areas have a total surface of 39,869.58 ha. They include a national park and 71 nature reserves and monuments, the latter part of the Natura 2000 network of protected areas, consisting of Sites of Community Interest (SCIs) established under the Habitats Directive and Special Protection Areas (SPAs) established under the Birds Directive. This paper is a brief overview of the most significant geodiversity values of protected areas from Dobrogea, as well as main issues in protecting geological heritage.

Scientific and educational values of the geological heritage

Besides the Măcin Mountains National Park, in North Dobrogea there are 2 geological reserves (Dealurile Bujoarele fossil site and Agighiol geological reserve), along with 6 natural reserves of geological importance: Chervant-Priopcea, Consul Mountain, Sarica Hill, Secaru Peak, Beştepe Hills and Deniz Tepe Hill. Each of these reserves is included in larger areas of the Natura 2000 network, like ROSCI 0123 Măcin Mountains, ROSCI 0201 Nord Dobrogea Highland, ROSPA 0073 Măcin Niculiţel and ROSPA 0091 Babadag Forest, or in smaller SCIs and SPAs. *The Măcin Mountains National Park*, partly overlapping ROSCI 0123 Măcin Mountains and ROSPA 0073 Măcin Niculiţel, has a remarkable geodiversity on a relatively small area. Consequently to the Cimmerian orogeny superimposed on a Variscan deformed basement, a large variety of sedimentary, magmatic and metamorphic rocks occur in the Park area. Ore deposits also exist, related to Variscan intrusives or Early Triassic volcanism, and rocks are affected by various types of Variscan and Cimmerian deformation, from folding to normal, reverse or strike-slip faulting. *Dealul Chervant-Priopcea nature reserve* is important for its Variscan structure in thrust folds: Megina amphibolites (lower Cambrian) overthrust to the west Priopcea Quartzites (Ordovician) that, in turn, are overthrust onto the dominantly pelitic rocks of the Silurian Cerna Formation (Seghedi, 2012). *The fossil site Dealurile Bujoare*, a geological reserve of 8 ha included in ROSPA 0073 Măcin Niculiţel, exposes the only Lower Devonian macrofauna at outcrop in Romania. This is found in coquinas made of brachiopods, tentaculitids, crinoides and scarce trilobites (Iordan, 1974). Despite its protected status, in 2007 a quarry was started in this site, with unpredictable consequences for its future preservation. *Beştepe Hills*, a nature reserve of 415 ha, included in ROSPA0009 Beştepe Mahmudia, includes deep marine Silurian and Devonian deposits (radiolarian cherts and shales, associated with distal turbidites), with complex, superimposed Variscan and Cimmerian deformation (Seghedi, 2012). *The Consul Mountain* represents, together with the King Ferdinand Meadow from Niculiţel, the first nature reserves in Romania, declared in 1927. This pyramidal hill is relevant for the nature and lithology of Lower Triassic volcanism and sedimentation, as well as for the Cimmerian structure of North Dobrogea, displaying a structure in three thrust-folds: the lower Triassic calcareous turbidites, overlain by Lower Triassic rhyolite flows are repeated tectonically in three successive units, overthrusting eventually the Lower Carnian-Norian terigenous turbidites (Alba Beds) (Seghedi et al., 1990). *The Secaru Peak* is a nature reserve composed of Lower Triassic alkaline rhyolites, an erosion witness of the Cimmerian basement overlain by the Late Cretaceous post-tectonic cover of the "Babadag Basin". *The Agighiol geological reserve*, included in ROSCI 0060 Dealurile Agighiolului, contains an abundant Lower Triassic ammonoid fauna, important for biostratigraphic correlations (Grădinaru, 1997). The geodiversity values, vulnerabilities and threats for this site were detailed by Aniţăi (2013). *The Sarica Hill* shows the Scythian-Anisian basalt dominated succession of the Niculiţel unit, including basalt flows, massive dolerites to microgabbros and volcaniclastic turbidites with basalt clasts, dated on ammonoids and conodonts from the interbedded limestones. *Deniz Tepe* is the only hill exposing the Liassic facies of quartzitic sandstones-conglomerates in North Dobrogea.

Nature reserves in Central Dobrogea include 9 sites, 7 of them exposing the Ediacaran basement consisting of coarse, mid-fan turbidites with a very low-grade, subgreenschist facies metamorphism: Beidaud, Casimcea, Colţanii Mari, Ghiunghiurmez Hill, Gura Dobrogei, Războieni and Peceneaga. The most important of these sites are *Războieni*, where the first impression of an Ediacaran soft bodied organism was found (Oaie, 1992), *Casimcea*, hosting enigmatic traces resembling holdfasts (Saint Martin et al., 2013) and trace fossils, and *Peceneaga*, where the Peceneaga-Camena crustal Fault was mapped, separating the North Dobrogea Orogen from Central Dobrogea (East Moesian Platform). Other sites include the Late Jurassic carbonate platform cover of the Ediacaran basement: *the Cheia geologic massif*, a geological and botanical nature reserve, *the Neojurassic reef at Topalu*, *the Hârşova Bluffs* and *the Allah Bair geological, botanical and paleontological nature reserve*; their geodiversity values were presented in detail by Aniţăi (2013).

In South Dobrogea, the Lower Cretaceous paleontological heritage is protected in the rich fossil sites *Aliman* and *Cernavodă*. Other relevant nature reserves or monuments include the Cenomanian *limestone walls at Petroşani* and the Miocene fossil sites *Credinţa* (also containing vertebrate remains like fish, cetaceans, birds) and *Movila Banului*.

Conclusions

Geological and nature sites in Dobrogea have a great scientific and educational value related to their geodiversity. Most of them are used as stops on geological field trip routes during scientific meetings, or during geological applications with students. They are also used in short geological school trips, trying to raise awareness on protection of geodiversity and nature. Although the most significant sites from scientific point of view are protected as geological sites or nature monuments and reserves, most custodians and the national park administration are exclusively interested in protection and promotion of biodiversity. Therefore these sites are subjected to various types of pressures (quarries, wind parks, fossil collection) and geodiversity conservation measures are not always adequate, due to lack of knowledge and appreciation from the local communities and authorities, even custodians. Although past exhibitions, some websites and Facebook pages already exist, a larger effort of the geological community is necessary for promoting these sites through publications, exhibitions and media.

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POSTER

Paleodictyon assemblage from Frasin, Bukovina Area (Eastern Carpathians, Romania)

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Keywords: Tarcău Nappe, Tazlău Formation, preturbidite deposits, graphoglyptides

Our study was carried out in Molid Syncline, in a dug outcrop in Tazlău Formation. This lithostratigraphic unit is representative for Tazlău (central and north part of East Carpathians) and Tazlău-Colţi (central and south part) Lithofacies of Tarcău Nappe, overlaying Straja Formation and being overlain by Plopu Formation (Grasu et al., 1988). The fossil assemblage indicates an early-middle Eocene age (Ionesi, 1971).

Petrographically, it was described as a 400 m thick alternance of Tarcău-type immature and rich in muscovite sandstone, calcareous sandstones, and marls or as „an arenitic-calcareous flysch" (Mutihac & Mutihac, 2010). The analyzed bed is 8-12 cm thick, has a lenticular shape, and consist of 5 sets with ripple cross lamination, bounded by wavy surfaces of amalgamation. With such features, we consider the studied bed a turbidite having only its T_c division of Bouma Sequence.

The unit shows convex and concave hypichnia, among them being *Paleodictyon*, a very delicate trace fossil (Fig. 1). Its preservation on large surfaces, indicate that only the topmost part of the muddy floor was slightly eroded to exhume the organisms' traces. Moreover, the quasi-nonerosive character of turbidity current is also proved by the lack of mechanical sole marks. The basal surface of the studied bed shows trace fossils such as: *Strobilorharphe*, *Megagrapton*, *Spirodesmos*, *Heliminthopsis*, and (?) *Treptichnus*. *Paleodictyon* is the representative of the graphoglyptides ("deep-sea farmers", *sensu* Seilacher, 2007). This environment is also supported by the agglutinated foraminifera, dominated by tubular forms such as: *Bathysiphon* sp., *Psammosiphonella cylindrica*, *Nothia excels*, which were found in the samples collected from the above and below shale interlayers (Kaminski & Gradstein 2005).

The entire assemblage is associated with pre-turbidite background deposits, accumulated in relative quiet intervals, depleted of nutrients. Due to extreme diet conditions and also to the lack of light, this environment coerces a highly organized feeding behavior.

Fig. 1 The basal surface aspect of a sample from the analyzed bed showing *Paleodictyon* trace fossil developed on large surface

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ORAL

Ichnological-sedimentological analysis of Podu Secu Formation (Tarcău Nappe, Eastern Carpathians)

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Keywords: Outer Carpathians, heterolithics, Cruziana-Nereites Ichnofacies

An ichnological-sedimentological study has been conducted on the Podu Secu Formation (Tarcău Nappe, Outer Eastern Carpathians), outcropping along the Răchitiş brook, a right side tributary of Tarcău River (Neamț County). The unit is considered Priabonian or early Oligocene in age being part of the sedimentary succession characterizing the so-called "Tarcău Lithofacies" (Grasu et al., 1988) or Tarcău Group (Belayouni et al., 2009). The unit holostratotype, defined by Băncilă (1955), is sunk today under the Izvoru Muntelui Lake. The author considered it a lateral equivalent of more external Plopu and Bisericani Formations, respectively.

An outcrop of 80 m stratigraphic thickness was logged and described bed by bed by facies analysis method. Among of more than 1500 of logged sandstone beds, 180 are thicker than 5 cm, only 11 being 20-60 cm. All of them can be considered tabular at the outcrop scale indicating no relief of the sea-floor during the sedimentation. Ten sedimentary facies were discriminated based on their lithology, sedimentary structures, and geometry: normal graded micro-conglomerate (G3); ripple cross laminated micro-conglomerate (G7); normal graded sandstones (S2); parallel laminated sandstones (S3); cross laminated sandstones (S6); sandstones with TCS (Trough Cross Stratification) (S7); parallel laminated siltstones (Si1); cross laminated siltstones (Si2); green mudstones (M1), and dark grey-brownish mudstones (M2). They associate in higher rank units showing incomplete turbidite of Lowe-Bouma-Stow & Shanmugam sequence-type ($S_1S_2T_{abcd}T_{234568}$). The $T_{cd}T_{3456}$ sequence is the most frequent (Lowe, 1982; Bouma, 1962; Stow&Shanmugam, 1980). Based on the above mentioned features, the measured deposits of the Podu Secu Formation can be interpreted as fan lobe.

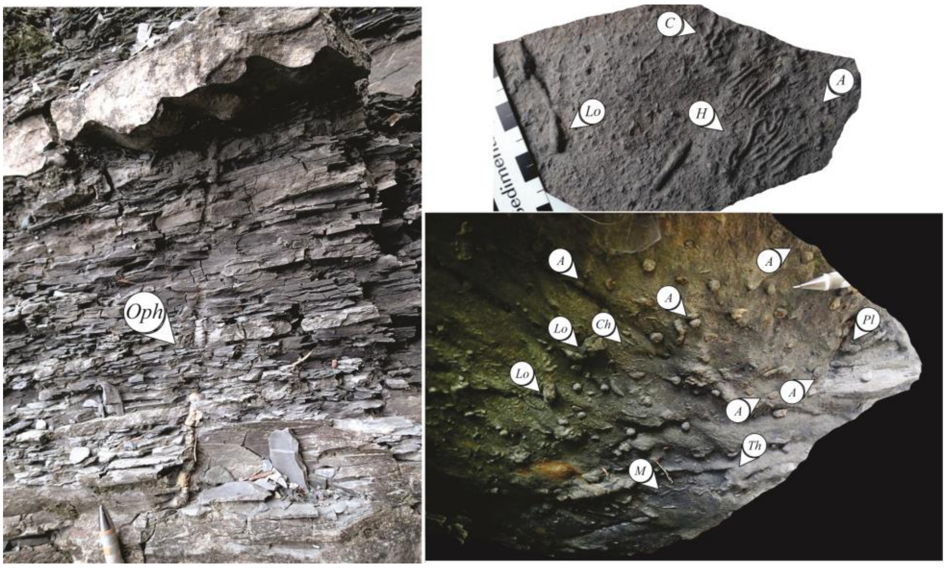

Fig. 1 Some of the ichnofossils in the sandstone and mudstone beds of the Podu Secu Formation (see the text for explanation)

Both sandstone and mudstone beds are very rich in trace fossils. Based on Martinsson's toponomic terminology (from Rindsberg, 2012) they can be grouped in: hypichnia, epichnia, exichnia, and endichnia. The most eye-catching ones are the convex hypichnial forms found mainly on the soles of S2, S3, S6, and S7- type beds. Epichnia dominate on top of S6-type beds, while exichnia and endichnia characterize mainly the mudstone beds, M1 and M2 facies, but occasionally can be also recognized in the coarser beds. The hypichnia/epichnia are horizontal to sub-horizontal, endichnia horizontal and subvertical, while exichnia forms are mainly vertical and sub-vertical, passively filled with coarser material then the host sediment. The sharp contours of the later suggest at least a firm consistency of the muddy sediment when bioturbated.

We have determined several ichnogenera/ichnospecies (Fig. 1), such as: *Ophiomorpha rudis* (*Oph*), *Arenicolites* cf. *sparsus* (*A*), *Asterosoma ludwigae*, *Palaeophycus*, *Planolites* (*Pl*), *Scolicia*, *Macaronichnus* (*M*), *Taenidium*, *Chondrites intricatus*, *C. targionii*, C. *recurvus*, *Phymatoderma granulata*, *Thallasinoides* (*Th*), *Rhizocorallium hamatum*, *Lockeia* (*Lo*), *Cosmorhaphe parva* (*C*), and *Helminthorhaphe* (*H*). Many of the above mentioned ichnogenera/ichnospecies were included by Uchman (2009) in the so-called *Ophiomorpha rudis* ichnosubfacies that, according to him, would characterize the channels and proximal lobes in turbiditic systems.

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ORAL

Maeotian ostracods from Costeşti area (Vâlcea)

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Keywords: Dacian Basin, Paratethys Late Miocene, biostratigraphy

Trovants' Museum Nature Reserve represents a protected area, in the northern part of the Vâlcea county, famous for its spectacular sandstone concretions various in shape and size, locally known as "growing stones" or "trovants".

The massive sandy deposits from Trovants' Museum that crops out in the outstanding openings were formed in marginal fluvial-deltaic depositional setting. Despite the fact that most sands do not contain fossils due to the active hydrodynamic environment numerous ostracods were found in the clay boulders transported and included in the sand mass. The microfauna identified is abundant in brackish water ostracods from Cyterocopina suborder represented by the following genera: *Hemicytheria*, *Cyprideis*, *Amnicythere*, *Maeotocythere*, *Euxinocythere*, *Pontoleberis*, *Loxoconcha*, *Xestoleberis*. Ostracods with thin, smooth shell from Cypridocopina suborder are also abundant but of low diversity, being dominated by a few species of *Candona*, *Eucypris* and *Iliocypris.* There were also identified numerous microgastropods from *Staja* and *Theodoxus* genera, juvenile bivalves probably from *Dreissena* genus, as well as teeth and fish bone fragments.

This is the first microfaunistic assemblage found and described at the Trovants' Museum Nature Reserve and it is associated with a brackish lake of the Dacian Basin. The identified ostracod fauna proves a Lower Maeotian age for the clay boulders and it implies that the sands including those boulders are younger. Furthermore, south from the Trovants' Museum, the same sand deposits extended along the Bistrita Valley are unconformably overlapped by clay deposits from Lower Pontian. Therefore, the most plausible age for the sand deposits is Upper Maeotian. The presence of the sandy deposits at this stratigraphic level falls within the general evolution of the Dacian Basin during Maeotian. In the Lower Maeotian, a short transgressive event led to the sedimentation of clays along a coastal plain in lacustrine facies. The depositional settings record afterwards a marine regression characterized by a fluvial-deltaic facies. Based on the ostracods found, it appears that the sand deposits from the Trovants' Museum Nature Reserve were deposited in the Upper Maeotian.

ORAL

Miocene-Pliocene microfauna from Barda Rash area (NE Iraq-Kurdistan)

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Keywords: Ostracods, Foraminifera, Biostratigraphy, Miocene-Pliocene, Iraq

The Miocene-Pliocene sequence is well exposed in NV-Iraq (Kurdistan region) along Barda Rash Anticline the eastern continuation of major structure, Maqlab anticline with E – W orientation and around 1000 m elevation where the Eocene Pila Spi Formation is developed in axial zone. Al Khazir River cuts from north to south the anticline, offering one of the best sections to investigate the structure and lithofacial characteristics of Miocene sediments. In order to complete these information have been mapped in detail also the main valley that cross the southern and northern flank of the anticline.

In the axial zone of Barda Rash anticline crops out the Lower?-Middle Miocene **Lower Fars (Fatha) Formation** that unconformable underlay cherty limestones of the Upper Eocene Pilaspi Formation. This is one of the most widespread formation in the Foothill Zone of Zagros Mountains and is represented by a cyclic succession of green and red mudstones with gypsum layers, lenses and few oolithic or bioclastic limestone beds. In the investigated area the thickness of Lower Fars Formation rich up to 100m. Samples collected from fine-grained intervals, provided a rich micro-paleontological association represented by benthonic and few planktonic foraminifers, Cytheridae and Cyprididae ostracods, cyclostomatae bryozoans, fragments of echinoderms, microgastropods, juvenile stage of bivalve, decapods claws, fish teeth, etc. An important aspect of this fauna is represented by the high endemic character, possible due to the progressive isolation of the sedimentary basin and the installation of the lagoonar condition that lead to fluctuation of water salinity. This formation was deposited into a rapidly subsiding basin of lagoons that periodically became evaporitic.

The Lower Fars Formation is gradually replaced by more than 230m of sedimentary succession represented by cyclic alternation of calcareous sandstone separated by reddish and gray silty mudstone intervals of **Upper Fars Formation** (Upper Miocene). In general, the microfauna of Upper Fars sedimentary sequence is relatively rare, concentrated especially to the lower part. The microfauna prove the presence of Upper Miocene freshwater environment: fluvial, lacustrine and deltaic. The dominant aspect of microfossil assemblage is given by the presence of freshwater ostracods, charophyta algae and fish teeth.

The sedimentary sequence from Barda Rash anticline ends with so named **Lower Bakhtiari Formation** (Upper Miocene-Lower Pliocene) deposited into fluvial environment in rapidly subsiding foredeep basin and **Upper Bakhtiari Formation** (Upper Pliocene), deposited in alluvial fans originated from the High Folded Zone. No fossils were identified in sedimentary sequence of these two formations so, ages are considered conventionally, according with geometrical position.

Acknowledgment

We thanks to ASCOM S.A. Company for the permission to present the micropalaeontological data from Barda-Rash area.

ORAL

Geodiversity interpretation in Buzău Land Geopark

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Keywords: interpretation, geodiversity, geopark, geo-routes, geocaching

Buzău Land Geopark is a territory of 1000 square km, which includes 18 mayoralties from the East Carpathian Bended Area. The initiative outlined the need for socio-economic development of the area, as well as the need to preserve the geologic, natural and cultural heritage.

The hypotheses of economic development are closely related to the capacity of local entrepreneurs to make sustainable use of the area's geodiversity, natural and cultural assets. Thus, the geopark requires the promotion of knowledge of the local heritage, but also the responsible involvement of the community through the protection and use it as resource (Brilha, 2016). Geotourism and social economy, by capitalizing on local products, could be the premises of organic development. Geotourism in geoparks means observing and understanding the geodiversity and geological heritage of a place: the diversity of rocks, minerals, fossils, landscapes, relief and their interaction with the biodiversity, but also with the activities and way of living of the local community. The geopark offers an exploration of the relationship between Earth and humans, and helps to discover future assumptions on Earth and climate evolution. Geotourism is a model for responsible tourism where local communities are directly involved, and the visitor can walk the geo-routes which tell the story of the place (with or without a local guide), is accommodated by the locals and eats local products to enhance the experience of the place.

Geo-routes are thematic paths that tell the story of geological time, describing the paleoenvironment, flora, fauna and climate of a certain time, or geological heritage, and the relationship between them and the members of local community, the stories which they created to explain the geological phenomena present in everyday life.

The beginning of a geo-route will be marked by panels or visitors centers, Augmented, or Virtual Reality, which will interpret the scientific information of the places, its map and management instructions: what is or is not allowed, the difficulty, the time needed to cover it, etc. These means of interpretation will be minimally invasive and integrated in the landscape.

The main assets of a trail in a natural park can be the aesthetics of the landscape marked by belleview points. A geo-route, however, has an aesthetic role, but also an educational one, without being too didactical, it tells the story of the relationship between earth, nature and the people of the area, highlighting its aesthetic, scientific and cultural values.

The paper presents the description of salt geo-routes in Buzău Land Geopark, the assessment of geotouristic potential and the identification of management methods (conservation, arrangement and monitoring). The local community should be included in the geosites management decision, local geodiversity being part of the community's life, culture and activities long before it was described by specialists, in order to establish a coherent plan which will be an integral part of the territory. In the GeoSust Project, a landscape resource analysis model has been developed which involves learning about natural and cultural local values from member of the communities – resource persons, children, decision-makers and local entrepreneurs (Seghedi & Popa, 2015).

The main points to be included in the geo-routes tell the story of formation, deposition, outgrowing of the salt and evolution of the area in geological time. They also tell the story of the interaction between salt and people as anthropological and socio-economic experience, salt being the element that shaped the lives of the geopark's communities.

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POSTER

First report of mammoth fossil remains from Peretu, Teleorman County (Dacian Basin, southern Romania)

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Keywords: Proboscidea, *Mammuthus meridionalis*, early Pleistocene, Vedea Valley

Proboscideans are one of the best represented groups in the Quaternary fossil record of Romania (e.g. Patte, 1936; Apostol, 1968). Remains belonging to the elephantid *Mammuthus meridionalis* are particularly abundant in the freshwater or loess deposits of the Dacian Basin, southern Romania (Andreescu et al., 2013), where they are usually found in outcrops along river banks or in small sand and pebble quarries. Vedea is the largest river that crosses Teleorman County, its high banks granting access to Pleistocene deposits that are otherwise usually covered by soil. Many Pleistocene fossil localities are found along the Vedea River, or nearby, along small tributaries. Mammoth dental or postcranial remains were found at Brebina, Alexandria (the Brick Factory site), Mavrodin, Nanov, and Buzescu (Apostol 1968; Apostol & Cacoveanu, 1980; Vasile et al., 2012; Vasile & Cojocaru, 2015).

Local sand and pebble quarrying in an abandoned branch of Vedea River, at Peretu, uncovered proboscidean remains represented by dental (isolated molar fragments), cranial (mandible fragments), and postcranial (limb bones and vertebral fragments) elements. The postcranial elements are not diagnostic, but dental morphology and morphometrics allow for a confident referral to *M. meridionalis*. Furthermore, the morphometrical parameters available for assessment suggest the assignment to a basal form of *M. meridionalis* (sensu Baygusheva & Titov, 2012).

This discovery not only decuments a new *M. meridionalis* site along Vedea River, but also allows comparison to material found in other nearby fossil sites. The specimens from Peretu are similar to mammoth teeth known from Bogdana (Teleorman County) or Daia (Giurgiu County) (Apostol, 1968), all basal forms of *M. meridionalis*, suggesting an early Pleistocene age of the deposits that yielded the remains.

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ORAL

Reassessment of the teeth of the shark *Otodus* AGASSIZ, 1843 (*sensu* Cappetta, 2012) hosted in the main Romanian collections

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Keywords: *Otodus*, reassessment, serration, collections, Romania

The aim of this contribution is to re-evaluate and update the systematic status of the teeth belonging to the shark *Otodus* hosted in several paleontological collections from Romania, and to assess the correct position of its related species within the phylogenetic lineage of the genus. Some of these specimens were never studied, while others were taxonomically assigned several decades ago and their identifications were never updated subsequently. Six transitional species of the *Otodus* lineage are described and figured herein. This lineage is then discussed in a European and global context. Two main difficulties arose in this study. The first one concerns the fragmentary status of the fossils, some of them devoid of diagnostic features. Therefore, such specimens could not receive systematic assignment below genus level. The second difficulty refers to the poor stratigraphic control that is available for a large part of this material: with a few notable exceptions, the stratigraphic level from where the fossils originated is unknown, with only a locality name as indication for the origin of the specimens.

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POSTER

Dinocyst stratigraphy and palynofacies of Oligocene sequences in the northern Eastern Carpathians

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Keywords: dinoflagellate cyst biostratigraphy, Tarcău Nappe, Oligocene

Introduction

The Oligocene succession of the Moldavidian Domain from the northern Eastern Carpathians consists of organic–rich beds which have a good to excellent petroleum potential. These include siliceous deposits (Lower Menilite Formation), bituminous marls (Bituminous Marls Formation), black shales (Lower Dysodilic Shale Formation) deposited in a pelagic to a hemipelagic depositional environment, followed by quartzarenites (Kliwa Sandstone Formation) sedimented on the shelf.

Previous biostratigraphic studies of these formations were made based on mollusks (Ionesi, 1997), calcareous nannofossils (Melinte-Dobrinescu and Brustur, 2008), fossil fish fauna (Baciu, 2001) and palynomorphs (Ţabără et al., 2015). This fossil content marks the Oligocene age for these formations. A different opinion regarding the age deposits assigned to the stratigraphic interval between the Lower Menilite Formation up to Kliwa Sandstone Formation from the Moldavidian Domain was discussed by Belayouni et al. (2009) and Guerrera et al. (2012). Based on a calcareous nannofossil assemblage (e.g., *Helicosphaera recta*, *Triquetrorhabdulus carinatus*), the authors assign the succession of bituminous rocks (Lower Menilite, Bituminous Marls and Lower Dysodilic Shale formations) to late Rupelian/Chattian–early Aquitanian, and the Kliwa Sandstone Formation (as well as the synchronous geological formations) to Aquitanian.

Materials and samples location

The studied outcrop is located between Gura Humorului and Frasin localities, on the left side of the Moldova River. The Paleocene–Oligocene stratigraphic sequence is framed to the Tarcău Nappe (Kliwa Lithofacies) and it occurs as a syncline. In this geological profile, eight samples were collected for palynological and palynofacies analyses (Fig. 1).

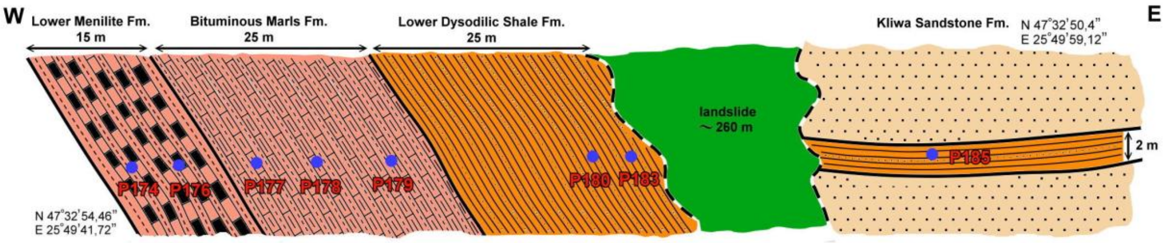

Fig. 1. Cross-section in the Gura Humorului-Frasin area, with the samples location.

Results

Palynological assemblages and age assignment. All samples contain fair to well–preserved palynological assemblages consisting of dinocysts, fern spores, pollen of gymnosperms and angiosperms, prasinophytes and freshwater algae. Generally, the Lower Menilite and Bituminous Marls formations exhibits a poor content in palynomorphs, but the diversity of the palynological content increases in the Lower Dysodilic Shale (upper part) and in the Kliwa Sandstone formations. The following marker taxa were identified and used for biostratigraphic interpretation:

- *Rhombodinium draco* was identified in the Lower Dysodilic Shale and in the Kliwa Sandstone formations. According to Vandenberghe et al. (2012) and Williams et al. (2004), the First

Appearance Datum (FAD) of this taxon marks the mid part of Bartonian. The Last Appearance Datum (LAD) of *Rhombodinium draco* is dated at the mid part of the Rupelian in Northwestern Europe (Williams et al., 2004; Vandenberghe et al., 2012), or this bioevent is deemed to occur at the Rupelian–Chattian boundary in Germany (Köthe & Piesker, 2007).
- *Wetzeliella gochtii* occurs in the studied section only in the Kliwa Sandstone Formation and this taxon is considered by most authors as a marker for Rupelian. According to Williams et al. (2004) and Vandenberghe et al. (2012), the presence of *Wetzeliella gochtii* indicates a range from the lowermost Rupelian to the middle part of the Chattian.
- *Wetzeliella symmetrica* was identified in the Lower Dysodilic Shale and Kliwa Sandstone formations. Generally, this taxon is considered as a marker for Rupelian (Pross et al., 2010).
Palynofacies data. The palynofacies analysis indicates a high content of granular Amorphous Organic Matter (AOM) of microbial and phytoplanktonic origin in the Lower Menilite and Bituminous Marls formations, while to the top of the Lower Dysodilic Shale and the Kliwa Sandstone formations, the kerogen consists mainly in phytoclasts (e.g., translucent and opaque particles, gelified AOM), suggesting a strong terrestrial influx.

Conclusions

This study describes biostratigraphical data inferred based on dinoflagellate cyst bioevents, as well as the palynofacies content from an Oligocene sequence of the Tarcău Nappe. The main conclusions are the following:
- the dinocyst assemblages identified to the top of the Lower Dysodilic Shale Formation and to the middle part of the Kliwa Sandstone Formation indicates a Rupelian–early Chattian age.
- according to the palynofacies analysis, a distal suboxic–anoxic environment defines especially the lower part of the sequence, followed by a more proximal shelf environment to the top of the Lower Dysodilic Shale and of the Kliwa Sandstone formations.

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ORAL

Taxonomical significance of several nautiloid specimens of Praşca Klippe (Rarău Syncline - Eastern Carpathians, Romania)

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Keywords: Early Jurassic, *Cenoceras*, type-species, validity.

Introduction

Hyatt (1884) proposed the new genus *Cenoceras* designating as type-species *Nautilus intermedius* J. SOWERBY, 1817 "*as figured by d'Orbigny*" considering it better described and illustrated than the original proposal. Several years later, Meneghini (1867-1881) observed the different positions of the siphuncle between d'Orbigny's description and figure (1842-1849) rising severe question mark on the specimen and on type-species for the *Cenoceras*, consequently. Unfortunately, both Sowerby and d'Orbigny' specimens of *C. intermedius* were lost later. To solve this taxonomic discrepancy, Prinz (1906) proposed a new species, *C. orbignyi* respectively, based only on d'Orbigny's (1842-1849) and Dumortier's (1869) descriptions.

Geological framework

The nautiloid specimens were collected during the diggings performed in the last years within the massive and bedded limestone block embeded in the Early Cretaceous wildflysch near to the top of Praşca Hill (Rarău Syncline, Eastern Carpathians). It would represent either a klippe, either an olistolith after the adopted concept viewing the Alpine evolution of the Romanian territory (e.g. Săndulescu, 1984 or Hoeck et al., 2009). For the present paper, one still adopts the former concept, which assigns the Rarău Syncline to the Median Dacides of Eastern Carpathians or the informal Cristalline-Mesozoic Zone. The klippe was discovered by Uhlig (1900), who quoted an abundant fauna of ammonites and subsequently few brachiopods, crinoids and coleoiods. Uhlig assigned the Early Jurassic succession of Praşca to the "Adnether Schichten" with the type-area in Northern Calcareous Alps (Austria). After Uhlig (1900), the paleontological data were improved by foreigner and Romanian geologists(e.g. Trauth, 1906; Turculeţ, 1965). I have collected the first nautiloids of the klippe several years ago (2011).

Paleontology

Family *Nautilidae* de BLAINVILLE, 1825
Genus *Cenoceras* HYATT, 1884

Type-species: *Nautilus intermedius sensu* d'Orbigny 1842

Cenoceras affinis CHAPUIS and DELWAQUE, 1854

1842,1846. *Nautilus intermedius* SOW. d'Orbigny, pp. 150, Pl. 27.
1854. *Nautilus affinis* Chapuis and Delwaque, p. 34, pl. II, fig. 4 a, b.
1869. *Nautilus intermedius* SOW., Dumortier, pp. 55.
1906. *Nautilus Orbignyi nov. sp.*Prinz, p. 213 (*cum syn.*)

Material: 3 specimens, Department of Geology, University of "Al. I. Cuza" Iaşi.
Age: Late Sinemurian, *Paltechioceras aplanatum* Taxon-index Zone.
Description: The specimens display generally a nautiliconic shell, with an open and deep umbilicus. The cross-section is trapezoidal showing various values of the W/H report (width versus height of the preserved last whorl). Consequently, two general morphs can be distinguished, respectively inflated versus thinned whorl sections (after Tintant, 1984). The venter is flattened, with obvious shoulders, which could become evanescent towards the inner whorls. The flanks are also largely convex with an incressing tendency to flatten; the biggest width is near to the umbilicus border. The suture line displays an inferred or shallow ventral lobe, a conspicuos small ventro-lateral saddle, a large and less pronounced lateral lobe, followed by a dorsal saddle and lobe. The annular lobe is not clear, at least in this stage of research. The siphuncle is placed near to the center of septa towards the dorsal part (generally, Hc/Ds varies around 0.45).

Disscusions

As one mentions above, Prinz (1906) proposed a new species for d'Orbigny's morphotype, namely *"Nautilus" orbignyi* outlining the siphuncle position as key-feature of taxonomic importance. It sould be noted again that Prinz has been carried the proposal whitout to have a specimen as holotype. One specimen (PrN 1 – fig. 1) illustrates very well d'Orbigny's description and would represent the material support for Prinz's proposal. Still on, the validity of *Cenoceras orbignyi* is not yet conspicuously. Chapuis and Delwaque (1854, p. 34) described a new species *"Nautilus" (=Cenoceras) affinis* from the Early Jurassic *"sandstone of Luxembourg and marl of Strassen",* which exhibits many similarities with *Cenoceras orbignyi*,the most striking difference being the slender cross-section. But the only significant study on *Cenoceras* variability (respectively *C. intermedius*) performed by Tintant (1984) pointed out several trends during the ontogenesis and also the coexistence between thick and more compressed individuals in the same outcrops. These data are consistent with the sexual dimorphism displayed by recent *Nautilus* (more inflated conchs for female versus slender conchs for male). Consequently, taking into account these evidences and the sampling from the same bed of all three specimens, one assigns them to *C. affinis*, Prinz's species being considered its junior synonym. Further studies on a wealthy collection could bring more clarifying data on its validity.

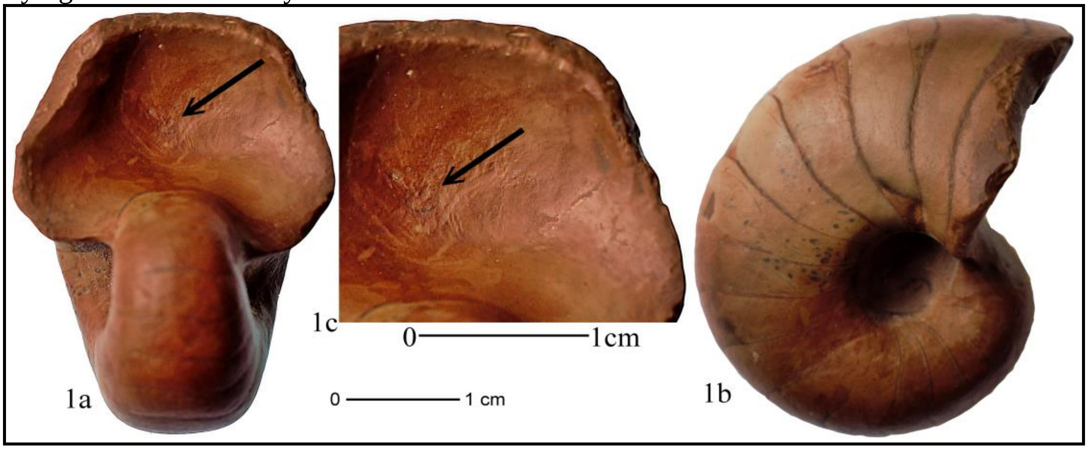

Fig. 1 *Cenoceras orbignyi* (PRINZ 1906), specimen PrN 1

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ORAL

Large paleoenvironmental changes during the late Miocene affecting the Black Sea Basin (Taman Peninsula, Russia)

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Keywords: mean annual air temperature, cooling and drying, Pontian

Introduction

During the late Miocene to early Pliocene (~11.6 to 2.6 Ma), large part of Eurasian inland was covered by the Eastern Paratethys. This epicontinental sea was extending at times from the Carpathian foredeep to the Aral Lake, stretching over the present-day Black Sea and Caspian Sea basins (Popov et al., 2006). The Black Sea basin, as a remnant part of the Eastern Paratethys, represents an ideal target region to study continental response to the changes in the Eurasian inland hydrological conditions.

Methods

To understand the environmental changes governed by intermittent Black Sea connection to the open ocean during the late Miocene into the transition to early Pliocene, we present here the reconstructed mean annual air temperature (MAAT) based on the relative distribution of branched glycerol dialkyl glycerol tetraether lipids derived from soil bacteria (Weijers et al., 2007) recorded in the Zheleznyi Rog section (Taman Peninsula-Russia) (Vasiliev et al., 2011). We further quantify the so-called branched and isoprenoid tetraether (BIT), index used to monitor the changes in the source of the organic matter into Miocene-Pliocene rocks (Hopmans et al., 2004). Additionally, we extend the knowledge on the hydrological changes further back in time on the entire integrated stratigraphy dated record of the Zheleznyi Rog reference section (Vasiliev et al., 2013).

Results and Conclusions

Our MAAT, BIT and additional pH data indicate that the dryer event between 5.8 and 5.6 Ma, inferred from earlier acquired $\delta D_{alkneone}$ data (Vasiliev et al., 2013), coincides with a significant cooling in the continental realm north of the Black Sea. During that time, the Taman region was dry and cold and was receiving fresh water from colder, steppe environment draining the alkaline soils from northern (Black Sea) latitudes. This cooling was the probable cause responsible for the significant, more than 45‰, drop in the $\delta D_{n\text{-alkanes}}$ recorded from the onset of the Pontian stage to the Kimmerian. Climate at the end of Pontian (in Zheleznyi Rog) was cooler and dryer than before, synchronized with the TG 20-22 or TG 12-14 glacial peaks. Additionally, there is an older dry event, at the Khersonian-Meotian transition expressed in very high $\delta D_{alkneone}$ values. This dry event is correlated to the older, dry event recorded in the DSDP 42B 380 between 934 – 830 mbsf (Vasiliev et al., 2015). This suggests that the sedimentary succession from the DSDP 42B was deposited at the transition Khersonian-Meotian transition, implying that the sedimentary succession from the DSDP 42B 380, at depth greater than 934 mbsf, is Khersonian and/or older.

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ORAL

Reminiscences of Palaeozoic structures in a Liassic coral: convergence or inheritance from the past?

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Keywords: Pliensbachian, Toarcian, biological crisis, cnidarian, scleractinian

The Pliensbachian-Toarcian boundary and Toarcian Oceanic Anoxic Event (T-OAE) are intervals of worldwide environmental and ecological turnover. This period is known for large-scale black shale deposits (occurring in Upper Pliensbachian and Lower Toarcian) and multiple negative excursions of $\delta^{13}C$ affecting exogenic carbon reservoirs and associated sediments. These events have been associated with marine eutrophication, increased ocean anoxia, high global temperatures, acidification of the oceans (putatively), and global disturbances of the carbon cycle attributed to the pulsed emplacement of the Karoo-Ferrar flood basalts. These paleoenvironmental disturbances appear to be contemporaneous with a second-order biodiversity crisis concerning various taxonomic groups such as ammonites, foraminifera, bivalves, and brachiopods. Nevertheless, data about coral turnover are relatively sparse, which motivates the current research project that aims to provide additional knowledge about these biological events and the associated palaeoecological disruptions. This presentation will focus on one coral in particular because of its unique features reminiscent of Palaeozoic coral structures.

One of the victims of the Pliensbachian-Toarcian boundary crisis is a small solitary coral: *"Mesophyllum" pseudocolumellatum*. This taxon was described only once in Beauvais (1986) but is currently an unavailable genus name because of homonymy. The original description of this species was established on the basis of a narrow sampling of only 7 poorly preserved specimens from Beni Tadjit in Morocco (Menchikoff collections) and the genus is based on these 7 samples and 6 others specimens from the Jebel Bou Dahar found in the Du Dresnay collections. These other samples were considered by Beauvais as another potential species but the preservation was too bad to validate this assumption. The present study is based on the analysis of 70 specimens of "*Mesophyllum*" collected by our team during field campaigns from the Dadès valley and the Amellago region in the Central High Atlas as well as from Guigou in the Middle Atlas of Morocco. They were assessed visually using thin section petrography and 3D tomography and have been statistically analyzed using univariate and multivariate analysis based on morphometric data.

"Mesophyllum" pseudocolumellatum is of scientific interest as it is a fossil known only from Pliensbachian and possibly Sinemurian stages; this species went extinct during the Pliensbachian-Toarcian transition. In addition, this cnidarian is also important because of a distinctive skeletal organization; the axial structure of the corallite, which has no equivalent in Mesozoic taxa, is reminiscent of the skeletal organization of some Palaeozoic rugose corals such as *Clisiophyllum* Dana 1846 based on the occurrence of a calicular boss. Therefore, the following questions must be posed: is the apparent similarity between these two structures due to an evolutionary convergence or is this organization inherited by *"Mesophyllum" pseudocolumellatum* from a Palaeozoic ances-

tor? The morphological aspects of the skeleton have been assessed in order to understand the function and growth of this axial "calicular boss" as well as to describe more precisely the genus and species characters. The organization of the septal apparatus points to a Scleractinian Bauplan, which is supported by the probably aragonitic nature of the initial skeleton. This suggests a convergence phenomenon, leaving open the question of the functional significance of such a calicular organization.

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ORAL

Theropod teeth from the Maastrichtian of the Haţeg Basin, Romania: dental morphotype diversity in an European context - preliminary results

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Keywords: latest Cretaceous, statistical analysis, Theropoda, tooth morphotypes

The uppermost Cretaceous (Maastrichtian) continental deposits of the Haţeg Basin have yielded a diverse and unique array of vertebrate remains, including fish, amphibians, turtles, lizards, snakes, crocodyliforms, pterosaurs, various types of dinosaurs, birds and multituberculates (Grigorescu, 2010; Csiki-Sava et al., 2015). Although herbivorous dinosaur remains are abundant, theropod fossils are rare and consist mainly of isolated teeth. Nevertheless, the diverse morphologies that can be recognized within the available theropod teeth sample suggest a relatively high taxonomic diversity within this group despite their relatively low abundance (e.g., Csiki & Grigorescu, 1998; Codrea et al., 2002; Csiki, 2005, and references therein).

In order to more thoroughly understand the abundance, diversity and patterns of distribution of the theropod taxa represented in the uppermost Cretaceous of the Haţeg Basin, the existing sample of isolated theropod teeth from the collections of the Laboratory of Paleontology, University of Bucharest (a total of 63 specimens) were restudied both morphologically and morphometrically, using the set of measurements suggested by Hendrickx et al. (2015a). The resulting dimensional data from Haţeg was plotted against the global and taxonomically comprehensive dataset compiled by Hendrickx et al. (2015b), using statistical analyses in PAST 3.17 (Hammer et al., 2001), and morphospaces were generated for the main clades represented by a significant number of isolated teeth.

Based on our preliminary results, the studied Romanian specimens group into three separate morphospaces, corresponding to three different theropod clades: Dromaeosauridae, *Richardoestesia*, as well as a novel, not previously defined morphospace. Such a taxonomic composition conforms to those identified from the Haţeg Basin in previous studies, although solely on morphological grounds (e.g., Csiki & Grigorescu, 1998; Codrea, 2002; Csiki-Sava et al., 2016; Bucur & Roman, 2016), studies that highlighted in this area the common presence of theropods referable to velociraptorines, *Richardoestesia* and *Euronychodon*. Most of these taxa have a wide geographic and stratigraphic distribution in the uppermost Cretaceous of the Haţeg Basin.

Interestingly, the precise taxonomic composition of the Haţeg theropod assemblage, and especially the relative abundance of the different taxa represented, appears to depart from that recorded in other European areas with fossil-bearing continental uppermost Cretaceous deposits, respectively Hungary (e.g., Ősi et al., 2010; Ősi & Buffetaut, 2011), Spain (e.g., Torices et al., 2015) or France (e.g., Buffetaut et al., 1986), suggesting that a large degree of faunal heterogeneity fueled by differential local evolution shaped the composition of these different theropod assemblages, another reflection of the high-level faunal provinciality that seemingly characterized the latest Cretaceous continental faunas of the Late Cretaceous European Archipelago (Csiki-Sava et al., 2015).

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ORAL

Inoceramids of the Upper Cretaceous of Romania

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Keywords: inoceramids, Romania, biostratigraphy, species diversity, Upper Cretaceous.

Inoceramid bivalves are widely known in the Upper Cretaceous of Romania both in the Carpathians and in the Carpathian foreland. Four well-documented areas are: (1) Apuseni Mts (various regions); (2) central Southern Carpathians (first of all the Olănești-Brezoi Basin); (3) central Perșani Mts, and (4) northern Dobrogea.

The Apuseni Mts region yielded a number of critical forms for the Turonian through basal Campanian (e.g., Todiriță-Mihăilescu 1966; Lupu 1974, 1976; Lupu & Sornay 1978), with documented lower Turonian, upper Turonian through to lower Coniacian, and upper Santonian through lower Campanian intervals.

Extremely rich inoceramid material yielded the lower Coniacian of the Olănești-Brezoi Basin of the central Southern Carpathians (Szasz 1998; Damian & Lazăr 2005). This area is also known from its upper Santonian-basal upper Campanian succession, poorly documented in other parts of the country.

The Perșani Mts, the classic area for inoceramid studies in Romania (Simionescu 1899), provided the rich faunas of the upper Turonian and of the lower Coniacian (Pauliuc 1968; Walaszczyk & Szasz 1997).

The upper Turonian-lower Coniacian inoceramids are richly represented in the Babadag Basin of North Dobrogea (Szasz 1985; Szasz & Ion 1988). The stratigraphical succession in the area ranges higher, into the middle-?upper Coniacian, however, its inoceramid record is poor to moderate.

All four regions are characterized by extremely rich inoceramid faunas of the upper Turonian to lower Coniacian. Quite recently, more than 20 new species were described from the lower Coniacian alone (Szasz 1985, 1998). Is it the result of taxonomic over-splitting of this fauna or the reflection of inoceramid actual diversity in this part of the world cannot be answered until the details of the record here are known.

Late Cretaceous inoceramids of Romania are characteristic of faunas known from the boundary zone between the North European and Mediterranean biogeographic provinces (subdivision after Kauffman 1973). This is featured by their poor representation of the *Inoceramus lamarcki* group in the middle and basal upper Turonian; sporadic occurrence (if at all?) of *Volviceramus* in the middle-upper Coniacian, and total lack of *Sphenoceramus*, which dominates the topmost Coniacian through basal Campanian succession further north.

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