

**TRACE- AND RARE EARTH ELEMENT GEOCHEMISTRY OF PLIO -
PLEISTOCENE FINE-GRAINED SEDIMENTS IN THE LOWER RHINE
EMBAYMENT: DISCRIMINATION ACCORDING TO PROVENANCE**

HANS AXEL KEMNA¹, HAINO UWE KASPER²

¹ Ucon geoconsulting, Moritzstr. 18, D-47803 Krefeld, Deutschland

² Institut für Geologie und Mineralogie der Universität zu Köln, Zùlpicher Str. 49a,
D-50674 Köln, Deutschland

Abstract

This case study demonstrates that trace element contents of fine-grained sediments can be used for the discrimination of provenance without regard to different lithological composition such as clay, silt or peat. Compared with heavy mineral analysis, this method allows more refined interpretations, e.g. in the case of mixed sediments with differing provenance. The study has been carried out on fine-grained sediments of Late Pliocene to Middle Pleistocene age from the tectonically subsiding area of the Lower Rhine Embayment. Sediments containing predominantly stable heavy minerals are characterised by high contents of TiO₂ and Zr. Deposits of the river Rhine containing predominantly unstable heavy minerals, show increased contents of Li, Sr, Rb and Cs.

Key words: Lower Rhine Embayment, Plio-Pleistocene, provenance, trace elements, Rare Earth Elements, ICP-MS, heavy minerals

¹ e-mail: ha.kemna@ucon4d.com