Geophysical Research Abstracts
Vol. 18, EGU2016-10990, 2016
EGU General Assembly 2016

Hydrogen isotopes on organic compounds express large hydrological changes in the Mio-Pliocene of the Dacian Basin (Romania)

Iuliana Vasiliev (1,2), Gert-Jan Reichart (3,4), and Wout Krijgsman (2)

(1) Faculty of Geology and Geophysics, Bucharest University, Traian Vuia 6, 020956, Bucharest, Romania, (2) Paleomagnetic Laboratory 'Fort Hoofddijk', Department of Earth Sciences, Utrecht University, Budapestlaan 17, 3584 CD, Utrecht, The Netherlands, (3) Royal Netherlands Institute for Sea Research (NIOZ) P.O. Box 59, NL-1790 AB Den Burg (Texel), The Netherlands, (4) Department of Earth Sciences, Utrecht University, Budapestlaan 4, 3584 CD, Utrecht, The Netherlands

During the late Miocene to Pliocene ($\sim$11 to 3 Ma) large part of the southern Eurasian interior was covered by the Eastern Paratethys epicontinental sea. The western most part of the Eastern Paratethys was occupied by the Dacian Basin, in the foredeep of the Carpathians. The active subsidence in the front of the Carpathians led to the fast accumulation of up to 10 km think sedimentary load in the Dacian Basin, all during the latest Miocene and Pliocene. These deposits are now tilted and well exposed along river section in the Carpathian Foredeep. Here we are reconstructing the large-scale changes of hydrologic budget in the Dacian Basin area over a long time interval (8 to 2.5 Ma). The sampled Rîmnicu Sărat Valley section covers the Messinian salinity crisis interval, times when the adjacent Mediterranean basin suffered severe restrictions of its connections to the Ocean and, subsequently was flooded by the Atlantic at the beginning of Pliocene. We are using compound-specific hydrogen isotopic composition (δD) measured on n-alkanes produced by plant waxes. We focus our analysis on long-chained $\delta D_{n-alkanes}$ (n-C_{27} to n-C_{33}) derived from the vascular plant waxes. The saturated hydrocarbon fraction of the extractable organic matter identified in the a-polar fraction of Rîmnicu Sărat Valley is dominated by a homologous series of n-alkanes ranging from n-C_{16} to n-C_{35}. The long-chain ($>C_{25}$), predominantly odd-carbon number homologues are prevailing which is typical for terrestrial higher plant derived n-alkanes, indicating an important terrestrial organic matter input. The $\sim$ 60 ‰ amplitude of changes for seven consecutive sampled levels measured from both δDn-C_{17-21} and δDn-C_{27-31} can be majorly explained by significant changes in the stable hydrogen isotope ratios characterizing the Dacian basin waters and the meteoric waters reaching the Dacian Basin. This indicates that the hydrological regime in Dacian paleo-basin has significantly varied, with heaviest δD values being recorded from a time-interval corresponding to the exceptionally dry Messinian salinity crisis of the Mediterranean.