Evidence from *n*-alkanes for ancient organic matter sources in Lake Superior

NADIA DILDAR[1*] AND FRED J LONGSTAFFE[1*]

[1]Department of Earth Sciences, The University of Western Ontario, London, Ontario, N6A 5B7, Canada (*correspondence: ndildar@uwo.ca, flongsta@uwo.ca)

Stable carbon isotopic compositions and abundances of individual *n*-alkanes have been analyzed for sediment cores from the Ile-Parisienne, Duluth and Caribou sub-basins of Lake Superior to investigate the source(s) of organic matter since 11,000 cal yr BP. In Lake Superior, the individual abundances of C_{21} to C_{31} *n*-alkanes are very much higher than obtained for C_{17} or C_{19} *n*-alkanes. The relative contributions of terrestrial versus aquatic organic matter have been estimated using the following ratio of *n*-alkane abundances: [C_{25} to C_{31}]/[C_{17} to C_{23}]. This ratio is highest in the glacial (≥ 8800 cal yr BP) sediments, and then decreases upwards in the postglacial (< 8800 cal yr BP) sediments. This trend suggests a progressive decrease in the relative abundance of terrestrial higher plants versus macrophytes in the post-glacial lake sediments. The carbon isotopic compositions of the C_{25} – C_{31} *n*-alkanes are more or less constant (–32 to –29 ‰) in each core over the entire sampling interval. These results suggest similar sources for these compounds throughout glacial and post-glacial times. However, the C_{21} and C_{23} (macrophytic) *n*-alkanes exhibit a pronounced shift in carbon isotopic composition from –29 to –37 ‰ over a ~800-1100 year period beginning at the boundary between glacial and post-glacial sedimentation. The much lower carbon isotopic macrophyte signature suggests quite different conditions for formation of the C_{21} and C_{23} *n*-alkanes found in the post-glacial sediments. This shift was likely a response to the massive alteration of the climate system, and associated aquatic and catchment ecosystem reorganization – including plant species changes – that occurred during this time.

Pleistocene weathering and climate evolution in southern Italy: data from intermontane basins

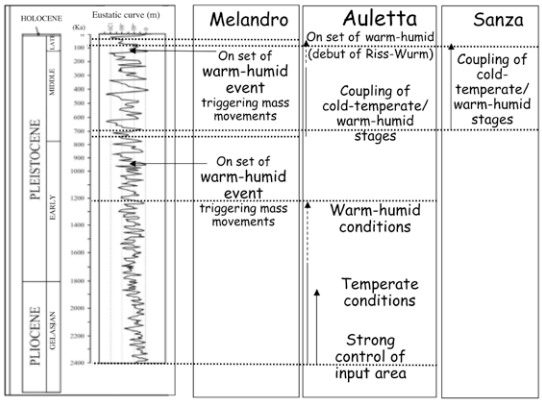
PAOLA DI LEO[1*], SALVATORE IVO GIANO [2], DARIO GIOIA [2], IOLANDA PULICE [1] AND MARCELLO SCHIATTARELLA [2]

[1] CNR-IMAA, Tito scalo (PZ), Italy (*correspondence: pdileo@imaa.cnr.it)

[2] Dipartimento di Scienze, Basilicata University, Potenza, Italy (marcello.schiattarella@unibas.it)

[3] CNR-IBAM, Tito scalo (PZ), Italy (dario.gioia@ibam.cnr.it)

In order to reconstruct the Pleistocene climate- and morpho-evolution of southern Italy, a multidisciplinary approach has been adopted and a multiproxy dataset implemented using geomorphological, mineralogical and geochemical information collected from three intermontane basins of the southern Apennines axial zone (Melandro, Auletta, and Sanza basins, Basilicata and Campania regions). To get this goal, a quantitative evaluation of eroded rock volumes were estimated by comparing uplift and erosion rates using both geological and geomorphological markers such as paleosols, weathering horizons, erosional surfaces, and paleolandslides. Besides, the calculated erosion rates were set in the evolving paleoclimate scenarios defined by means of proxies based on mineralogy (specifically clay minerals distribution) of soils, paleosols, weathering horizons developped onto differently aged erosion/depositional surfaces, and of continental sediments from key areas of southern Apennines, and on geochemical distribution of major, trace, and rare earth elements, and of stable isotopes. Since erosion rates from the three basins investigated are quite similar in a mid- long-term time interval (~1 Ma),



mineralogical and geochemical data may be used as suitable and comparable proxies to decipher the evolution of paleoclimate conditions. Coupling of cold-temperate/warm-humid climate stages seems to be the recurrent condition responsible for the genesis and evolution of ancient landscapes of the orogenic belt – including regional-scale erosional paleosurfaces – as well as a control factor in triggering mass movements.

www.minersoc.org
DOI: 10.1180/minmag.2013.077.5.4