Molecular and isotopic characterization of *n*-alkanes in a humic-rich, urbanised estuary

J.M.E. AHAD[1]*, G.F. SLATER[1], R.S. GANESHRAM[2],
T. ERTUNC[3] AND C.L. BRYANT[3]

[1]School of Geography and Earth Sciences, McMaster University, Hamilton, ON, L8S 4K1, Canada (*ahadj@mcmaster.ca)
[2]School of GeoSciences, University of Edinburgh, Edinburgh, EH9 3JW, UK
[3]SUERC, NERC Radiocarbon Laboratory, East Kilbride, G75 0QF, UK

The molecular distributions and carbon isotope compositions ($\delta^{13}C$) of *n*-alkanes extracted from surface sediments in a humic-rich, urbanised estuary (Tyne, NE England) were investigated. The most abundant homologues were C_{29} or C_{31}, and the carbon preference index (CPI) of C_{23}-C_{31} *n*-alkanes ranged from 5.55 at the most upriver site to 1.59 in the lower estuary. The average chain length (ACL) of C_{25}-C_{33} *n*-alkanes also decreased toward the North Sea, ranging from 29.5 to 28.6. The strong odd-even predominance in upriver sediments is consistent with a significant contribution from terrestrial plant waxes. All samples showed a pronounced unresolved complex mixture (UCM), suggesting a substantial component of degraded and weathered petroleum in estuarine sediments. Thus the lower CPI and ACL values found in the lower part of the estuary likely reflected a higher component of petrogenic contamination.

$\delta^{13}C$ signatures of C_{19}-C_{31} *n*-alkanes ranged from -37.1 to -30.1‰ and became more ^{13}C-depleted with increasing carbon number. $\delta^{13}C$ signatures for shorter odd-numbered *n*-alkanes (C_{19} and C_{21}) showed little variation across the estuary, whereas larger odd-numbered *n*-alkanes (C_{27}, C_{29} and C_{31}) showed a downriver ^{13}C-enrichment of up to 4‰. Since longer odd-numbered *n*-alkanes in uncontaminated estuarine sediments are typically derived from riverine inputs, the downriver ^{13}C-enrichment observed here supports the evidence provided by molecular distributions indicating substantial petrogenic contamination.

Lithological, mineralogical and geochemical aspects of Kuh-Shah mantle peridotites in South-East Iran

HAMID AHMADIPOUR

Dept. of Geology, Shahid Bahonar University of Kerman, Iran (hahmadi@mail.uk.ac.ir)

In South-east Iran, mainly in Kerman province, there are several ultramafic- mafic massives that have intruded into the coloured melange and other lithologies of Sanandaj-Sirjan metamorphic zone and kuh-Shah complex is one of them that have intruded into the Paleozoic metamorphic rocks of Sanandaj-Sirjan. This complex can be formed lower parts of Sanandaj-Sirjan Mesozoic ophiolites or a part of mantle diapir. Different evidences show that ultramafic parts of Kuh-Shah belong to the upper mantle. Lithologically, it contains alternative bands of harzburgite, dunite and pods of dunite with small amount of chromite concentrations as thin layers, that cross cut by pyroxenite intrusions.There are many high P-T deformation textures, such as elongation, bending, kinking and grain boundary migration in different crystals, porphyroclastic textures and lobate grain contacts.These textures have overprinted by low temperature ones during emplacement in the crust. Mineral chemistry of olivine, orthopyroxene, clinopyroxene and disseminated chromespinel in harzburgites and dunites are identical to the highly depleted mantle peridotites (for example, weight percent of NiO in harzburgitic olivines is 0.3-0.45 and those for dunites is 0.3-0.5 and the olivines are forsteritic with fo% more than 90). Chromite thin layers (2-3 cm) show magmatic layering. Average of Cr# and Mg# in chromites are 82 and 62 respectively, very simillar to boninitic chromites that form in the suprasubduction zones. Harzburgites and especially dunites show many evidences for partial melting, incongruent melting of orthopyroxene and melt-rock interaction. From geochemical point of view, these peridotites are depleted in incompatible elements and their REE patterns are more or less U-shape that show these rocks have been partially melted and then, affected by ascending melts. Emplacement of the complex in the present position is completely fault control.

[1] Zhou, M.F., Robinson, P.T., Malpas, J., Edwards, S. J. & Qi, L. (2005) *J. of Petrology* **46**(3), 615-639. [2] Ishimaru, S., Arai, S., Ishida, Y., Shirasaka, M. & Okrogin, V.M. (2007) *J. of Petrology* **48**(2), 395-433.