

**LIPIDIC BIOMARKERS APPROACH FOR THE CHARACTERIZATION OF THE BIOSTRATIGRAPHIC ENVIRONMENT OF MARINE SEDIMENTS FROM THE GULF OF CÁDIZ, (SW SPAIN)**

Laura SÁNCHEZ-GARCÍA<sup>1</sup>, J.-Ramón de-ANDRÉS<sup>1</sup> and Francisco-J. GONZÁLEZ-VILA<sup>2</sup>

*1. Instituto Geológico y Minero de España, IGME, Ríos Rosas 23, 28003, Madrid-Spain.*

*2. Instituto de Recursos Naturales y Agrobiología, CSIC, Avda. Reina Mercedes 10, 41080, Sevilla-Spain.*

This work pretends to contribute to a better delineation of the multistage geochemical processes occurring in a sedimentation scenario from the inner continental shelf of the Gulf of Cádiz (SW Spain), subjected to the Guadiana Estuary influence. In this way, the spatial distribution of terrestrial and marine biomarker compounds in a 15 sediments suite was determined by gas chromatography–mass spectrometry (GC–MS). The dichloromethane-methanol extracts of lipids from the surficial sediments, together with some sediment bulk properties (elemental composition, carbon and nitrogen stable isotope ratios) proved to be a valuable approach to characterize the SOM from this coastal system. The abundance, distribution, origin and geochemical significance of main lipids compounds (*n*-alkanes, *n*-alkan-2-ones, *n*-aldehydes, *n*-fatty acids,  $\alpha$ ,  $\omega$ -alkanedioic acids, diterpene resin acids, isoprenoids, etc) were discussed. The origin of the organic matter (OM) composition heterogeneity in the coastal areas (Meyers, 1997) was reflected in the lipid assemblages, which exhibit local variations showing the continental influence exerted by Guadiana fluvial system. In particular short-chain (< C<sub>20</sub>) alkyl compounds, diagnostic of predominant marine origin (Grimalt and Albaigués, 1987), dominated within offshore-situated sediments, whereas typical long-chain homologues from terrestrial plants (Jaffé et al., 1995) constituted a major contribution of near-shore sediments. The alkyl series in intermediate-location sediments indicated the existence of a gradient from terrigenous to marine contribution, by an OM composition of miscellaneous source of algae, seagrasses, microbial biomass and higher plants. The continuous presence of specific bacterial biomarkers iso-/anteiso- C<sub>15</sub>/C<sub>17</sub> branched acids and dominant <1 Pr/C<sub>17</sub> and Ph/C<sub>18</sub> ratios, could be related with microbial activity (Kaneda, 1991), whereas the relative abundance of unsaturated C<sub>16:1</sub> and C<sub>18:1</sub> acids and strong reducing nature *n*-aldehydes, together with the presence of molecular sulphur in most of the extracts and low pristane/phytane ratios, could suggest the dominance of an anoxic deposition environment (Cranwell *et al.*, 1987; Didyk *et al.*, 1978).

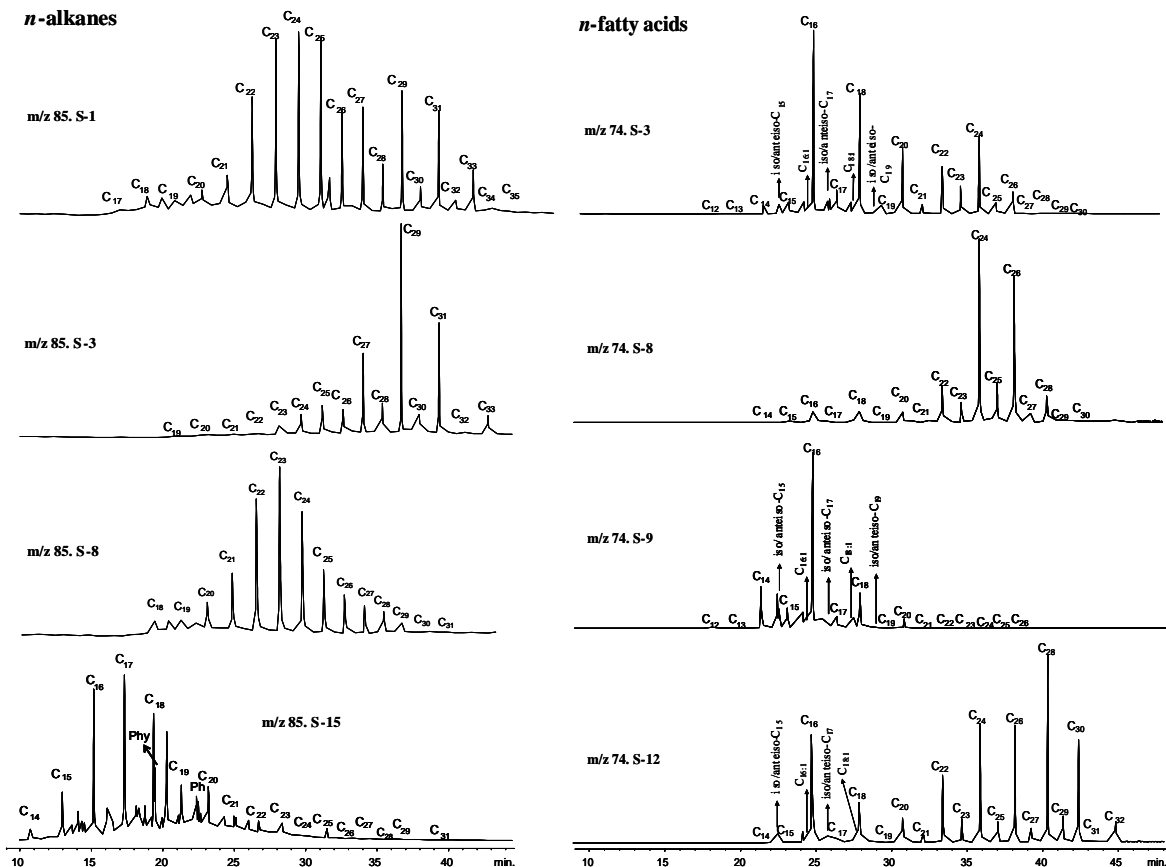


Figure 1. Reconstructed ion chromatograms of *n*-alkanes (m/z 85), along with pristane (Pr) and phytane (Ph) isoprenoids, and *n*-fatty acid methyl esters (m/z 74) series in the sediments. Numbers above peaks refer to carbon chain length.

## REFERENCES

- Cranwell, P.A., Eglinton, G., Robinson, N., 1987. Lipids of aquatic organisms as potential contributors to lacustrine sediments–II. *Organic Geochemistry* 11, 513–527.
- Didyk, B.M., Simoneit, B.R.T., Brassell, S.C., Eglinton, G., 1978. Organic geochemical indicators of palaeoenvironmental conditions of sedimentation. *Nature* 272, 216–222.
- Grimalt, J.O. y Albaigés, J. (1987). Sources and occurrence of C<sub>12</sub>-C<sub>22</sub> *n*-alkane distributions with even carbon number preference in sedimentary environments. *Geochimica et Cosmochimica Acta* 51, 1379-1384.
- Jaffé, R., Wolff, G.A., Cabrera, A.C., Carvajal-Chitty, H., 1995. The biogeochemistry of lipids in rivers from the Orinoco Basin. *Geochimica et Cosmochimica Acta* 59, 4507-4522.
- Kaneda, T., 1991. Iso- and anteiso-fatty acids in bacteria: biosynthesis, function, and taxonomic significance. *Microbiological Reviews* 55, 288–302.
- Meyers, P.A., 1997. Organic geochemical proxies of paleoceanographic, paleolimnologic and paleoclimatic processes. *Organic Geochemistry* 27, 213–250.