



Composition and sources of sedimentary organic matter in deep basins of the North-Eastern Mediterranean Sea

Rut Pedrosa-Pàmies (1), Aleka Gogou (2), Anna Sanchez-Vidal (1), Costas Parinos (2), Antoni Calafat (1), Miquel Canals (1), Ioanna Bouloubassi (3), and Nikos Lampadariou (4)

(1) GRC Geociències Marines, Departament d'Estratigrafia, P. i Geociències Marines, Universitat de Barcelona, Barcelona, Spain., (2) Hellenic Centre for Marine Research, Institute of Oceanography, Anavyssos, Greece., (3) Laboratoire d'Océanographie et du Climat: Expérimentation et Approches Numériques (LOCEAN), CNRS – Université P. et M. Curie, Paris, France., (4) Hellenic Centre for Marine Research, Institute of Marine Biology of Crete, Heraklion, Crete, Greece.

The processes controlling the sources, and the composition, transport and transformation of sedimentary organic matter (SOM) in the oligotrophic North-Eastern Mediterranean Sea (NEMS) have been scarcely investigated so far. In this contribution we present the results of the analysis of 29 surface sediment samples collected in the Ionian Sea, the Southern Aegean Sea and the North-Western Levantine Sea, at depths from 1000 m to 4000 m, with the aim of characterizing the distribution and provenance of SOM in different regions of the NEMS. Samples were analyzed for grain size distribution, organic carbon (OC) content, total nitrogen (TN) and their stable isotopes ($\delta^{13}\text{C}$, $\delta^{15}\text{N}$), together with selected lipid biomarkers, which allowed identifying the marine vs. terrestrial sources of SOM, the later including anthropogenic aliphatic hydrocarbons.

Marked variations were observed from one region to another. Concentrations of clay-sized particles, and OC and TN contents varied significantly, ranging from 14 to 57%, 0.15 to 1.15% and 0.06 to 0.11%, respectively. The concentrations of their stable isotopes, $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$, and the TN/OC ratio ranged from -24.74 to -18.33 ‰, 2.46 to 8.67‰ and 0.09 to 0.18, respectively. The sum of terrestrial (wax) *n*-alkanes (defined as the sum of major homologues: *n*-C₂₇ to *n*-C₃₁) changed between 80.7 and 1800 ng g⁻¹, while the unresolved complex mixture of aliphatic hydrocarbons (UCM), reflecting anthropogenic inputs, shifted from 0.73 to 36.7 μg g⁻¹.

The grain size characteristics and the geochemical composition of surface sediments in each region seem to rely primarily on variable terrestrial inputs on the transport processes driven by the mesoscale circulation in the study area and on the seafloor physiography eventually easing advection. Our results show an enhanced contribution of terrestrial vs. marine-derived organic matter in the deep Ionian Sea basins, which likely reflects the oligotrophic character of the region and the degradation of the labile marine (planktonic) SOM, along with its transport to the depth. Our data also show the influence of deep Adriatic waters outflowing into the study area. A transfer of fine grained and OC-rich SOM along the submarine canyons of the western Cretan Straits was also identified.