



Sedimentary organic matter in the continental shelf of the Gulf of Lions: composition and preservation in the contrasted event-dominated Rhône and Têt prodelta (NW Mediterranean Sea)

Roselyne Buscaïl (1), Philippe Kerhervé (1), Jung-Hyun Kim (2), Nicolas Bossard (1), Céline Artero (1), François Bourrin (1), Vincent Roussiez (1,3), Gérard Jeanty (1), Marion Desmousseaux (1), and Christophe Rabouille (4)
(1) Centre de Formation et de Recherche sur les Environnements Méditerranéens (CEFREM)-UMR CNRS 5110-University of Perpignan, 52 avenue Paul Alduy, 66860 Perpignan, France (buscaïl@univ-perp.fr/33 4 68 66 20 96), (2) Royal Netherlands Institute for Sea Research (NIOZ), PO Box 59, 1790 AB Den Burg, Texel, The Netherlands, (3) université Libre de Bruxelles, Campus de la Plaine, CP 208 boulevard du Triomphe, 1050 Bruxelles, Belgium, (4) laboratoire des Sciences du Climat et de l'Environnement (LSCE), CEA-CNRS-UVSQ, Domaine du CNRS, avenue de la Terrasse, 91198 Gif-sur-Yvette, France

The analysis of the control on the input of organic particles in marine sediments and the processes those undergo until they are finally buried plays a key role in the marine biogeochemical cycles, especially carbon cycle, in order to evaluate their effects on atmospheric CO₂ levels and therefore on climate changes. Organic matter (OM) inputs from both terrestrial and marine origin represent the two main sources of organic supply in the coastal zone. We have chosen to compare two contrasted prodelta in the Gulf of Lions continental shelf. The Rhône prodelta in front of the most important river of the Mediterranean sea in term of annual organic carbon discharge. The Têt prodelta, a small, event-dominated system (flood, storms, frequent resuspension). In prodelta the upper sediments are subject to strong post-depositional modifications. Our studies were conducted over time scales depending on climate events such as storms and floods. Spatio-temporal variability in surface sediments has been tackled using the following strategy

- spatial variations based on 70 stations regularly located in the Gulf of Lions continental shelf from 26m to 124m depth ;

- temporal variations investigated during 4 cruises (2007-2008) in the Rhône prodelta in accordance to the Rhône river organic inputs variations (low and high discharge); and during an annual survey (2004) at 28 m depth in the Têt prodelta.

Different biogeochemical compounds have been utilized in order to assess the budget for recycling/preservation OM.

- for quantification and composition: OC, TN, biochemical compounds (total lipids, total carbohydrates and total hydrolysable amino acids) in order to estimate the proportion between labile and refractory fractions.

- for the origin: C/N, $\delta^{13}C$, BIT (Branched and Isoprenoid Tetraether) index indicator of soil organic carbon input. Moreover, in order to evaluate organic temporal changes in relation with sediment dynamic events numerous parameters were simultaneously measured during storm and flood events from November 2003 to March 2004 in the Têt prodelta: meteorological conditions, waves, currents, water temperature and turbidity, seafloor erosion/accretion, and physico-chemical conditions (redox, porosity), grain size variations and sediment rate accumulation of the deposits.

The influence of the riverine OC inputs was prominent within the first 10 km off the Rhône river mouth and only 2 km off the Têt river mouth. A comparison of exportation/preservation was established between the two prodelta at 20-30 m depth.

- in the Têt prodelta 80-90% of the OC inputs are rapidly exported to the adjacent slope (canyons). A very low part of OC is preserved.

- in the Rhône prodelta 40% of the OC inputs are exported offshore in the entire continental shelf of the Gulf of Lions (and slope). The Rhône prodelta is an important area of preservation.