

DISTRIBUTION AND FATE OF THE ORGANIC MATERIAL DISCHARGED BY THE RHONE RIVER

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Abstract

Within the framework of the ANR-CHACCRA program, a monthly sampling of suspended particles (SP) on the downstream part of the Rhone River (Arles station) has been performed during 4 years (2006-2009), combined with seasonal cruises on the Rhone prodelta for collecting sediments. Carbon and nitrogen content, stable isotope ratios ($d^{13}C$ and $d^{15}N$) and biochemical analyses have been performed on these materials in order to understand the role of Rhone River in the distribution of the particle organic material and its fate within a coastal environment (prodelta area).

Keywords: Gulf Of Lions, Rhone Delta, River Input, Sediments, Organic Matter

Continental shelves are dynamic sedimentary environments that receive, store and export high amounts of organic carbon (OC) and nitrogen (N) introduced by a variety of terrestrial and marine sources. Rivers provide the major pathways for the input of terrestrial organic matter to marine sediments. The Gulf of Lions is a key area of the Mediterranean Sea since it receives the Rhone River discharge, the largest river input into the Mediterranean Sea in terms of liquid and solid fluxes [1].

The purpose of our study is to compare the variations in term of flux and quality of the riverine particulate organic material (RPOM) from the Rhone River with the distribution and the quality of the sedimentary organic material (SOM) from the Rhone prodelta. The strategy developed within the framework of the ANR-CHACCRA program is based on a monthly sampling of Rhone RPOM at Arles started in January 2006 and on coastal cruises (April 2007, September 2007 and May 2008) for collecting sediments off the Rhone mouth. Carbon and nitrogen contents (OC%, N%) and stable isotope ratios ($d^{13}C$ and $d^{15}N$) were performed to assess the Rhone inputs and to follow this material once settled off the mouth. Further analyses on the three main organic classes (proteids, lipids, sugars) were achieved also on sediments and some river samples to characterize the OM, investigate its spatial and temporal distributions. Our results exhibited a relation between the quality of the SOM with seasons and regimes of the Rhone River. Moreover, taking into account the large size of the Rhone watershed, our survey showed that floods can discharge two kind of RPOM that should follow different fate in coastal sediments. We knew that the RPOM fluxes change markedly according to seasons and floods and now, we have to integrate the temporal heterogeneity in the nature of RPOM in further studies. What are the responses of the prodelta benthic fauna to this heterogeneity? As extreme hydro-climatic conditions on the shelf of the Gulf of Lions may induce large transfer (e.g. cascading event) of this RPOM to the deep basin [2], does this RPOM heterogeneity in term of nature influence the deep ecosystems?

Global Biogeochemical Cycles, 14(2), 669-681.

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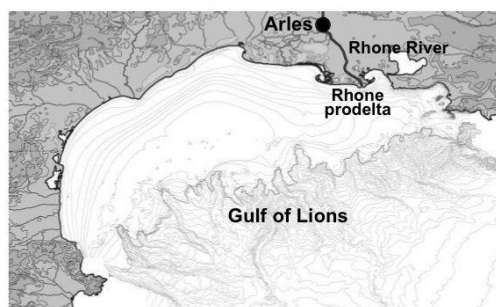


Fig. 1. Location of the study area

References

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