FLUVIAL INPUTS AND ISOTOPIC SIGNAL OF ORGANIC MATTER DISCHARGED TO THE NW MEDITERRANEAN

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Abstract
Nine rivers discharging to the NW Mediterranean (Gulf of Lions and Catalan Sea) are currently biweekly/monthly studied to understand their role in the transport of organic matter from the continent to the ocean. Water discharge, total suspended sediment, particulate organic carbon and nitrogen contents and their isotopic ratios will be used to answer to major questions regarding the amount and quality (as a measure of source) of organic matter which is effectively transported from land to sea.
Keywords: Western Mediterranean, River Input, Organic Matter

River systems represent the primary pathway for carbon transport from the terrestrial to the marine environment, and are thus critical in determining the quantity and composition of carbon reaching the continental shelf. In addition, physical processes occurring at the shelf edge are capable of transferring this accumulated organic carbon to the deep sea. Thus, identifying sources and fluxes of carbon and nitrogen to the continental margin is essential to understanding carbon and nitrogen cycling in the overall marine environment.

We have analyzed the temporal variations of water discharge, total suspended sediment, particulate organic carbon (C_{org}) and nitrogen (N) contents and their isotopic ratios ($\partial^{13}C$ and $\partial^{15}N$) from three Catalan rivers (Fluvià, Ter and Tordera) and six French rivers (Têt, Agly, Aude, Orb, Hérault, Rhône) flowing into the Catalan margin and the Gulf of Lion, respectively, in the Western Mediterranean [1].

First results from the 2008-09 period show that the origin of the organic matter carried by the Catalan rivers is mostly waterweeds in the Fluvià River and soil with terrestrial vegetation in the Ter and Tordera rivers. In addition, $\partial^{15}N$ results show that Ter and Tordera rivers undergo anthropogenic inputs of inorganic nitrogen, while the Fluvià River is the less human-impacted. Moreover, alteration of the solid load by artificial dams has been observed to be a significant factor influencing the total suspended sediment in the Ter River.

The French rivers have high Corg and N contents (up to 20% and 5%, respectively). The main feature of this survey concerns the high seasonal variation in the quality of the riverine particulate organic matter excepted for the Rhone River. In summer, the biological production (mainly freshwater phytoplankton) is enhanced in sunlit and calm waters, whereas higher water flows floods discharging material mainly originated from soil erosion characterize winter and spring. The Têt River exhibited atypical $\partial^{13}C$ and $\partial^{15}N$ values that may reflect the large influence of the sewage treatment plant of Perpignan.

Overall, particulate matter samples from these nine rivers are used to characterize the riverine input to the adjacent coastal system and provide information about the fate of the land-sea transported particles and their potential impact on the marine ecosystems.

References
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