Geophysical Research Abstracts,
Vol. 11, EGU2009-6222-1, 2009
EGU General Assembly 2009

Sediment and organic carbon transport in Cap de Creus canyon, Gulf of Lions (France)

T. Tesi (1,2), P. Puig (3), A. Palanques (3), M.A. Goni (2), S. Miserocchi (1), and L. Langone (1)

(1) Istituto Scienze Marine CNR Sede di Bologna - Geologia Marina, Via P. Gobetti, 101, Bologna, 40129, Italy, (2) College of Oceanic and Atmospheric Sciences, 104 COAS Administration Building, Corvallis, OR 97331-5503, United States, (3) Instituto de Ciencies del Mar, CSIC, Passeig Maritim de la Barceloneta, 37-49, Barcelona, 08003, Spain

The off-shelf transport of particles in continental margins is responsible for much of the flux of organic matter (OM)and nutrients towards deep-sea ecosystems, playing a key role in the global oceanic biogeochemical cycles. Off-shelf sediment transport mechanism have been well described for many continental margins being triggered by a series of physical forcings such as tides, storms, internal waves, floods, earthquakes, as well as the combination of some of these processes, while topographic structures such as submarine canyons act as preferential sedimentary conduits toward deep ocean. However, the composition of the material supplied to the deep ocean during these events is still poorly understood since most studies have only investigated the magnitude of the down-slope fluxes or limited their analysis to the major bulk components. A special opportunity to characterize the biogeochemical composition of the off-shelf export in the Gulf of Lions (GoL) margin was provided during the winter 2004-2005, when an exceptional dense water cascading event occurred. Dense water overflowing off the shelf in the GoL has been recently recognized as one of the main process affecting particulate shelf-to-slope exchange in northwestern Mediterranean Sea. During the 2004-2005 cascading event, moored instruments were deployed at the Cap de Creus (CdC) canyon head to monitor the physical parameters and to characterize the temporal variability of the exported material. Post-cascading sediment cores were collected along the sediment dispersal system to trace the sediment transport pathway. In this study we developed a source tracing method using elemental compositions, alkaline CuO reaction products (lignin, cutin, lipids, hydroxy benzenes, proteins, lipids, and polysaccharides products), biogenic silica, carbon stable isotope composition, radiocarbon measurements, and grain size as a fingerprint for each sample. The aforementioned analyses were carried out on both sediment trap and sediment samples to obtain a homogeneous data matrix. The dynamic mixture of OM sources and shelf sediments was then analyzed using multivariate statistics. A quantitative mixing model was used to assess the relative contribution of allochthonous and autochthonous OM and to identify the relationship between sediment export from the shelf and down-slope particulate fluxes (sediment provenance).