Geophysical Research Abstracts
Vol. 12, EGU2010-10427, 2010
EGU General Assembly 2010

Terrigenous organic matter signals in submarine canyons along the southwestern Gulf of Lion margin during Dense Shelf Water Cascading and quiescent conditions

Catalina Pasqual (1), Tomasso Tesi (2), Anna Sanchez-Vidal (1), Miguel Goñi (2), Antoni Calafat (1), Cindy Lee (3), and Miquel Canals (1)

(1) Grup de Recerca Consolidat en Geociències Marines, Universitat de Barcelona, Barcelona, Spain , (2) College of Oceanic and Atmospheric Sciences, Oregon State University, Corvallis, Oregon, USA, (3) School of Marine and Atmospheric Sciences, Stony Brook University, Stony Brook, New York, USA

Previous projects in the Gulf of Lion have analyzed the path of terrigenous compounds in the Rhone deltaic system, the continental shelf and the canyon heads. In this study we present results from the HERMES project, focused on the GoL slope to further assess the particulate exchange with the interior ocean. Experimental design consisted in nine sediment traps deployed along the Lacaze-Duthiers and Cap de Creus submarine canyons (from the canyon heads to the canyon mouth) and the southern open slope during 1 year. Sediment trap materials were analyzed by CuO oxidation to investigate spatial and temporal variability in the yields and compositional characteristics of lignin-derived phenols. These organic biomarkers are uniquely synthesized by vascular plants, most of which inhabit the aerial ecosystems, and have been used extensively to trace the contribution and source of terrigenous organic matter in many environments.

Sediment trap data indicate that the Dense Shelf Water Cascading event that took place in winter 2006 dominates overall particle fluxes in both canyons. During the deployment, fluxes of biogeochemical parameters were positively correlated with the total mass flux. Lignin fluxes were also highly correlated with mass fluxes, but the ratio of lignin to lithogenic material and lignin composition varied significantly indicating significant changes in the composition and nature of land-derived materials mobilized along both canyons. For example, during the DSWC period land-derived material is not significantly enriched in lignins and main changes in lignin composition are the enrichment in vanillyn phenols respect to syringyl and cinamyl phenols in the middle Cap de Creus canyon and upper open slope samples. Lithogenic-normalized lignin contents were higher during late spring and summer at all stations, when overall particle fluxes are relatively low. During these periods, lignin compositions were characterized by elevated cinnamyl to vanillyl phenol ratios, a trend that is consistent with elevated inputs of pollen. Our results suggest large differences in the sources and transport processes responsible for terrigenous material transport along canyons, ranging from export of fluvial and shelf sediments during winter to atmospheric dust inputs during spring and summer.