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BIOMARKER DISTRIBUTION ACROSS THE GALICIAN SHELF SYSTEM

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Continental shelves are highly complex sedimentological systems and represent a link between coastal areas and the open ocean. Therefore, they are controlled by both continental and oceanic factors. Transport of particles over the continental margin and sedimentation processes cannot be easily quantified; organic and inorganic substance classes are supposed to show different behaviour in the marine environment.

The main focus of this study is the partitioning of organic matter at the shelf system of Galicia for the reconstruction of its sources and transport pathways. To distinguish between terrestrial and marine sources of organic matter specific biomarkers will be routinely analysed. Two major and several smaller rivers drain into the Galician shelf system and deliver their sediment load. The northern part of the shelf is characterized by the Galician Rías which are drowned tertiary river valleys. The rivers ending in the Rías are not expected to contribute much material due to smaller islands off the coast trapping the river load (Dias *et al.* 2002a). The main contributors of terrestrial material to the shelf are the Minho River at the southern border of the research area and the Douro River even further in the south (e.g. Dias *et al.*, 2002b). The oceanographic regime of the Galician Shelf is a low-productivity, high-energy system with seasonal variability. Northward bottom currents together with downwelling during winter result in local mud belts where fine grained organic rich material is deposited (Drago *et al.*, 1998*)*. Up to now, the reason for the existence of the Galicia Mud Patch located in the southern part of the research area is not fully understood. The Minho River is supposed to be the main sediment source but, however, during the last century the sediment supply should has been reduced due to the construction of dams in the river basin. Sediment might also derive from the Douro Mud Patch further in the south and the adjacent shelf areas by remobilisation (Vittorino *et al.*, 2002).

We are currently analysing sediment and particulate organic matter (POM) samples from the majority of the local rivers and we will use these source signals to trace the terrestrial material in an area on the shelf of approximately 7200 km². Biomarkers of terrestrial origin (e.g., amyrin, lupeol, long-chain *n*-alcohols and *n*-alkanes, branched isoprenoidal tetraethers) will be compared with the abundance of typical marine compounds (alkenones, alkanediols, dinosterol, bishomohopanol, crenarchaeol) in surface sediments of 34

sampling locations on the shelf for the reconstruction of recent sediment transport and deposition. Additionally, five surface sediment samples deriving from the continental slope will be analysed to determine sediment export beyond the shelf break. All of the marine samples were obtained by giant box coring during the GALIOMAR P342 cruise in August 2006. First results coming from the analysis of Douro River POM indicate a predominance of long-chain *n*-alkanes (C_{27}, C_{29}, and C_{31}), long-chain *n*-alcohols (C_{24}, C_{26}, C_{28}, and C_{30}), sterols (cholesterol, sitosterol, stigmasterol) and pentacyclic triterpenoids (lupeol, amyrin). All of these biomarkers appear also in shelf samples, but decrease in abundance in sediments on the slope. Here, some of the biomarkers (*n*-alkanes, *n*-alcohols and stigmasterol) are still present, but only in low concentration, whereas others (lupeol, amyrin) are completely absent. In contrast, shelf and slope samples are dominated by marine-derived lipid biomarkers such as dinosterol, sitosterol, cholesterol and C_{30} alkyl diol.

To evaluate the proportion of terrestrial material over the shelf area different indices (BIT, CPI, TAR) will be calculated from the relative abundance of the defined biomarkers. This first study will be the base for further investigations on radiocarbon-dated sediment cores concerning the evolution of the Galician Shelf system and temporal changes of organic matter sources and distribution.

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