



Supply of terrestrial organic matter to Amazon Shelf sediments of the last 1000 years deduced from bacteriohopanepolyols and other lipid biomarkers

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In the Amazon Shelf and Fan region large amounts of particulate material - mainly derived from the Andes - are transported via the Amazon River into the western tropical Atlantic Ocean. Previous studies have shown that the Amazon Fan sediments dominantly consist of terrigenous material. In this study we investigate the distribution of lipid biomarkers for terrigenous and soil organic matter (SOM), in particular bacteriohopanepolyols (BHPs), and other lipid biomarkers in a sediment core covering approximately the last 1000 years, recovered on the Amazon Shelf about 350 km north of the Amazon River mouth at about 50 m water depth. Here we present the first evidence for the presence of soil-specific and other BHPs in these sediments. Concentrations of soil BHP within the range of 70 to 220 $\mu\text{g/g}$ TOC are amongst the highest reported to date from marine environments confirming the exceptional role of SOM export from major tropical rivers. Enhanced concentrations of 35-amino-BHPs in the sediments also suggest intense aerobic methane-oxidation, testifying for intense and active microbial cycling of labile organic matter. However, we can not rule out the possibility that this signal is exported from the catchment with the soil-marker BHPs. The concentrations of n-alkanes also show fluctuations, albeit less distinctive and not correlated with the cyclic variations of the BHPs. Very low concentrations of alkenones as molecular markers for prymnesiophyte algae imply comparatively small contributions of marine organic matter.

The relative abundances of different groups of BHPs remain rather constant downcore, arguing that the type of SOM being exported over the last >1000 years was uniform. The concentrations of all individual BHPs reveal a cyclic pattern that might be related to changes in the supply of terrestrial material due to climatic fluctuations. This is also supported by the Al/Ti record of our core showing a similar cyclicality as the BHPs. The current observations support the conclusions that the land-ocean linkage of the Amazon system is highly sensitive exporting even subtle climate variations in the continental interior to the shelf sediments. Ongoing biomarker analysis will explore the potential of these sediments to produce continuous palaeo climate records in the Holocene and further investigate the importance of SOM supply and burial during glacial climate conditions.