



Rapid lateral Particle Transport in the Argentine Basin: Th-230 and molecular C-14 Evidence

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Lateral transport and focusing of particles strongly influences the depositional patterns of organic matter in marine sediments (e.g. Thomsen et al., 1998; Benthien & Müller, 2000; Ohkouchi et al., 2002). Transport can occur in the water column prior to initial deposition or following re-suspension of sediment grains. In both cases, fine-grained and organic particles are more susceptible than coarse grained particles (e.g. foraminiferal test) due to their slower sinking velocities. This may lead to spatial and, in the case of transport of re-suspended sediments, temporal decoupling of fine-grained organic matter and coarser sediment constituents. Using compound-specific radiocarbon dating, large age offsets between foraminifera and algal biomarkers have been found at sites of sediment focusing such as sediment drifts and depo-centers on continental slopes (Ohkouchi et al., 2002; Mollenhauer et al., 2003), documenting temporal decoupling. Sediment focusing on the other hand can be quantified based on excess Th-230 ($^{230}\text{Th}_{(xs)}$) measurements (e.g. François et al., 2004). Here we present a combined data set of compound-specific radiocarbon ages of marine phytoplankton derived biomarkers (alkenones) and $^{230}\text{Th}_{(xs)}$ -derived sediment focusing factors for core top samples from the Argentine Basin. Prior studies have shown that suspended particles are displaced northward and downslope by strong surface and bottom currents, leading to anomalously cold alkenone-derived sea surface temperature estimates (Benthien & Müller, 2000) and to the presence of shells of Antarctic diatom species in Argentine Basin surface sediments (Romero & Hensen, 2002). $^{230}\text{Th}_{(xs)}$ -measurements do not indicate that sediment focusing is significant in areas with large

temperature anomalies. Moreover, alkenone radiocarbon data suggest coeval deposition of marine biomarkers and planktic foraminifera. Based on our data, we infer that the transport processes leading to the lateral displacement of these sediment components are rapid and probably occur in the upper water column.

References:

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