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MSP Drilling through a complete Pliocene series : the case of the Gulf of Lion (GOLD-2 project)

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Borehole transects across passive continental margins are required to understand the history of eustasy versus subsidence/sediment supply changes. In this context, the Gulf of Lion is a unique natural laboratory to study surficial processes at the scale of the last 5Ma. Here, we present, the main objectives for GOLD 2 Mission Specific Platform drilling project on the continental shelf (30 - 120 m water depth) where the sedimentary column consist of very well developed prograding Pliocene clinoforms. On the shelf we record the full and very high resolution history of earth history since 5 Ma within 0.6 to 2 km of sedimentary archives.

Over the last 5 m.y., global climate has evolved from being warm with only small Northern Hemisphere glaciers to being cold with major Northern Hemisphere glaciations every 100–40 k.y. The Gulf of Lion receives most sediments from the Alps by the Rhône River. We infer that the amount of sediment will vary significantly according to the existence or not of ice sheet and glaciers. We thus believe that a drilling transect through these deposits give an opportunity to address the following scientific targets: (1) estimate the amplitudes, rates and mechanisms of sea-level change during the last "great global warming", culminating at $\sim$3 Ma during the mid-Pliocene climate optimum, and presenting analogies with a condition that we may eventually achieve in the near future even if CO2 emissions are stabilized; (2) Date and characterize the impact of the initiation and the change in glacioeustatic cyclicities on alpine glacier and ultimately on sedimentation on the shelf; (3) study the distribution and dynamics of freshwater within continental shelf sediments, which have important implications for microbial processes and long-term fluxes of carbon and nitrogen and other nutrients to the global ocean.

This drilling project and the GOLD I project (Rabineau et al., this congress, session CL 4.9/SSP 1.7) have the objectives of recovering a unique global geological records preserved in marine sedimentary deposits. GOLD-1 main aim is to drill below the salt with the Chikyu, with major outcomes concerning pre-salt deposition, messinian event, margin formation and deep biosphere.

We invite all interested scientists to join us in planning and promoting this drilling project. We are proposing an IODP Magellan workshop in Banyuls in October, 2010 to bring together all interested scientists and stake-holders around thess proposals and other drilling projects in the Mediterranean Sea (e.g. ICDP). Please contat us at the earliest opportunity.