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Integrating seismic and core data at PRGL1 and PRGL2 Promess drillsites, a first attempt

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The Promess 1 drillsites in the Gulf of Lions offer one of the first opportunities to explore the impact of Late Quaternary sea-level changes on shelf (site PRGL2) to slope (site PRGL1) depositional sequences on a passive continental margin at the high resolution scale. The integration of core and seismic data, together with *in situ* measurements, allows, and will allow when all data are exploited, to understand the timing and processes that controlled sedimentation at the shelf edge. The very high sedimentation rate (up to 3.5m/ky during glacial periods) also offers unequalled opportunities for having access to rapid climate changes that affected the Western Mediterranean basin (Flores et al., this conference.

Our study is based on a very dense grid of "nested" seismic data at various frequencies, covering the entire shelf and slope area. Different kind of chirp and sparker data were acquired, as well as multi-channel seismic profiles using a cluster of GI-Guns. In 2005, complementary data, including High Resolution 3D seismics, were acquired at the position of site PRGL1 (Thomas et al., this conference). On the shelf, major seismic discontinuities bound sequences made either of high-angle ($>5^{\circ}$) or low-angle ($<1^{\circ}$) clinoforms. They become correlative continuities on the slope, still easily detectable on seismic profiles thanks to the presence of buried pockmarks and amplitude

anomalies. Using shallow cores for the uppermost deposits, and stratigraphic modelling for the entire data set, we proposed that 100 ky glacio-eustatic cycles were at the origin of major depositional sequences, their bounding surfaces being composite erosion surfaces formed by submarine and subaerial ravinement, both during sea-level fall and sea-level rise (Berné, 1999; Rabineau, 2001). This interpretation is confirmed by preliminary analysis of nanno-plancton, that shows that both PRGL1 and PRGL2 probably reached MIS 12. This analysis also permit to assign ages to each of the major seismic sequence, and to confirm correlations between shelf and slope (seismic discontinuities being used as time-lines). The correlation between seismic and core data at PRGL2 (thanks to a very good match between core and seismic data when using along-core celerity measurements for time/depth conversions) shows that ravinement surfaces are characterized by the presence of very coarse shell lags indicative of periods of condensation with mollusc assemblages typical for ravinement surfaces (Bassetti et al., this conference). In contrast, their correlative conformities along the slope display much more subtle changes, only detectable through detailed grain-size analysis (Frigola et al., 2005), with increased grain size at the position of seismic boundaries. In fact, seismic reflections might correspond to boundaries between (1) porous layers rapidly deposited during glacial maxima and (2) overlying, more condensed interglacial deposits forming permeability barriers. This would explain the occurrence of some gas trapped below such surfaces. The Fe/Ca ratio, measured through continuous XRF core scanning, displays a similar pattern, high values corresponding to (glacial) periods when fluvial input was dominant, compared to (interglacial) periods with more biogenic material.

Within most of the major sequences, sub-sequences, probably linked to higher-order cyclicities are clearly visible on seismic data and all sedimentary proxies. Isotopic- and magneto- stratigraphy will allow to assign an age to these sub-sequences, and possibly to link them to climatic events recognized elsewhere.

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