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Integrating seismic-stratigraphy with eco-lithologic data from PRAD1-2, central Adriatic margin. Implications on sea level and tectonic subsidence during the last 450 kyr

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Relative sea level change can be driven by cyclical or impulsive phenomena. In some cases, cyclical events such as glacial-eustatic sea level changes, may shape the sedimentary record in a way that a typical motif can be recognised. However, regional setting and local environmental factors, superimposed on glacio-eustasy, may alter the cyclical pattern of stratigraphic trends. On the Adriatic shelf, four middle-upper Pleistocene depositional sequences (named sequence 1 to sequence 4, top-down) show evident stratigraphic similarities resulting from re-iteration of comparable depositional conditions during sea level cycles reflecting 100 kyr astronomical pacing. The 71 m-long PRAD1-2 borehole, 184 m below sea level on the central Adriatic slope, provides evidence of an overall upward-fining lithologic trend within the four sequences. This trend and the evidence of more frequent cm-thick silt and sand beds at the top of sequence 4, indicates a longer-term lithologic variability on the background of periodic, climate-driven sea level changes.

Each of the four sequences on the Adriatic margin consists of progradational units recording highstand and falling sea level (e.g. forced-regression deposits). During successive steps of relative sea level fall, near-shore sandy facies within shoreline deposits are cannibalised and coarse sediment is temporarily stored on the top-sets of each successive forced-regression wedge punctuating sea level fall, before it is delivered to the lowstand shoreline. Depending on supply (amount of available coarse-grained sedi-

ment) and wave-current regime, offshore sand sheets and sand bars may form in equilibrium with nearshore sand deposits; however, in low-energy, low-gradient, and overall mud-dominated environments, sand facies are more likely restricted to nearshore deposits. Because of narrowing of the shelf during lowstand, relatively coarser sediment is more easily dispersed on the outer shelf and upper slope by storms or density currents.

Silt and fine sand layers of the kind found at the base of PRAD1-2 likely record episodic silt and sand escaping a nearby shoreline and depositing on an outer shelf environment. However, the higher frequency of these coarser deposits within sequence 4, combined with seismic evidence of erosional truncation of this sequence in a more seaward location than in the case of younger sequences, suggests that the distance between forced-regressive/lowstand shoreline and the site of PRAD1-2 was at a minimum at the time of deposition sequence 4, and increased progressively during successive cycles, determining a concomitant deepening of the depositional environment at the PRAD1-2 site. A nearshore environment at the top of sequence 4 where the sandy interval occurs is also confirmed by benthic foraminifera assemblages indicative of water depths around 20 m. On this basis, significant changes in the amplitude of sea level oscillations or long-term tectonic subsidence (or a combination of both) may have been responsible for the observed changes in the sedimentary facies and depositional environment. We discuss on the implications of possible scenarios.