



## **Sea level change and supply switching during the past four climate cycles: evidence from integrated shallow-shelf stratigraphy and $\delta^{18}\text{O}$ records (Adriatic Margin)**

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Sequence-stratigraphic reconstruction, numerical modelling and  $\delta^{18}\text{O}$  records are combined in order to unravel the record of composite  $\sim 100$  and  $20$  ka Milankovitch cyclicity through the past  $\sim 400$  ka on the Adriatic margin. Multi-proxy chronostratigraphic data and stable isotope records from planktic and benthic foraminifera are derived from Borehole PRAD1-2, a  $71$  m continuous core drilled on the western Adriatic slope (PROMESS-1 European Project). The cored interval encompasses the distal parts of stacked progradational wedges that are the main building blocks of depositional sequences on the Adriatic shelf. Direct slope-shelf correlation indicates that two types of clinoforms (defined on seismic profiles) alternate in phase with the pattern of composite climate and sea level changes figured by  $\delta^{18}\text{O}$  records. Numerical modelling indicates that changes in clinoform geometry of the kind observed in the Adriatic are consistent with a mechanism of switching supply from dominant advection on a flooded shelf, during highstand intervals, to overall sediment starvation on a narrowed shelf, during lowstands. Suchlike changes are expected during shorter-term sea level highstands and lowstands superimposed on the dominant  $100$  ka cycle of the Middle-Upper Pleistocene. The calibration of progradational sequences on

the Adriatic shelf with PRAD1-2 stratigraphy therefore provides an unprecedented shallow-marine record of the stratigraphic signature of composite  $\sim 100$  and 20 ka Milankovitch cyclicality, as it results from re-arranging of oceanographic setting and sediment pathways during the last four glacial-interglacial cycles. Our findings also have relevant implications for sequence-stratigraphic interpretation and modelling of Quaternary continental margins. In contrast to most of the basic concepts of the sequence stratigraphic model, the Adriatic example of depositional sequences emphasizes the importance of supply dynamics during short-term sea level changes in shaping sequences and margin architecture. Exploiting the sedimentary record of Quaternary continental margins may thus require substantial revisiting of the sequence-stratigraphic model, in order to account for the rapid and significant changes in sediment flux driven by changes in the hydrological-oceanographic system.