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Sequences development during the Upper Pliocene of the external Abruzzi area (Central Apennines, Italy): tectonic vs climatic control

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A sequence stratigraphy analysis has been applied to the Upper Pliocene deposits in order to better investigate the transition from syn-to-postorogenic phase, and to discriminate among the driving factors which control the stratigraphic signature of the basin fill. The presence of open lagoon, shoreface and open shelf depositional systems, stratal geometries and widespread unconformities favoured the application of sequence stratigraphy techniques and the recognition of high frequency sequences, along a cross-section located between the external Apennine chain front and the Adriatic offshore.

The Upper Pliocene has been referred to a third order sequence, bounded at the base by a type 1 sequence boundary. The LST was deposited in the deeper basinal areas and it pinches out toward the more internal carbonate anticline and around the Coastal Structure. During the TST, the Coastal Structure is definitively drowned, although ephemeral emersions can be present prior to the MFS. This coincides with the maximum deepening of the depositional environments and with the maximum displacement of marine facies landward. The HST is outlined by the progradation of channelised conglomeratic fan deltas on the MFS, in the inner basin sectors, and the return of shoreface deposits on the Coastal Structure. A type 2 sequence boundary, nearly coincident with the Pliocene-Pleistocene transition, bounds the sequence at the top. Stratigraphic and geometric evidences suggest that the formation of the lower sequence boundary and the LST were controlled by the uplift of local structures due to the residual growth of anticlines. In contrast, a cycle of sea level rise and fall, induced by the decay and growth of polar ice caps, is argued as the main forcing mechanism

controlling the sedimentary architecture of the TST, HST and the upper boundary of the sequence. Moreover, other depositional sequences, of one order higher magnitude and with an average duration of 180 kyr, modulated the third order sequence. They reflect large (tens of meters) and rapid (occurring in $<$200 kyr) sea level fluctuations which can be explained with rapid climate changes due to astronomical forcing mechanisms.