AAPG Annual Meeting
March 10-13, 2002
Houston, Texas

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Surprising(?) Eustatic Signals in Deep Marine Pliocene Sections From Two Widely Separated Tectonically Active Basins: Alboran Basin, Westernmost Mediterranean Sea and Woodlark Basin, Near Papua New Guinea

Our work in the Alboran and Woodlark basins suggests that eustatic signals are likely present, but perhaps rarely deciphered in tectonically active basins. During the Pliocene, the Alboran Basin was affected by compression, whereas the Woodlark Basin formed in the Pliocene during extension associated with rift propagation.

Eustatic effects are evident at many levels within the Pliocene section at Ocean Drilling Program Site 978 in the Alboran Basin: (1) a major sequence boundary at 3.0 Ma is recorded by a homogeneous middle Pliocene subunit at Site 978 and elsewhere in the Mediterranean by evidence of slumping; (2) detailed correlation of rhythmically bedded marls in the lower Pliocene subunit indicate that intervals with lower rates of sediment accumulation are associated with eustatic highstands (periods of enhanced carbonate dissolution and/or erosion by bottom currents); and (3) a plot of Pliocene turbidite frequency shows relative maxima in condensed sections at approximately 5.0, 3.4, 2.7, and 2.0 Ma. A predicted, but absent condensed section at 4.0 Ma corresponds to one rhythmically bedded interval with missing section in the lower Pliocene subunit.

Eustatic signals are also present in Pliocene sections drilled by ODP in the Woodlark Basin. The downhole occurrence of sandy turbidites in the <3.9 Ma section at Sites 1109, 1115 and 1118 was tabulated using high resolution microresistivity logs (Formation MicroScanner) in conjunction with recovered core. Marked changes in turbidite frequency occur mainly at eustatically significant time intervals (3.45, 3.0, 2.6, 2.0 Ma). However, these changes do not appear to correspond to turbidite frequency maxima.