

Sequence and Carbon Isotope Stratigraphy from the Aptian carbonate platform interior, southern Croatia

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Six stratigraphic sections (Korcula, Hvar, Mljet islands and the Peljesac Peninsula) of shallow, Aptian platform interior carbonates from the southern Croatia part of Tethys, were studied to document the sequence development, parasequence stacking, and the effects of oceanic anoxic events on the platform stratigraphy.

The vertical stacking of subtidal, intertidal-supratidal, and subaerial exposure facies generated shallowing-upward parasequences whose architecture was controlled by 3rd-order sea level cycles with superimposed Milankovitch sea-level fluctuations, coupled with down-to-basin differential subsidence. The parasequences make up three 3rd-order sequences separated by sequence boundary zones of breccias. The three sequences correlate with regional sequences of the Arabian Platform and elsewhere in Tethys. The Early Aptian Sequence 1 (16 to 51 meters thick) is characterized by poorly cyclic, subtidal amalgamated parasequences indicative of relatively high sea levels, increased species population and diversity. Facies are poorly-cyclic, thick-bedded to massive, composed of subtidal lime mudstone and skeletal-intraclastic lime mudstone and wackestone with rare benthic foraminifera, calcareous algae, microbial encrusters, bivalve fragments, as well as subordinate pelagic crinoids and planktic foraminifers. The Early to Late Aptian Sequence 2 (6 to 27 meters thick) is characterized by peritidal parasequences of skeletal mudstone-wackestone overlain by peloid-intraclast-skeletal packstone and grainstone, and barren mudstone or regional thin, microbial laminites and rare breccias updip. Locally, it contains an early highstand 10-meter-thick unit of thin-bedded, platy laminated limestone with petroliferous odor, the laminae being mm-to-cm alternations of lime mudstone and fine pellet packstone. This localized deeper lagoon facies marks a major transgression coeval with drowning of numerous Tethyan carbonate platforms (OAE-1a), and is followed by a pronounced Late Aptian regression marking a significant biological crisis in the peri-Adriatic region. The latest Aptian Sequence 3 (9 to 19 meters thick) consists of parasequences with subtidal to subaerial exposure facies. The overlying Aptian-Albian sequence boundary consists of 3 to 5 well developed breccias.

Carbon isotopes were obtained from carbonate mud matrix of the Aptian mudstone-wackestone. The resulting C-isotope curve (range from -1.59 to 4.03 ‰VPDB, with mean

values of 0.7 ‰) matches with Alpine Tethys trends. The initiation of OAE-1a, defined by a negative shift to -1.6‰VPDB followed by a positive excursion to 3.4‰VPDB, coincides with a long-term global sea-level rise; the sedimentary expression of deepening is evidenced by the locally limited deeper lagoon platy lime mudstone overlying subaerial exposure breccia.