

## Sequence Stratigraphy, Carbon Isotope Signature, and Dolomitization of a Late Jurassic Greenhouse Platform, Croatia

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Late Jurassic platform carbonates, Croatia contain a detailed paleoclimate, stable C-O isotope, and sea level record in the stratigraphy. The Kimmeridgian supersequence has 2 sequences bounded by emergence breccia, with the lower sequence containing 2 high frequency sequences. In the lower Kimmeridgian sequence, lump-skeletal wackestone and mudstone cap most parasequences. Elsewhere, parasequences are dominated by lump-oncoid wackestone-mudstone capped by lime mudstone and microbial laminite, and packstone-grainstones are rare. Microbial laminite caps parasequences in late highstands of Kimmeridgian sequences.

The Tithonian supersequence has 4 smaller scale sequences. The lower Tithonian is dominated by subtidal parasequences and the upper Tithonian by peritidal and oolitic parasequences. Parasequences of basal skeletal-oncoidal wackestone-mudstone or oolite, grade up into intraclast-peloid packstone grainstone capped by lime mudstone or microbial laminite. Clayey breccias occur at sequence boundaries in the platform interior. The abundance and character of the meter-scale parasequences and duration of the Tithonian suggests greenhouse low amplitude sea level changes within the precessional band.

Carbon and oxygen isotopes were obtained from carbonate mud matrix of the Lower Tithonian mudstone-wackestone (shallow lagoon). Isotope values (PDB) of dolomite are compatible with semi-arid tidal flat and reflux origin with  $\delta^{18}\text{O}$  dolomite values about 3 to 4‰ heavier than the marine calcite mudstone (0.5 to -2.0‰) and the  $\delta^{13}\text{C}$  carbon values of the dolomites are similar to the calcite precursors (0 to 3‰); low Mn (commonly below 20 ppm), and moderate strontium values (50 to over 200 ppm) suggest that their has been relatively little late diagenetic burial resetting of the dolomites.

In terms of chemostratigraphy, C and O values co-vary. Positive excursions in C isotopes (1 to 2 ‰) appear to occur toward parasequence set boundaries, and lightest values occur near floods. These light flooding values may relate to aging of interior platform waters when the whole platform was flooded, coupled with respiration, and carbonate precipitation. The heavy values may indicate the decreasing effects of interior platform waters, coupled with increasing biologic production and increased effects of evaporation as the platform shallowed under semi-arid climate. This raises the possibility that the platform C-O isotope stratigraphy may not be representative of the open ocean.