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TECTONIC CONTROLS OF HIGH-FREQUENCY SEDIMENTARY CYCLES IN THE UPPER TRIASSIC DACHSTEIN PLATFORM CARBONATES, NORTHERN CALCAREOUS ALPS

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High-frequency cycles are common features of Triassic platform carbonates from the Western Tethys basins. The 4^{th} and 5^{th}-order cycles have been particularly intensively studied in the Middle Triassic of the Dolomites and in the Upper Triassic of the Dachstein platform. The cycles display both shallowing and deepening upward trends and encompass carbonates formed from subtidal to supratidal environments (Fischer, 1964).

The high-frequency cycles are commonly ascribed to glacio-eustasic mechanisms controlled by astronomical Milankovitch cycles. Recent radiometric data challenged the direct link between the orbital forces and these cycles for the Middle Triassic of the Dolomites (Mundil et al., 2003). Moreover, there is no evidence of Triassic glaciations, hence an alternative genetic model of the cyclicity is needed.

According to field revision of the Upper Triassic Dachstein carbonates, they display common features indicative of synsedimentary tectonic and seismic mobility. Very common are synsedimentary faults, reaching in scale from a few millimeters to meters. Many of the features previously interpreted as karstic fissuring appeared to be tectonic cracks. The brittle faults affected completely lithified carbonates and are commonly accompanied by breccias (e.g., hydraulic breccia) and by flowage of the unconsolidated sediments. The quake motion involved development of cm-sized recumbent folds, flowage deformations and dewatering structures. Particular records of paleoseismic events are *in situ* -deformed stromatolites. The stromatolites show brecciation, cracking and intrastratal liquefaction, obliterating the original laminated fabrics.

Common syndepositionary deformations indicate that the topographic and bathymetric changes of the Triassic carbonate platforms could be controlled by tectonic block movements. Paleoposition of all of the discussed platforms within strike slip zones confirms this presumption.

Considering the cyclic facies succession in terms of syndepositional tectonics, one cycle would reflect the crustal downwarp influencing platform subsidence (deepening trend) that became abruptly arrested and succeeded by rapid uplift during the elastic rebound. Such a course of deformations plausibly explains the direct switch off between the subtidal and subaerial paleoenvironments observed, e.g., in the Lofer cycles. In the opposite case (i.e., under an upwarping regime) one would observe a shallowing upward trend replaced by sudden sinking.

The proposed model of "swinging block" tectonics may be adequately referred to the recent counterparts particularly well recognized in the Chilean and North American western coastal margin. The measured elevation changes in these seismic areas reach rates of several mm/year during strain buildup The crustal swelling lasts for several hundreds to some thousands of years. The coseismic vertical displacement during elastic rebound event may reach values between several centimeters to several meters and takes less than several minutes time and may play havoc against the stroked perilitoral zone.

The radiometrically estimated period of the cycle from the Triassic of the Dolomites is shorter than 3000 years (Mundil et al., 2003). The quake recurrence intervals measured in subrecent examples from plate-boundary belts range between several hundreds and 3000 years. The concordance between the Triassic high-frequency cycles and the recent subsidence-effective earthquakes strongly supports the assumed working model. Also, the remarkable asymmetry of these cycles is plausibly explained in terms of intermittent strain accumulation and release as already postulated by Cisne (1986).

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