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# Controls on high order cyclicity in Late Carnian evaporites in Israel

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The early Mesozoic world was warm, dry and unglaciated, but there is evidence that Milankovitch-order cycles exert control on the sedimentary pattern in the Middle and Late Triassic.
The Mohilla Formation at the Ramon outcrop of central Israel is of Tuvalian (upper Carnian) age, and contains a carbonate-evaporite-clastic section demonstrating rapid transitions between lithologies and facies at several scales. The high sensitivity of evaporitic sedimentation to changes in precipitation, humidity, and marine input suggests that cyclic behavior observed in the field at high resolution can be attributed to quantitative and qualitative changes in local environmental factors controlled by a cyclic mechanism. We interpreted cycles form field data both by classic analysis of changes in facies and by spectral analysis using FFT to determine wavelength of cycles in terms of thickness and hierarchy. By calculation of applicable rates of sedimentation per lithology, and introducing a decompaction term, the time frame for these phenomena was established, and the temporal resolution of several orders of cyclicity could be resolved.
Direct interpretation of relative sea level change derived from boundary criteria yielded 3 orders of cycles with average wavelength calculated at 23 Kyr, 85 Kyr and 245 Kyr. Spectral analysis of changes of all lithofacies components yielded 6 orders, with groups of wavelengths falling at 20 Kyr ($\pm$5), 30 Kyr ($\pm$3), 40 Kyr ($\pm$1), 60 Kyr ($\pm$4), 160 Kyr (one peak), and under 10 Kyr, that may be unresolvable noise. The 20 Kyr , 40 Kyr , 85 Kyr and probably the 160 Kyr and 245 Kyr cycles are consistent with Milankovitch cycle bands and their resonance. Orbital control on the sedimentary pattern would be indicated, and have been described in the Dolomites (Italy). Evaporitic systems of the Triassic have not been interpreted this way, but orbital control on precipitation would have a strong effect that could be tracked by stable isotopes; initial data suggests that this may be one mechanism that operated on our sections.
30 Kyr and 60 Kyr cycles stand out; the latter and the 85 Kyr band may be resonance. None are known to be governed by orbital control. If these bands prove significant, the possibility of a rhythmic tectonic response, either locally on the faults governing the basin, or remotely in the form of cyclic intervals of extension and relaxation connected to the opening Neo-Tethys, should be explore.