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Integrated stratigraphy and chronology of Messinian evaporites from the Levant basin in the deep eastern Mediterranean

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The elaborate and ongoing study of the Mediterranean Messinian evaporites (Messinian salinity crisis; MSC) is focused on marginal and intermediate sections from which material was previously available. This proximal data set is also coupled with offshore seismic data and a few wells which have penetrated the Messinian salt in its uppermost parts, for producing stratigraphic models and hypotheses related to the distal occurrence of the MSC. These offshore assumptions could only be tested by drilling in the deep Mediterranean Sea. In this work we investigate these fascinating deposits from previously inaccessible domains in the deepest realms of the Mediterranean, and correlate this data with the much more abundant and elaborate findings reported from the marginal and intermediate depositional environments.

Here we provide for the first time high resolution sedimentological, faunal and geochemical data from the massive Messinian evaporite section of the deep Eastern Mediterranean basin. We have analyzed an extensive set of well cuttings while correlating results to well logs and seismic data, and constructed a chronostratigraphic model based on biostratigraphy and astrochronology. We present a detailed account of the pre- and evaporitic Messinian as it occurred in the deep Levant basin, identifying paleo life in the form of diatoms, foraminifera and ostracods within different parts of the section.

We challenge some of the models previously presented that have attempted to explain the $\sim$1.5 km thick salt giant, in terms of timing, composition and oceanographic implications. Questions such as "did the Mediterranean experience dramatic sea-level drops and desiccation during the Messinian?" are re-assessed.