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Mercury anomaly as a proxy for volcanism in an isolated carbonate platform during the end-Triassic mass extinction

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Massive release of volcanic gases into the ocean-atmosphere system during geologically short periods of time is often invoked as the main trigger of episodes of global paleoenvironmental perturbations, and a link has been proposed between some mass extinction events, OAEs and the activity of Large Igneous Provinces. However, establishing a precise correlation between sections where the volcanic deposits of LIPs are preserved and marine sections, which hold the key records of global biotic and paleoenvironmental changes, is not a trivial effort. During the past 15 years, mercury concentration in sedimentary rocks has emerged as a useful proxy for bracketing intervals of LIPs activity, because Hg is primarily introduced into the atmosphere, and from there into the sedimentary record, through volcanic inputs.

The end-Triassic extinction (ETE), one of the big five mass extinction of the Phanerozoic, has been linked to the volcanic activity of the Central Atlantic Magmatic Province (CAMP). Correlation by radiochronologic dating of CAMP basalts has been further supported in recent years by detection of mercury anomalies in marine deposits of key sections recording the ETE, including the Kuhjoch GSSP in the Northern Calcareous Alps (Austria), St Audrie's Bay (UK) and the New York Canyon (Nevada, USA). However, as the Hg proxy is investigated in more and more sections, a complicated pattern is emerging, which indicates that depositional and diagenetic processes can produce Hg anomalies unrelated to LIP magmatism. For this reason, it is important to test the proxy across a wide range of depositional environments.

In this study, we present a high-resolution record of Hg concentration in an uppermost Triassic-Lower Jurassic carbonate platform section of the Pelagonian Domain (Greece). In this section the ETE is marked by the abrupt disappearance of megalodontid bivalves and involutinid benthic foraminifers. By integrating bio- and high-resolution carbon isotope stratigraphy, we correlate the studied section with reference sections for which a record of Hg concentration across the ETE has been published. Furthermore, we use facies analysis and geochemistry to unravel the role of local depositional and diagenetic processes in overprinting the global signal of volcanism on Hg concentration.