

Highly siderophile elements and Os isotope stratigraphy across the Norian/Rhaetian boundary in the Lagonegro Basin, southern Italy

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The Norian-Rhaetian transition (Late Triassic) is characterized by a faunal turnover in major pelagic groups, such as radiolarians, conodonts, and ammonoids [1]. Although catastrophic events such as emplacements of large igneous provinces and/or extraterrestrial impacts have been suggested to account for this biotic turnover, firm evidence based on geochemistry of sedimentary successions is still lacking. In order to assess environmental changes across the Norian/Rhaetian boundary (NRB), we examined high-resolution stratigraphic profile for whole-rock major, trace, and highly siderophile element (HSE: Os, Ir, Ru, Pt, Pd, and Re) concentrations and osmium isotope ratios (¹⁸⁷Os/¹⁸⁸Os) for the Sasso di Castalda section in Lagonegro Basin, southern Italy. The section consists of a continuously exposed sequence of upper Norian through the lower Rhaetian of deep basinal deposits. Our data demonstrated that the detrital components are mostly terrigenous origin and the compositions of provenance material are relatively constant through the studied section. However, we identified two important events in stratigraphically ascending order from the uppermost Norian: (1) an input of Rochechouart impact components detected by HSE anomaly [2], and (2) a transient change of redox state into reducing condition in the Lagonegro Basin marked by increases of V, U, and Re. The impact horizon displays significantly lower Cr/Ir compared with other samples in the study section, and is plotted close to the mixing line between the typical compositions of chondrites and terrigenous materials. Since the oxygen-depleted condition is recorded ~3 m above the HSE-enriched horizon, the identified sequence of events in our study suggests that the Rochechouart impact occurred before the decline of oxygen level and the biotic turnover at the NRB. Considering the small size of Rochechouart impactor and stratigraphic interval between the HSE-enriched horizon and the NRB, it is not clear if the impact played a causative role in triggering the environmental perturbations at the NRB. However, our study provides the first identification of Rochechouart impact horizon in marine strata, which could be an important geologic marker for further studies in other localities.

[1] Rigo et al. (2020), *Earth-Sci. Rev.* 204, 103180. [2] Sato et al. (2021), *Chem. Geol.* 586, 120506.