

Sedimentary PGE signatures of a chondritic impactor for an Upper Triassic impact event

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Platinum group element (PGE) anomalies and Os isotope negative excursion have been reported from four claystone layers in the Upper Triassic bedded chert succession of the Sakahogi, Unuma, Hisuikyo, and Enoura sections in southwest Japan, and are considered to have been derived from an extraterrestrial impact event [1] [2]. In order to determine the type and size of the impactor, the stratigraphic profile of PGE concentrations in these sections were examined.

The type of impactor has been identified by comparing the isotope and elemental ratios obtained from the ejecta layers with those of meteorites. The Ru/Ir and Pt/Ir ratios of all the claystone samples from the study sites are plotted along the mixing line between chondrites and upper continental crust. Although chondrites can be distinguished from iron meteorites by neither Ru/Ir nor Pt/Ir ratios, the Cr/Ir ratios of the claystone layers ranging from 10^4 to 10^5 indicate the large fraction of the chondritic materials. The size of the impactor can be estimated from the Os isotope ratios with reasonable assumptions of the range in the amount of Os released from the impactor into the seawater. Given that 22 to 100% release of chondrite-derived Os into the seawater, the impactor was calculated to be 3.3–7.8 km in diameter [2].

[1] Onoue *et al.* (2012) *PNAS* **109**, 19134–19139. [2] Sato *et al.* (2013) *Nat. Commun.* **4**, 2455.