

Secular variation in Os isotope composition of Early Cretaceous seawater: an indicator of a LIP-OAE link.

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The eruption of large igneous provinces (LIPs) has been hypothesized to perturb global environmental and to induce climatic change. Ontong Java Plateau (OJP), the largest LIP formed in the Early Cretaceous (120Ma) has been postulated to be linked to the global Oceanic Anoxic Event 1a (OAE1a), although it is not clear to what extent the plateau eruption caused them. We report the first Os isotopic record across OAE1a sequence from Gubbio, central Italy. Secular change of Os isotopic composition is controlled by a balance between a mantle component with a low $^{187}\text{Os}/^{188}\text{Os}$ and continental material with a high $^{187}\text{Os}/^{188}\text{Os}$. We observed a large negative excursion in marine $^{187}\text{Os}/^{188}\text{Os}$ record (down to ca. 0.2) at the start of global deposition of organic-rich OAE1a sediments. As the large Os flux from mantle leads to the low Os isotopic composition of seawater, negative excursion of the marine Os isotopic composition is possibly caused by OJP eruption. It continued throughout the OAE1a event, suggesting that it could have eventually induced oceanic stratification. The major phase of OJP emplacement took as short as ca. 300 kyr and the global flux of volcanic lava reached an order of magnitude higher than that prior to the event.