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Mid- Late Miocene marine Os isotopic fluctuation and burial fluxes of Re, Os and Ir into deep-sea deposits

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Temporal variations in $^{187}Os/^{188}Os$ and burial fluxes of Re, Os and Ir into deep-sea deposits were studied using late to middle Miocene nannofossil ooze from IODP Exp. 321 (PEAT II; Pacific Equatorial Age Transect II) from the time interval investigated ranges from 14 Ma to 11 Ma with sampling resolution of about 40 kyr.

Marine Os isotopic ratio ($^{187}Os/^{188}Os$ ratio) increases monotonically from 14 Ma to 11.8 Ma, reaches a local maximum at 11.8 Ma, and decreases continuously to 11 Ma. This broad peak around 11.8 Ma was not apparent in previous low-resolution data (Reusch et al., 1998). The causes of change of Os isotopic trend at 11.8 Ma are still uncertain. Based on the similarity of trends between oxygen-carbon isotopes from benthic foraminifera (Zachos et al., 2001) and marine Os isotopes (Fig.), some relationship with global climatic changes is expected.

Burial fluxes of Re, Os and Ir range 0.04 - 36 ng/cm^2/kyr, 60 - 330 pg/cm^2/kyr and 18 - 28 pg/cm^2/kyr, respectively. Burial fluxes of Os and Ir are within the range of the published data from Quaternary pelagic calcareous oozes (Burton et al., 2010: Cave et al., 2003: Dalai and Ravizza, 2006, 2010: Kyte et al., 1993). On the other hand, studied values of Re burial fluxes are out of the range of Quaternary pelagic calcareous oozes (Burton et al., 2010). Especially, Re burial fluxes at the two horizons of 12.1 Ma and 11 Ma are over 15 pg/cm^2/kyr. Re is sensitive tracer for moderately reducing conditions when oxygen is present in bottom waters but rapidly consumed from interstitial waters (Morford et al., 2005). It was suggested that accumulation flux of organic carbon increased suddenly at 12.1 Ma and 11 Ma around the eastern Equatorial Pacific.

Keywords: Os, Miocene, Paleoceanography, IODP, PEAT