

The evolution of the Asian and American Monsoon recorded in ferromanganese crusts

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Ferromanganese crusts are slow-growing laminated and hydrogenetic mineral species which enables them to record changes in the paleo-ocean environment on the tectonic scale. K, Si and Al are generally recognized as the elements monitoring continental denudation and they can participate actively to the pelagic sedimentation via wind or current conveyor. As to Western and Central Pacific Ocean, the input of continental denudation is influenced by the movement of the plate versus planetary wind system as well as the evolution of paleo-monsoon. Based on the result of Os stable isotopic chronology from the crust samples of the Magellan and Line Seamounts, the mass percentage profiles of the elements above-mentioned have been made and comparative studied with monsoon evolution pattern. The results shows that the profiles coincide with the American Monsoon prior to the late Eocene while match well with the Asian Monsoon since the early Oligocene. The very relationships between the profiles and the monsoon evolution pattern could to some extent explain the anomaly of the Os isotopic composition ratio of the samples from Line Seamounts which relatively higher than the seawater standard curve before 33Ma. Under the tectonic setting of plate movement, as the Line Seamounts migrating north-west, leaving the influence scope of the south(north)east trade wind and entering prevailing westerlies subsequently, the denudation origin has been changing. The study gives evidence to the theory that continental denudation can be one of the important sources of terrestrial material in crusts. At the same time, ferromanganese crusts can be the suitable recorder of its evolution.