Coral REE characters as an indictor of sea level rise in the Xigong waters, Hong Kong

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High resolution records of the rare earth elements (REE) from 1991 to 2002 in the *Porites* coral, from the Xigong waters（22°20′ N，114°16′ E）, Hong Kong, located at the west coast of Pearl River Estuary, have been determined using inductively coupled plasma mass spectrometry. The distribution pattern of REE in the coral is similar to that in the seawater with the characters of Ce negative anomaly and heavy REE enrichment on the basis of normalization by use of a shale in Post-Achaean average Australian sedimentary rock（PAAS）. The REE contents in the coral from Hong Kong are much higher than that from the other areas, except the corals from Misima Island, Papua New Guinea, where the REE contents are affected by an open-cut gold mining. However, the high REE contents in the Hong Kong coral are a direct response to high REE contents in the Pearl River and nearby surface sedimentary deposit, rather than to anthropogenic impacts.

Moreover, the decreasing trend of annual REE contents in the Hong Kong coral is very apparent, with severer Ce negative anomaly and heavy REE enrichment, from 1991~2002. The REE contents in the coral are significantly negatively correlated with sea level values （R=-0.7~-0.9）, and the heavy REE linear correlation coefficients are much higher than the light REE ones. These results are associated with sea level rising, caused by globe warming, polar ice melting and more important by decadal warming of upper seawater of the South China Sea in 1990s. The rising speed of sea level in Hong Kong is as high as 13.5 mm/a, which is almost six times of the globe average. When the sea level is quickly rising, the terrestrial REE influence to the Hong Kong coral is being reduced.