

Clumped Isotope Thermometry on Modern Pearl Oyster of Paradeep Sea beach, Odisha, India

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Modern Pearl oyster shell has been collected from Paradeep sea beach, east coast of India, for stable isotopic and clumped isotopic analysis. This species is native to shallow marine water and thrives in the coastal region of the Bay of Bengal. This Oyster shell contains two mature pearls and four immature pearls. Stable and Clumped isotopic studies have been done for both oyster shell and pearls. $\delta^{13}\text{C}$ value of Oyster shells ranges from $-1.74 \pm 0.03\text{‰}$ (VPDB) to $0.102 \pm 0.02\text{‰}$ (VPDB) reflecting food source and seawater dissolved inorganic carbon. $\delta^{18}\text{O}$ of biogenic shell carbonate ranges from $-3.25 \pm 0.016\text{‰}$ (VPDB) to $-1.796 \pm 0.015\text{‰}$ (VPDB). $\delta^{13}\text{C}$ value of pearl ranges from $-0.38 \pm 0.017\text{‰}$ (VPDB) to $0.37 \pm 0.014\text{‰}$ (VPDB), and $\delta^{18}\text{O}$ of the same ranges from $-3.21 \pm 0.02\text{‰}$ (VPDB) to $-0.44 \pm 0.03\text{‰}$ (VPDB), where both are isotopically enriched compared to oyster shell carbonate. The clumped isotopic temperature has been measured in different growth bands of the Oyster shell from the ventral side toward umbo. The Clumped temperature of shell carbonate ranges from 11°C to 39°C with an average of 28°C , similar to the instrumental annual average sea surface temperature of the head Bay of Bengal [1]. Two mature pearls are showing high clumped temperatures around 52°C , and the growth bands containing these pearls are showing very low temperatures. But the immature pearl is showing temperature similar to instrumental data. Sea water oxygen isotopic composition has been calculated using Clumped temperature and oxygen isotopic composition of the shell as well as pearls.

References:

1. *Variations of Indian Monsoon Precipitation During the last 32 kyr Reflected in the Surface Hydrography of the Western Bay of Bengal, P. Govil et al., 2011.*