

Seasonal growth bands in Oyster shell recording signature of river discharge at the confluence of river Ganges

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The aim of this work is to unfold the discharge of river Ganges comparing seasonal isotopic record preserved in the incremental growth of oyster shell from modern sediments as well as retrieved from the well dated sedimentary record. Present day Oyster shell sample was collected from Ganga Sagar Island while overbank sedimentary piles at Hendry Island yielded fossilized Oyster shell for this investigation. Fossilized Oyster was dated 2765 ± 130 year BP using conventional Beta counting technique at PRL, Ahmedabad. Carbonate powder derived from close spaced (1mm) sampling of growth bands using microdrill was analysed for $\delta^{13}\text{C}$ and $\delta^{18}\text{O}$. The oxygen isotopic compositions at the confluence of river Ganges (Kakdweep) have a large range, from -8.6‰ during wet season to -3.4‰ during the dry season [1]. Clumped temperature estimated for the modern shell showed a larger range (45° - 18°C) while palaeo samples yielded smaller temperature range (22° - 36°C) (Using Ghosh et al. 2006 eq. [2]). The calcite precipitated at equilibrium with host water at the temperature range suggests that shell grew in a water with $\delta^{18}\text{O}$ composition ranging between -4.8‰ to 1.2‰ for modern sample, while $\delta^{18}\text{O}$ in growth bands of paleo Oyster ranges between -2.37‰ and 0.82‰ .

The inference drawn based on our study suggests process of sea water incursion in the region during past, while river discharge is prominently registered in the shell of present day. The study can be extended in understanding the variability of river discharge at seasonal time scale for the past.

[1] P. Ghosh et al. (2013) *Chemical Geology* **335**; [2] Ghosh et al., (2006) *GCA*, **70**