Carbonate ion effects on elemental ratios in benthic foraminifera Hoeglundina elegans: application to intermediate water circulation in the north Indian Ocean during the last deglaciation

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The Indian Ocean is an important region to understand the mechanisms ruling the global ocean circulation, and atmosphere-ocean relationships, especially through the intermediate water masses. Seawater carbonate ion concentration ($[CO_3^{2-}]$) and benthic $\delta^{13}C$ can be used to reconstruct intermediate-deep water masses circulation in the past and help to better constrain ocean -atmosphere exchanges during the two-stage increase in the atmospheric CO_2 during the last deglaciation.

Stable isotopes ($\delta^{18}O$ and $\delta^{13}C$) of *Cibicidoides wuellerstorfi*, *C. pachyderma and Uvigerina peregrina* and elemental ratios (Mg/Ca, Sr/Ca, Li/Ca and U/Ca) of *Hoeglundina elegans* have been analyzed on cores MD77-191 (07°30'N-76°43'E, 1254m) and MD77-176 (14°30'5N-93°07'6E, 1375m) the from the south tip of India and the northern Bay of Bengal, respectively, to better contrain the evolution of intermediate circulation in the northern Indian Ocean since the last deglaciation.

From the *H. elegans* elemental ratios, we reconstructed past changes in the $[CO_3^{2-}]$. Our results show that intermediate water $[CO_3^{2-}]$ is mainly affected by the global ocean alkalinity changes which could be linked to the modulating atmospheric CO_2 on glacial-interglacial time scales. Higher $\delta^{13}C$ and depleted $[CO_3^{2-}]$ and B-P age ^{14}C offsets at intermediate water depth suggest a release of deep-sea CO_2 to the atmosphere through the Antarctic Intermediate Water (AAIW) in the Southern Ocean during the 17-15.2 and 12.6-10.5 cal kyr BP time intervals. During the late Holocene, a decrease in the $[CO_3^{2-}]$ may indicate the contribution to atmospheric CO_2 rise since 8 cal kyr BP, as reduced CO_2 solubility is due to the depleted global ocean alkalinity in the seawater.