Last 32 000 Years Record of Indian Monsoon Variability Reconstructed from Paired Measurements of Foraminiferal $\delta^{18}O$ and Mg/Ca ratios

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The effect of seasonally reversing monsoons in the northern Indian Ocean is to impart significant change in surface salinity. Here, we report on the sea surface-salinity (SS) and –temperature (SST) changes occurred during the last 32 kyr off the southwest coast of India from paired measurements of $\delta^{18}O$ and Mg/Ca in *Globigerinoides sacculifer*, an upper mixed layer dwelling foraminifera. The $\delta^{18}O_{G.sacculifer}$ shift between the Holocene and the last glacial maximum (LGM) is 1.93 ‰. The heaviest $\delta^{18}O_{G.sacculifer}$ (-0.07±0.08‰) are recorded between 23 – 15 cal ky BP, which could be defined as LGM. The SST shows an overall warming of 2 °C from the LGM to Holocene (28 °C to 30 °C). However, the coldest SSTs are observed prior to the LGM (28 °C at ~ 27 ky BP). The surface salinity was higher (~ 38 psu) throughout the most of the last glacial period (32.5 – 15 ky BP) together with generally lower than Holocene SSTs suggest a period of sustained weaker summer or stronger winter monsoons. The deglacial warming of SSTs associated with rapid reorganization of monsoons are reflected in decreased salinities, to a modern level of ~ 36.5 psu within a period of ~ 5 kyr. This change suggests that summer monsoons intensified during the cold to warm climate transition.

Key words: Paleoclimate, Arabian Sea, Oxygen isotopes, Mg/Ca Thermometry, Monsoon variability.