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A 30 kyr record of surface water pH, pCO2 and nutrients in the Northern Arabian Sea

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Boron isotope compositions have been measured in 30 samples of G. sacculifer from NIOP core 464 taken from the Northern Arabian Sea. The samples range in age from 8 to 30 ka and provide a record of surface water pH in the area over this period. The data can be coupled with temperature and DIC to derive the history of surface water pCO2 over this interval. This record shows that the Northern Arabian Sea has been a source of CO2 to the atmosphere throughout this period as a result of upwelling driven by the summer monsoon. However, in accord with previous studies, it is apparent that the strength of the summer monsoon was lower during the LGM. Our data suggest that the average pCO2 difference between surface water and the atmosphere was 30% lower during the LGM relative to the Holocene. In addition, we have measured the carbon isotope composition of alkenones from this core. When these data are coupled with the boron isotope measurements they provide a record of nutrient levels. This comparison suggests that surface water concentrations were substantially lower during the LGM.