Changes in Primary Productivity and Oxygen Minimum Zone (OMZ) in the Northwestern Arabian Sea During Late Quaternary

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In the present study micropaleontologic and some sedimentary data at ODP Site 728A near the Oman Margin (northwestern Arabian Sea) were examined to understand the paleoceanographic changes in this region during last ~540 kyrs. The increased relative abundances of high fertility taxa i.e. *Globigerinita glutinata* and *Globigerina bulloides* mainly during interglacial intervals indicate open-ocean upwelling. Intense interglacial SW summer monsoon probably increased the upwelling in the western Arabian Sea and caused high surface productivities due to the lateral transport of eutrophic waters. Most of the glacial periods (i.e. MIS 2, 4, 6, 8 and 12) are characterized by higher relative abundances of *Neogloboquadrina pachyderma* and *Neogloboquadrina dutertrei* associated with *Globigerinoides ruber*. The more stratified condition and deep mixed layer due to increased NE winter monsoon are mainly responsible for the higher relative abundances of *N. pachyderma* during glacial periods. Many glacial intervals are also characterized by pteropod spikes reflecting deepening of aragonite compensation depth (ACD) and relatively less intense oxygen minimum zone (OMZ) in this region due to deep sea mixing and thermocline ventilation, and the relatively less intense surface productivity during winter monsoon. The interglacial periods are largely devoid of or marked with very low pteropod abundances indicating more aragonite dissolution due to increased intensity of OMZ in the northwestern Arabian Sea.

In general, the interglacial periods are characterized by low sediment accumulation rates than the glacial intervals. The total biogenic carbonate percentages were, on average, higher during interglacial and during periods of higher surface productivity. Most terrigenous material is trapped on the shelf during intervals of high sea-level stands of interglacial, whereas during glacial periods this zone is eroded and sedimentation rates are higher in the upper slope basins. In addition, the fragmentation record may be the result of changes in intensity, and vertical distribution of the OMZ with time. During glacial intervals the lower boundary of the OMZ probably was in a shallower position than during interglacial periods, when dissolution increased as a result of higher organic production. The higher rates of sinking organic matter result into a stronger OMZ as oxygen is used to disintegrate the organic matter. This process lowers the p^H of water which results into increased dissolution of calcium carbonate.