



Carbon fluxes in the Arabian Sea: Export versus recycling

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The organic carbon pump strongly influences the exchange of carbon between the ocean and the atmosphere. It is known that it responds to global change but the magnitude and the direction of change are still unpredictable. Sediment trap experiments carried out at various sites in the Arabian Sea between 1986 and 1998 have shown differences in the functioning of the organic carbon pump (OCP). An OCP driven by eukaryotic phytoplankton operated in the upwelling region off Oman and during the spring bloom in the northern Arabian Sea. Cyanobacteria capable of fixing nitrogen seem to dominate the phytoplankton community during all other seasons. The export driven by cyanobacteria was much lower than the export driven by eukaryotic phytoplankton. Productivity and nutrient availability seems to be a main factor controlling fluxes during blooms of eukaryotic phytoplankton. The ballast effect caused by inputs of dust into the ocean and its incorporation into sinking particles seems to be the main factor controlling the export during times when cyanobacteria dominate the phytoplankton community. C/N ratios of organic matter exported from blooms dominated by nitrogen fixing cyanobacteria are enhanced and, furthermore, indicate a more efficient recycling of nutrients at shallower water depth. This implies that the bacterial-driven OCP operates more in a recycling mode that keeps nutrients closer to the euphotic zone whereas the OCP driven by eukaryotic phytoplankton reduces the recycling of nutrients by exporting them into greater water-depth.