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Particle fluxes in the coastal upwelling zone off north-west Africa

G. Karakas (1), P. Marchesiello (2), N. Nowald (3) and R. Schlitzer (1)

(1) Alfred-Wegener-Institute for Polar and Marine Research (AWI), Bremerhaven, (2) Institut de Recherche pour le Developpement (IRD), Brest, (3) Center for Marine Environmental Sciences (MARUM), Bremen (Contact Email: gkarakas@awi-bremerhaven.de)

Particle flux is a significant driving force for the removal and storage of atmospheric carbon dioxide in the deep ocean, in particular across the upwelling regions, where increased rates of primary production take place. The NW African coast is one of the important high productivity regions of the world ocean with a complex dynamics, which is associated with sub-mesoscale flow features and filaments at various scales. Particles of lithogenic and biogenic origin enter the system by several processes like atmospheric deposition, primary production or shelf suspension and erosion. The lateral and vertical distribution of particles are eventually set through the interplay of their settling behaviour and the flow dynamics. Recently conducted optical measurements of particle profiles in the region by deep-sea camera system provide new insights into the distribution of particles in the water column. By setting up a high resolution terrain following regional ocean model, we numerically investigate the patterns of particle fluxes under climatological forcing with idealistic scenarios, in which various settling velocities are considered. It appears that the sub-surface maxima of particle concentrations observed in camera profiles might result from the filament activity in the region that transports suspended slow settling particles from the shelf into the open ocean.