Geophysical Research Abstracts, Vol. 8, 08292, 2006
SRef-ID: 1607-7962/gra/EGU06-A-08292

Relative contributions of primary production and local resuspension to suspended particle populations in the Western Irish Sea.

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Using an in situ laser diffraction analyser, hourly profiles of size-fractionated suspended particle volume concentration have been obtained over 50 hours at a seasonally stratified site during May in the Irish Sea. In the surface mixed layer (SML) the particle population is predominantly less than 12 microns. This fraction reduces to a pronounced minimum just above the base of the thermocline, before increasing again in the bottom mixed layer (BML). The fraction is consistently higher in the near surface layer than in the BML, and correlates with chlorophyll_a concentration obtained using a fluorometer. Within the fine particle minimum there is an increase in particles coarser than 65 microns, indicating that particles are aggregating at the base of the SML. In the bottom mixed layer particles between 30 and 250 microns increase towards the bed, and there is evidence of tidal resuspension and aggregation/disaggregation of this material. The variation of these different fractions results in an increase in mean particle diameter down to a maximum at the base of the thermocline, then a slight and time varying increase towards the bed. Over the study period meteorological conditions resulted in a cooling and weakening of the surface mixed layer, and during this time the fine particle minimum was removed and there was some entrainment of chlorophyll into the bottom mixed layer. The high vertical resolution of this data set allows discrimination and quantification of sources of suspended particulate matter from surface layer primary production and local resuspension, and estimation of volume concentrations and vertical fluxes of particles.