

Particle Mass In Deep-Water Benthic Nepheloid Layers: A Global Synthesis

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Abstract

The mass of particles in benthic nepheloid layers in the deep ocean is mapped using profiles of beam attenuation coefficient obtained with transmissometers interfaced with CTDs during WOCE, SAVE, JGOFS, CLIVAR-Repeat Hydrography, and other programs during the last four decades using data from over 8000 profiles from >70 cruises. We map the maximum concentration of particle mass near the seafloor and integrate the particle mass throughout the benthic nepheloid layer. In the Atlantic Ocean particle mass is greater in areas where eddy kinetic energy is high in overlying waters. Areas of high bottom particle concentrations and integrated benthic nepheloid layer particle loads include the western North Atlantic beneath the Gulf Stream meanders and eddies, Argentine Basin, parts of the Southern Ocean and areas around South Africa. Particle concentrations are low in most of the Pacific and tropical and subtropical Atlantic away from margins. This synthesis is useful for GEOTRACES and other global programs where knowing particle distribution is critical for understanding trace metal absorption, sediment-water exchange and near-bottom processes. Additionally, our synthesis provides baseline data to identify where mining of metal-rich nodules and metal sulfides on the seafloor may impact the benthic environment.