EDDIES sediment trap methods

From Buesseler, K.O., C. Lamborg, P. Cai, R. Escoube, R. Johnson, S. Pike, P. Masque, D. McGillicuddy and E. Verdeny (2008). Particle fluxes associated with mesoscale eddies in the Sargasso Sea. Deep-Sea Research II, 55: 1426-1444.

Sediment trap and filtered particle samples

VERTEX style sediment traps (Knauer et al. 1979; Martin et al. 1987) were deployed during EDDIES to directly capture sinking particles for flux analyses (trap trajectories plotted as solid line on Figure 1 maps). For each of these floating arrays, multiple collection tubes (area = 0.0039 m^2) were used to collect passively sinking material over a deployment period of 3-6 days. At the end of each trap deployment, samples were processed according to standard BATS protocols. This involves carefully pouring off waters overlying the formalin poisoned brine found at the bottom of each collection tube, and manual removal in the lab using a microscope of zooplankton “swimmers” which are thought to enter the trap actively and die in the poison, vs. as associated with sinking debris. Each sampling tube is treated as a separate sample (n=1-4 tubes per elemental analysis) and analyzed individually for CHN or mass at BATS, or for ^{234}Th at WHOI. It has been previously shown that for ^{234}Th, unlike POC and mass, the swimmer flux is insignificant, and thus we did not remove swimmers in the samples analyzed for ^{234}Th (Buesseler et al. 1994; Coale 1990). Sample processing as well as analytical methods for POC, PIN and bSi have been reported in earlier studies (Buesseler et al. 2005).

Buesseler, K., A. F. Michaels, D. A. Siegel, and A. H. Knap. 1994. A three dimensional time-dependent approach to calibrating sediment trap fluxes. Global Biogeochemical Cycles **8:** 179-193.

Buesseler, K. O. and others 2005. Particle export during the Southern Ocean Iron Experiment (SOFeX). Limnology and Oceanography **50:** 311-327.

Coale, K. H. 1990. Labyrinth of doom: A device to minimize the "swimmer" component in sediment trap collections. Limnology and Oceanography **35(6):** 1376-1381.

Knauer, G. A., J. H. Martin, and K. W. Bruland. 1979. Fluxes of particulate carbon, nitrogen, and phosphorous in the upper water column of the northeast Pacific. Deep-Sea Research A **26:** 97-108.

Martin, J. H., G. A. Knauer, D. M. Karl, and W. W. Broenkow. 1987. VERTEX: carbon cycling in the northeast Pacific. Deep-Sea Research A **34:** 267-285.