

Zooplankton community structure and biomass in the mesopelagic and deeper layers (F)

Conveners: Gabriel Gorsky (France) and Eilif Gaard (Faroe Islands)

The deep ocean extends from the edge of the continental shelf to the depths of the deepest trenches, covering approximately two-thirds of the earth's surface. Only a small percentage of this huge portion of the globe has ever been observed or sampled. Some of the critical ecological questions concern the biodiversity, structure, and function of the communities of organisms inhabiting this "inner realm". The scarce results show that the upper bathypelagic zone is intimately linked with the twilight zone (200–1000 m). Both are influenced by seasonally changing abiotic parameters, high variability in flux, and vertically migrating zooplankton. Net tows which integrate zooplankton over wide depth intervals in the mesopelagic have indicated that mesozooplankton abundance is usually several orders of magnitude less than in the epipelagic. Particle concentration (i.e. potential food for mesozooplankton) usually displays the same trend, but particles are often aggregated at density discontinuities. Bioenergetic models suggest that mesozooplankton must feed in these layers of enhanced particle concentration if they are to meet their daily metabolic requirements, grow and reproduce. Acoustic and imaging data on zooplankton suggest that layers of zooplankton also exist in the mesopelagic. These and the preliminary data on subduction of surface-produced matter in the dynamic frontal zones may be considered as "hot spots/layers" of the food particles. These particles and zooplankton may be tightly coupled in both temporal and spatial scales. As a consequence, these hot spots generate spatial heterogeneity of zooplankton and may be important sites of midwater processes that influence the sinking flux of organic material and the aphotic food chain in the ocean. Future studies should focus on zooplankton community structure and processes in the mesopelagic. A variety of new sampling techniques should be employed both to document the distribution of zooplankton on the important time and space scales in the mesopelagic and to create "smart samplers" which detect zooplankton hot spots and collect them for identification and the assessment of the ecosystem's stability and resilience in the ocean's interior.

Contributions assessing the current knowledge on the zooplankton community structure and biomass, on the relation between hydrology and distribution, and on methods of sampling and observation below the euphotic zone are solicited.

Gabriel Gorsky, Observatoire Océanologique, LOV - UMR 7093, BP 28, FR-06234 Villefranche-sur-Mer Cedex, France, e-mail: gorsky@obs-vlfr.fr

Eilif Gaard, Faroese Fisheries Laboratory, Nóatún, P.O. Box 3051, FO-110 Tórshavn, Faroe Islands, e-mail: eilifg@frs.fo