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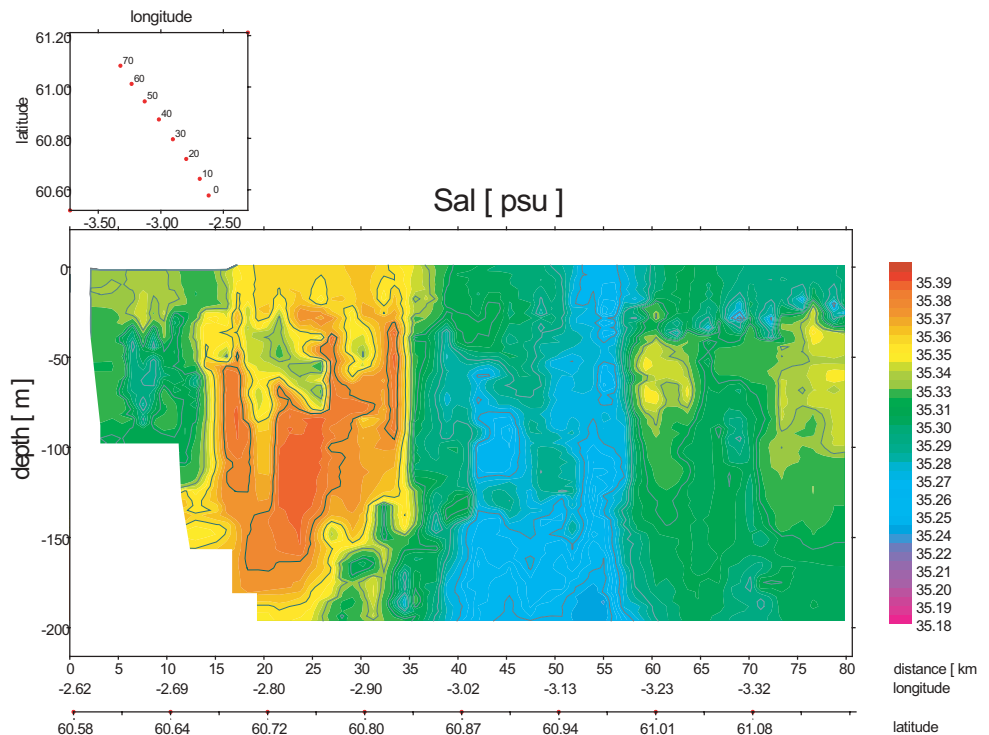
The department of Biological Oceanography contributed to PROCS with the research cruise "BIOPROCS-99", which was held from 21 June to 9 July 1999. The investigations concentrated on the microbial food web processes in the different watermasses of the FSC with special emphasis on the different horizontal and vertical transition zones (ecotones) between the watermasses where, due to for instance increased turbulence, aggregation of particulate matter or, horizontal or vertical mixing of dissolved nutrients and particulate matter, fluxes in the microbial food web can be widely out of range. Such local – and basically frontal – phenomena can be of great importance for the productivity of a sea area.

BIOPROCS-99 focused on observations along three transects crossing the FSC at right angles and running from the West-Shetland Shelf to the deepest stations in the centre of the Channel. Of basic importance were the Scanfish-surveys of the upper 250 m water layer carried out previous to the sampling. The detailed temperature and salinity distributions provided by the Scanfish sensors indicated three main surface water masses, being the NAW (the warm current flowing to the North in the eastern part of the FSC along and partly over the west Shetland Shelf; the MNAW (flowing in the western part of the FSC), and a narrow watermass between the two, representing an 'Ecotone'

Of the surface water masses entering the FSC from the South, especially the NAW appeared to be rich in phytoplankton whereas nutrient concentrations and primary production were only moderate. Apparently, there had been a plankton bloom in the NAW on its way along the Scottish shelf before it entered the FSC. Quite different were the higher nutrient concentrations, lower plant biomass and, higher primary production and obviously a beginning phytoplankton bloom in the MNAW. A study of grazing rates in the microbial food web showed, that only grazers of bacteria and picophytoplankton could keep their prey populations more or less under control; for larger grazers of larger prey the changes were obviously too fast (or, the residence time in the FSC too short) to establish grazing control, which means that plankton blooms could easily occur in the FSC.

Whereas the concentrations of total organic carbon (TOC) and dissolved organic nitrogen (DON) did not differ between transects, the dissolved organic phosphorus (DOP) concentrations appeared to be ~30% higher in the northern transect. These higher DOP concentrations in the surface waters of the northern part of the FSC reflect the higher contribution of MNAW, of which the total dissolved phosphorus (TDP) load increases during its flow along the western and northern coast of the Faeroe Islands.

CTD-casts at 7 stations per transect gave information on the different deeper waterlayers and their horizontal ecotones. A sharp thermocline marked the depth where, below the surface



Scanfish track contour plot of salinity in the upper 200 m of the water column from the Shetland Shelf (left) towards the centre of the FSC (right). Note the strong front above the shelf edge.

water, the cold overflow water from the Norwegian Sea moves through the FSC to the South. In turn, this Norwegian Sea water flows over the cold, more stagnant and aged water mass, which fills the lengthy narrow basin of the FSC below ca 600 m depth. The TOC- and DOP-concentrations showed a steep decrease with depth, which indicates a preferential utilization of these organic compounds by the bacterioplankton. The DON-concentrations showed no such pattern and had a high scatter over the whole water column. The absence of the commonly reported decline of DON with depth can be attributed to the higher concentrations in the intermediate water masses which transport N- rich dissolved organic matter (DOM) from the Arctic Ocean into the mesopelagic region of the FSC. Especially the deep FSC water is – from a wider oceanographic perspective - interesting for the microbial ecologists.

Depth distribution of total organic carbon (TOC), dissolved organic nitrogen (DON) and phosphorus (DOP) concentrations in  $\mu\text{M}$  at the oceanic stations (a, b, c). The different symbols indicate the samples from southern transect (transect 1, full circles), middle transect (transect 2, open circles), and northern transect (transect 3, gray circles).

