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Gliders in the Fram Strait Observatory

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Variability of oceanic advective fluxes through Fram Strait, one of the main gateways to the Arctic Ocean, has been monitored since 1997 by the array of 16 moorings and summer hydrographic sections. The main focus is on the inflow of warm Atlantic waters from the Nordic Seas, the only source of heat for the Arctic Ocean, and on the freshwater outflow to the North Atlantic. However, spatial resolution of the moored array, which varies from 10 to 30 km, is not sufficient to resolve the mesoscale variability of the complex, topographically flow through the strait. In the recently established multidisciplinary Fram Strait Observatory a combination of oceanographic observations by moorings and gliders with acoustic tomography measurements and the eddy-resolving numerical model will provide a new tool to assess the contribution of mesoscale dynamics to the variability of oceanic fluxes through Fram Strait.

Since 2007, in the framework of the EU DAMOCLES and ACOBAR projects, the long-term moored observations in Fram Strait have been complemented with repeated glider sections. During eight summer and autumn missions the oceanographic data with high spatial resolution were collected down to 1000 m by Seagliders profiling along the moored array. Here we report on the results from five years of gliders measurements and a comparison of glider data to observations from moorings and ship-borne CTD sections. The special attention is paid to measurements in the West Spitsbergen Current, where gliders have to operate in the strong current regime (occasional events up to 1 m/s). Spatially averaged glider data were also applied in the finite element inverse model FEMSECT and preliminary results are presented.

Future plans envisage a substitution of the upper part of moored array with repeated glider sections to achieve year-round glider operations in the partially sea-ice covered region. Since 2010 the array of RAFOS sources and tomographic sources providing RAFOS signal with frequency of 260 Hz has been deployed in the Fram Strait Observatory to test ranges of acoustic receptions by Seaglider equipped with the RAFOS hardware. Taking advantage of the ice-capable glider technology developed and provided by APL-UW, we aim for employing the acoustically navigated Seaglider to extend the glider observations into the permanently sea-ice covered western Fram Strait and to permit winter missions in its eastern part.