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The Fram Strait integrated ocean observatory

E. Fahrbach (1), A. Beszczynska-Möller (1), S. Rettig (1), G. Rohardt (1), H. Sagen (2), S. Sandven (2), and E. Hansen (3)

(1) Alfred-Wegener-Institut für Polar- und Meeresforschung, Bremerhaven, Germany, (2) Nansen Environmental and Remote Sensing Center, Bergen, Norway, (3) Norwegian Polar Institute, Tromsø, Norway

A long-term oceanographic moored array has been operated since 1997 to measure the ocean water column properties and oceanic advective fluxes through Fram Strait. While the mooring line along 78°50'N is devoted to monitoring variability of the physical environment, the AWI Hausgarten observatory, located north of it, focuses on ecosystem properties and benthic biology. Under the EU DAMOCLES and ACOBAR projects, the oceanographic observatory has been extended towards the innovative integrated observing system, combining the deep ocean moorings, multipurpose acoustic system and a network of gliders. The main aim of this system is long-term environmental monitoring in Fram Strait, combining satellite data, acoustic tomography, oceanographic measurements at moorings and glider sections with high-resolution ice-ocean circulation models through data assimilation.

In future perspective, a cable connection between the Hausgarten observatory and a land base on Svalbard is planned as the implementation of the ESONET Arctic node. To take advantage of the planned cabled node, different technologies for the underwater data transmission were reviewed and partially tested under the ESONET DM AOEM. The main focus was to design and evaluate available technical solutions for collecting data from different components of the Fram Strait ocean observing system, and an integration of available data streams for the optimal delivery to the future cabled node. The main components of the Fram Strait integrated observing system will be presented and the current status of available technologies for underwater data transfer will be reviewed.

On the long term, an initiative of Helmholtz observatories foresees the interdisciplinary Earth-Observing-System FRAM which combines observatories such as the long term deep-sea ecological observatory HAUSGARTEN, the oceanographic Fram Strait integrated observing system and the Svalbard coastal stations maintained by the Norwegian ARCTOS network. A vision of this modular underwater observatory network in Fram Strait will be presented.