Long- and short-term variability of currents and hydrography in Fram Strait

Wilken-Jon von Appen (1), Agnieszka Beszczynska-Möller (2), Eberhard Fahrbach (1), Ursula Schauer (1), and Edmond Hansen (3)

(1) Observational Oceanography, Alfred Wegener Institute, Helmholtz Centre for Polar and Marine Research, Am Handelshafen 12, 27570 Bremerhaven, Germany (Wilken-Jon.von.Appen@awi.de), (2) Institute of Oceanology PAS, Physical Oceanography Dept., Powst. Warszawy, 55 81-712 Sopot, Poland, (3) Norwegian Polar Institute, Fram Centre, Hjalmar Johansens gt. 14, NO-9296 Tromsø, Norway

The Fram Strait between Greenland and Svalbard is the only deep ocean connection between the Nordic Seas and the Arctic Ocean. The West Spitsbergen Current in the eastern Fram Strait accounts for a major part of the oceanic heat input to the Arctic while the East Greenland Current in the western Fram Strait is a major export pathway for freshwater from the Arctic. From 1997 to date a mooring array across Fram Strait at 78°50'N has been maintained measuring temperature and velocity. The moorings are accompanied by annual CTD sections across the strait. The northward volume fluxes can be estimated from the array, but the uncertainties are large due to the limited current meter coverage and the small spatial scales in the strait and the fact that the direction of the flow in the interior strait is westward and thus along the array. The temperature in the West Spitsbergen Current shows strong seasonality and also reveals a warming of the inflow to the Arctic Ocean by 0.8°C over 13 years. The middle of Fram Strait is dominated by the Atlantic Water recirculation which brings warm water from the eastern side of the strait to the western side thereby closing the cyclonic boundary current circulation of the Nordic Seas. The degree of variability of the recirculation from daily to interannual time scales is investigated. The types of eddies present in Fram Strait are characterized and their contribution to the flow is defined.