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The Faroe Bank Channel overflow in one year of continuous current and hydrographic measurements

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Cold, dense water from the Nordic Seas flows out into the North Atlantic across the shallow Iceland-Scotland ridge through a few deeper passages, the deepest of which (at 840 m) is the narrow Faroe Bank Channel. The overflow is swift, with velocities exceeding 1 m/s, and associated with strong vertical mixing. Here we present results from eight hydrographic and current meter moorings that were deployed in the Faroe Bank Channel overflow region during the period 28 May 2012 to 5 June 2013, measuring current velocity, temperature, and salinity at hourly or higher sampling frequencies.

One array of three moorings – the channel section – was placed at about 8° 30'W, just downstream of the sill in the channel. Another array, the slope section, with four moorings was located some 60 km further downstream, at about 9° 40'W. At the easternmost (channel) section, the cold plume was thick, with water colder than 3°C – considered as plume water – occupying the bottom 200 m at all times. At the slope section, the plume has thinned considerably as a result of entrainment of overlying warmer water.

Mesoscale oscillations at periods of a few days dominated the temporal variability of velocity and temperature at both mooring sections. The mesoscale oscillation period, indicated by a peak in the energy density spectrum, was longer at the channel than the slope section (four and six days, respectively). A spectral peak at the diurnal tidal frequency is observed in the channel, but is absent on the slope. We will discuss these and other aspects of how the plume structure and variability develops along its path as the dense overflow exits the Faroe Bank Channel.