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Variability of the Deep Bight: Two-years of Mooring Data in the Bight Fracture Zone

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The Bight Fracture Zone cuts across the Reykjanes Ridge half-way between Iceland and the Charlie-Gibbs Fracture Zone, and contains the single major outflow of Iceland Scotland Overflow Water (ISOW; deep limb of the Atlantic Meridional Overturning Circulation) before this water leaves the Iceland Basin westward through the Charlie-Gibbs Fracture Zone or southward into the West European Basin. Mean westward transport of ISOW through the Bight into the Irminger Sea has been measured in model studies at about $\sim$1 Sverdrup export from the Iceland Basin. Two moorings were placed in the north and south channels of the Bight (one in each channel) from summer 2015-summer 2017 and instrumented with current meters and CTDs from 1500 meters depth to the seafloor, capturing nearly all ISOW (salinity >34.96). High resolution cross-channel CTD and LADCP data were collected at the start, mid-point and end of the mooring placements, providing context to the mooring data. Preliminary results show the contrast in character between the comparatively quiescent north channel (mean along-channel speed of 6 cm/s at 1500-m and diminishing towards the seafloor), and more active south channel (mean along-channel speed 13 cm/s from 1750 m to the bottom). Along-channel velocities were measured up to 40 cm/s (20 cm/s) westward (southwestward) in the south (north) channel, and episodes of complete mooring-height reversals of flow were measured, especially in the late winter months of the first year. Mean salinity over the two year record showed that the south channel contained saltier water than the north channel, and, in the south channel, ISOW with salinities greater than 35.00 were occasionally measured at the bottom instrument. Deep RAFOS floats embedded in the ISOW upstream of the Bight indicate the source and fate of the ISOW from the Iceland Basin through the Bight to the Irminger Sea, as three floats travelled through the Bight while the moorings were in place, and then travelled due west or north after exiting the fracture zone into the Irminger Basin. Transport variability of this two-year record will be examined in context of the transport variability of the OSNAP mooring arrays to both the east and west of this fracture zone, and in context of atmospheric forcing.