



Moored observations of the Iceland-Scotland Overflow plume along the eastern flank of the Reykjanes Ridge

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Since 2014, an array of current meters deployed as part of the OSNAP trans-basin observing system has provided new measurements of the southward flow of Iceland-Scotland Overflow Water (ISOW) along the eastern flank of the Reykjanes Ridge in the Iceland Basin. The location of the array, near 58-59°N, captures the ISOW Deep Western Boundary Current at the farthest downstream location in the Iceland Basin before significant amounts of ISOW can flow into the Irminger Basin through deep fractures in the Reykjanes Ridge. The transport of the ISOW plume at this location - approximately 6 Sv based on the first 4 years of observations - is significantly larger than previous values obtained farther north in the Iceland Basin, suggesting that either additional entrainment into the ISOW plume occurs as it approaches the southern tip of the Reykjanes Ridge, or that the previous measurements did not fully capture the plume transport. Most of the plume transport is carried in a main branch of the plume along the upper ridge crest in depths from 1400-2200 m. A secondary branch in depths of 2400-2700 m along the lower ridge crest carries about 1 Sv. Detailed watermass analysis of the plume from continuous temperature/salinity observations shows that about 50% of the plume transport (2.6-3.0 Sv) is derived from pure Norwegian Sea Overflow waters (NSOW) - consistent with the amount of NSOW known to be flowing over the northern sills into the Iceland Basin - while the remainder is made up of approximately a 60/40 mix of entrained Atlantic thermocline water and modified Labrador Sea Water. Beginning in 2016, a distinct freshening trend is observed in the fastest part of the plume on the upper ridge crest, believed to be related to the remarkable freshening of subpolar mode waters that has occurred in the eastern Iceland Basin since 2014 and subsequent entrainment of these waters into the ISOW plume.