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Variability in the Irminger Sea: new results from continuous ocean measurements between 2014-2015

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The Irminger Current along the Reykjanes Ridge transports warm and saline Atlantic Water northward in the subpolar gyre and hence forms an important contribution to the upper warm limb of the AMOC. Volume and heat transport estimates have up to present principally been based on summer hydrographic data combined with satellite surface velocities. Here we present the first year-round volume and heat transports based on the full-depth mooring array on the western flank of the Reykjanes Ridge between 2014 and 2015. These estimates are compared with results based on shipboard data from the early 1990s and 2000s when two different modes of transport variability were observed through the appearance of a second deep core of the Irminger Current. The recently obtained continuous measurements show a distinct change in the shape and strength of the Irminger Current during the one-year deployment period. This change occurred during the winter of 2014-2015 concomitantly with record deep convection observed in the central Irminger Gyre. The convection, observed by a moored CTD-profiler, was associated with very strong sustained surface buoyancy forcing, leading to mixed layer depths of 1200 m. This oxygen-rich, recently ventilated water was observed basin wide in the Irminger Sea in 2015 and contrasted the stratified situation seen in 2014. The Irminger Current and the Irminger basin hydrography are reminiscent of the conditions that were seen in the early 1990s.