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Recent reduction in temperature and compensation of density in the upper Rockall Trough, Northeast Atlantic.

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Between 1994 and 2006 the upper 800m of the northern Northeast Atlantic increased in temperature and salinity. Data collected from around the region tracked the spread of warmer, more saline water northwards into the Nordic Seas and the Arctic Ocean, where it was associated with warming of the Arctic, reduction in ice cover and consequent changes in climate in the northern hemisphere. Increased temperature and salinity along the eastern side of the northern Northeast Atlantic resulted from a slowing and contraction of the subpolar gyre that lead to a change in the balance of water masses, constraining slightly fresher waters of the North Atlantic Current to the Iceland Basin and allowing more saline water from the inter-gyre region (e.g. Bay of Biscay etc.) to spread northwards through the Rockall Trough and into the Nordic Seas. The Extended Ellett Line is one of the sections that exhibited increased temperature and salinity. This full-depth hydrographic section from the Scottish shelf to Rockall and Iceland has been worked at least annually since 1975 to monitor the ocean climate west of the British Isles: it can be extended to nearly 60 years by adding co-located weather ship and weather station data, thus beginning to satisfy the 40 year requirement shown to be necessary in this region for unequivocally indentifying long term climate change. During this time the upper water column of the Rockall Trough has experienced temperature variability of up to 1-1.5^{o}C. Over the last 5 years, there has been a small but steady decrease in the mean temperature of the upper 800m, now amounting to 0.5^{o}C. This contrasts with almost constant salinity and is dissimilar in constancy and period from anything in the previous record. The net result is that density, having reached an all-record low in 2006-7, is now recovering and the density of the upper 800m reverting to former values. This latest variation in water mass properties is apparent in independent measurements from argos floats and gliders. As yet it is unclear what process has driven the decrease in temperature. There are other clues, such as an apparent reduction in the surface currents of the Iceland Basin in satellite altimeter measurements. We will investigate these changes and the mechanisms that might be associated with them.