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Evolution of Cold Subpolar North Atlantic Conditions in the Past Decade

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The eastern North Atlantic subpolar gyre has become a focus of research in recent years, partly in response to the extreme cold anomaly (the 2015CA) that developed in winter 2013-14, peaked in 2015 and persisted in a weakened state for several years. The anomaly was evident both in sea surface temperature which exceeded 1.0 °C of cooling averaged over 2015 as a whole and in reduced temperatures at depth to of order 500 m. Here, we place it in a longer-term context by considering other anomalies in the observational record since 1980 and discuss its subsequent evolution through to 2022. We also explore the role played by large scale atmospheric modes of variability, particularly the East Atlantic Pattern (EAP) and North Atlantic Oscillation (NAO), in generating such anomalies. Furthermore, we draw a connection between the combined influence of these modes on both the eastern subpolar gyre and intense heat loss in the Irminger Sea which potentially leads to a coupling of mode and dense water formation processes in these two key North Atlantic regions.