

Changing seasonality of convective events in the Labrador Sea

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The long-term goal of this ongoing project is to understand the interannual variability of oxygen and nutrients in the Labrador Sea, one of major sites for deep water formation in the North Atlantic. We hypothesize that fluctuations of oxygen and nutrients share some characteristics of hydrographic (T,S) variability due to changes in physical circulation, mixing and water mass structures. We first investigate the interannual variability of the deep convection in the central Labrador Sea from 1980 to 2009. It is found that the deep convection in the central Labrador Sea since the late 1990s experienced weakening magnitude, shifting seasonality by approximately three weeks, and shortening duration. Such changes are dominated by the local atmospheric forcing and are associated to a weakening of heat fluxes from December to April and winds from November to March. Those changes are enhanced by the warming of the Irminger Current that is ongoing since the late 1990s. Irminger water is advected to the central Labrador Sea through eddy-propagation. Moreover, the convection correlates significantly with the local atmospheric forcing in winter and the following spring, when convective events mainly occur. No significant correlations are found between the convection and atmospheric forcing in other seasons, indicating that the convection has little memory of the atmospheric conditions.