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Variability of deep water formation and circulation in the subpolar north atlantic: model results

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A host of medium-to-high-resolution models (1/2° to 1/12°) is used to investigate the interannual to decadal variability in the circulation and deep water formation of the northern North Atlantic. The emphasis is on the patterns, amplitudes and mechanisms of the boundary currents in the Labrador Sea, in relation to observational results from moored current meter measurements and floats. Questions of particular interest are the relation between the variability in the boundary current transports and the intensity of deep winter convection, and how this variability is reflected in large-scale indicies of gyre and meridional overturning transports. Use of model versions differing in aspects of the atmospheric forcing and the interaction with the Nordic Seas, allows to rationalize the spatial and temporal characteristics of the low-frequency variability, and to unravel the relative roles of different forcing mechnisms. Assessment of the similarities and deviations in simulations realized with numerical models (i.e. FLAME and ORCA) differing in the representation of advective and diffusive processes, contributes to an identification of model factors which are critical for a realistic representation of the observed behaviors.