



Connections between subpolar and subtropical deep western boundary currents and Overturning in the Atlantic Ocean

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A modified Uvic-Climate Model with parametrized hydraulically controlled Denmark Strait Overflow is run for 1000 years to study the response of the longer term variability of the North Atlantic boundary currents to surface forcing. A wind stress curl anomaly of fixed Gaussian shape which varies stochastically in time is additionally applied to climatological forcing. The meridional location of the center of forcing is shifted in a second run from subpolar to subtropical regions. The mean maximum overturning in both cases has its location in the subtropics, but the temporal fluctuations in the subpolar and subtropical gyre are in anti-phase. The question arises on which time scales the western boundary currents are a true indicator of the overturning variability measured at a fixed latitude.

The spectral response of the overflow across the Greenland-Scotland-Ridge and the overturning normal to a section between Greenland and Portugal is described. The correlations with the 53°N-subpolar and the 16°N-subtropical deep western boundary currents and its time lags are investigated. The variability shows spectral peaks around 5, 10 and 15 years as well as in the multi-decadal and centennial band. A first comparison with observations for time scales shorter than 20 years shows promising agreement with observations from the MOVE-, RAPID- and OVIDE-experiments.