

Abstract for ASOF/THOR workshop "OBSERVED NORTH ATLANTIC/ARCTIC OCEAN CLIMATE VARIABILITY AND ITS PREDICTABILITY"

Mechanisms for decadal scale variability in the North Atlantic Ocean circulation in the Bergen Climate Model

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From a 600-year pre-industrial control simulation with the Bergen Climate Model, we have identified potential mechanisms for decadal variability of the Atlantic Meridional Overturning Circulation (AMOC) and Subpolar Gyre strength. The three dominant patterns of North Atlantic atmospheric variability – the North Atlantic Oscillation (NAO), the East Atlantic Pattern and the Scandinavian Pattern (SP), are reflected in the ocean circulation. The Labrador Sea convection, giving the upper North Atlantic Deep Water, is driven by decadal scale variability in the heat flux related to the NAO. The lower North Atlantic Deep Water responds to fluctuations in the SP, where a negative phase is associated with northerly winds and an increased southward flow across the Greenland-Scotland Ridge. The deep water constitutes the lower limb of AMOC, where the variability is directly linked to convection in the Labrador Sea. The variability in the deep water, together with EAP, can partly explain the variations in the strength of the gyre circulation.