



The response in the North Atlantic Oscillation variability to a perturbed meridional overturning circulation

T. Breiteig

Bjerknes Centre for Climate Research

The oceanic influence on the climate variability of the North Atlantic region is not yet fully understood. Here, previous results from a model simulating an altered Atlantic Meridional Overturning Circulation (AMOC) are used to illuminate the topic. The model experiment uses a perturbed Bergen Climate Model (BCM), in which the AMOC is forced to weaken by continuously increasing the freshwater runoff from the Arctic region throughout the 150 yr model integration. The AMOC weakening persists for the first 50 years, followed by a gradual recovery back to the state of the BCM control run. The atmospheric response to the induced changes in oceanic parameters is investigated in terms of NAO (North Atlantic Oscillation) variability. As the AMOC weakens, NAO develops increased year-to-year variability compared to the control run. Once the AMOC reaches its weakest state, the NAO variability changes character again, towards having more interannual persistence, comparable to the NAO behaviour of the control run. Several hypotheses based on well established ocean-atmosphere interaction mechanisms are proposed.