



Atlantic Multidecadal Variability in an ensemble of coupled climate model simulations

A. von der Heydt, L. Frankcombe, and H. A. Dijkstra

Institute for Marine and Atmospheric Research, Utrecht University, Princetonplein 5, 3584CC Utrecht, The Netherlands (A.S.vonderHeydt@phys.uu.nl)

In simple ocean-only models spontaneous multidecadal variability can appear. In these models, an oscillation appears because the large-scale equilibrium flow obtained under restoring conditions is unstable under prescribed heat flux conditions and an internal mode of variability grows on the equilibrium flow. The oscillation is characterized by temperature anomalies propagating westward across the basin in combination with variations of the strength of the meridional overturning circulation. In coupled ocean-atmosphere models, the oscillation is damped, and it has been suggested, that atmospheric noise is needed to excite the oscillation to amplitudes observed in reality. In this presentation we study the mechanism of the Atlantic Multidecadal Variability in a 17-member 20C3M/SRES-A1b ensemble of simulations with a fully coupled climate general circulation model (ECHAM5/OM1) for the period 1950-2100. In particular, we investigate whether the mechanism found in simple ocean-only models is responsible for the multidecadal variability in the ensemble model results. Furthermore, we study the impact of the Atlantic Multidecadal Variability on the climate on land surrounding the North Atlantic as , e.g., on precipitation variability in North America and Europe. Disentangling the climatic impact of the natural multidecadal variability from greenhouse gas induced changes will be important for predicting future climate changes.