EMS Annual Meeting Abstracts
Vol. 8, EMS2011-338, 2011
11th EMS / 10th ECAM

Forecasting the weather
- ensemble techniques
in probabilistic weather prediction

The relationship between ocean heat content and winter storm activity over the North Atlantic on decadal time scales

K.M. Nissen, U. Ulbrich, and G.C. Leckebusch

Freie Universität Berlin, Meteorology, Berlin, Germany (katrin.nissen@met.fu-berlin.de)

Due to the large heat storage capacity of the oceans, slow variations of their upper level temperatures provide a potential source of long-term predictability. For this study we have analysed the relationship between the mixed layer ocean heat content (OHC) and storm activity over the North Atlantic / European region on the decadal time scale.

The analysis is based on 3 240 year long ensemble simulations with the ECHAM5 MPIOM model, forced with observed and A1B scenario greenhouse gas concentrations. Wind storms have been identified using an objective algorithm. In order to investigate variations on the decadal time scale the wind storm and OHC time series have been filtered with a band pass filter for periods between 10-35 years. For all 3 simulations correlation and composite analysis show a distinct pattern of OHC (North Atlantic) related to winter storm frequency over the North Atlantic and the adjacent European region. High storm activity is associated with a positive OHC anomaly at 45°N 35°W surrounded by negative anomalies in the shape of a horse shoe, which occur during the transition of the Atlantic Multidecadal Oscillation from its positive to its negative phase. Suggesting that during transitions to negative AMO conditions more frequent storms might be present.