Geophysical Research Abstracts, Vol. 9, 06853, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-06853

Variability and potential predictability of the Northern Hemisphere atmospheric blocking and their relation with teleconnection patterns

N. Rimbu (1), G. Lohmann (1,2) and M. Ionita (1)

(1) Alfred Wegener Institute for Polar and Marine Research, 27570, Bremerhaven, Germany. (2) DFG Research Center for Ocean Margins, University of Bremen, 28359, Bremen, Germany (Norel.Rimbu@awi-de).

The Northern Hemisphere atmospheric blocking variability and its potential seasonal predictability is investigated. The Tibaldi-Molteni (TM) index was calculated for each longitude and for each season (DJF, MAM, JJA and SON) using daily values of the Northern Hemisphere 500 mb geopotential height for the period 1948-2005. The dominant patterns of TM index variability as well as their associated time coefficients (PCs) were derived using EOF analysis.

The first mode of winter TM index has a monopolar structure with one prominent center in the Pacific sector and the other one in the Atlantic region. Its associated sea surface temperature and air temperature patterns resemble the corresponding ENSO patterns. This suggests that this mode captures the ENSO modulation of Northern Hemisphere blocking via tropical-extratropical ENSO teleconnections. The blocking PC1 is significantly correlated with previous autumn temperature anomalies from central North America, eastern Europe and western Asia. This suggests a possible predictive skill of the dominant mode of winter blocking variability using temperature anomalies from these regions as predictors.

The second EOF of TM index variability captures mainly the Atlantic-European blocking variability. The associated sea surface temperature and air temperature patterns resemble the signature of the North Atlantic Oscillation in these fields. Previous autumn temperature anomalies from northwestern Europe were identified as potential predictors of this mode. The indices of the main Northern Hemisphere teleconnection patterns during the autumn are also potential predictors for the dominant modes of

winter blocking variability.

Significant in-phase (lag 0) correlations between the PCs of the dominant modes of Northern Hemisphere blocking variability and temperature and sea surface temperature anomalies for MAM, JJA and SON were also detected. A lag-correlation analysis reveals a relatively low potential predictability of the dominant modes of MAM, JJA and SON blocking variability using temperature and sea surface temperature anomalies as well as teleconnection indices from previous seasons as potential predictors.