Geophysical Research Abstracts
Vol. 14, EGU2012-6205, 2012
EGU General Assembly 2012

Wave-breaking characteristics of mid- and high-latitude blocking

G. Masato (1), B. Hoskins (2), and T. Woollings (3)

(1) University of Reading, Department of Meteorology, Reading, United Kingdom, (2) Grantham Institute, Imperial College, London, United Kingdom, (3) University of Reading, Department of Meteorology, Reading, United Kingdom

The authors further develop the index of Pelly and Hoskins (2003), which identified blocking as the result of a Rossby wave-breaking. The aim is to describe the wave-breaking characteristics, hence it is possible to differentiate between cyclonic/anticyclonic and between cold/warm-cold air dominated blocking types. This is obtained via two new indices, which are called respectively the Direction of Breaking (DB) index and Relative Intensity (RI) index.These are calculated in a 1- and 2-dimensional form (i.e. latitude vs longitude), the latter being useful to identify blocking at higher latitudes.

The application of such a methodology to the reanalysis (ERA-40) identifies different blocking types over different regions of the Winter Northern Hemisphere. Over the oceans cyclonic blocking dominates, with warm events on the western side of the two basins. Over Europe and Asia anticyclonic blocking is the leading type. In these regions the RI index detects two blocking sub-sets, dominated respectively by warm and cold air mass extrusions. The impact on the lower troposphere and on the surface is substantially different, with cold, anticyclonic blocking leading to extreme cold winter conditions over the European region.