



Identification of Atmospheric Blocking Events and its Influence on Temperature and Precipitation Extremes in Europe

Andy Richling (1), Henning W. Rust (1), Peter Bissolli (2), and Uwe Ulbrich (1)

(1) Freie Universität Berlin, Institut für Meteorologie, Berlin, Germany (andy.richling@met.fu-berlin.de), (2) Deutscher Wetterdienst (DWD), Offenbach, Germany

Atmospheric blocking plays a crucial role in climate variability in the mid-latitudes. Especially meteorological extremes like heatwaves, cold spells and droughts are often related to persistent and stationary blocking events. For climate monitoring it is important to identify and characterise such blocking events as well as to analyse the relationship between blockings and meteorological extremes in a quantitative way.

In this study we identify atmospheric blocking events and analyse the influence on temperature and precipitation extremes with statistical models. For the detection of atmospheric blocking events, we apply modified 2-dimensional versions of commonly used blocking indices suggested by Tibaldi and Molteni (1990) as well as Masato et al. (2013) on daily fields of 500hPa geopotential heights of the Era-Interim reanalysis dataset. A result is a list of blocking events with a multidimensional index characterising area, intensity, location and duration and maps of these parameters, which are intended to be used operationally for regular climate diagnostics at the German Meteorological Service. In addition, relationships between grid-point-base blocking frequency, intensity and location parameters and the number of daily temperature/precipitation extremes based on the E-OBS gridded dataset are investigated using general linear models on a monthly time scale. The number of counts as well as probabilities of occurrence of daily extremes within a certain calendar month will be analysed in this framework.

G. Masato, B. J. Hoskins, and T. Woollings. Winter and Summer Northern Hemisphere Blocking in CMIP5 Models. *J. Climate*, 26:7044–7059, 2013a. doi: <http://dx.doi.org/10.1175/JCLI-D-12-00466.1>.

G. Masato, B. J. Hoskins, and T. Woollings. Wave-Breaking Characteristics of Northern Hemisphere Winter Blocking: A Two-Dimensional Approach. *J. Climate*, 26:4535–4549, 2013b. doi: <http://dx.doi.org/10.1175/JCLI-D-12-00240.1>.

S. Tibaldi and F. Molteni. On the operational predictability of blocking. *Tellus*, 42A:343–365, 1990. doi: [10.1034/j.1600-0870.1990.t01-2-00003.x](https://doi.org/10.1034/j.1600-0870.1990.t01-2-00003.x).