Atmospheric blockings: Relative frequency of different types

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There are different types of atmospheric blockings, including dipole- or split-type (splitting) blockings (or Rex-type), omega-blockings and meridional blockings (e.g., (Obukhov et al., 1984; Barriopedro et al., 2010)). It should be noted, that splitting blockings can cause long-term change in the mid-latitudinal westerlies to the opposite direction (Mokhov, 2017; Sitnov, Mokhov, 2017; Sitnov et al., 2017). Other types of atmospheric blockings just suppress zonal circulation in the mid-troposhere. We analyze here relative frequency of different types of atmospheric blockings with the use of ERA-Interim reanalysis (Dee et al., 2011).

Dipole-type (split) blockings can be separated from other types of atmospheric blockings as intersections of blocking index areas and 500 hPa zonal wind speed areas on Hovmöller diagram (Figure 1). Figure 1 shows negative Lejenas-Okland blocking index (Lejenas, Okland, 1983) with negative values corresponding to blocking conditions and negative (eastern) zonal wind component at 500 hPa between 40ºN and 60ºN. The joint realizations of these conditions correspond to split blockings.

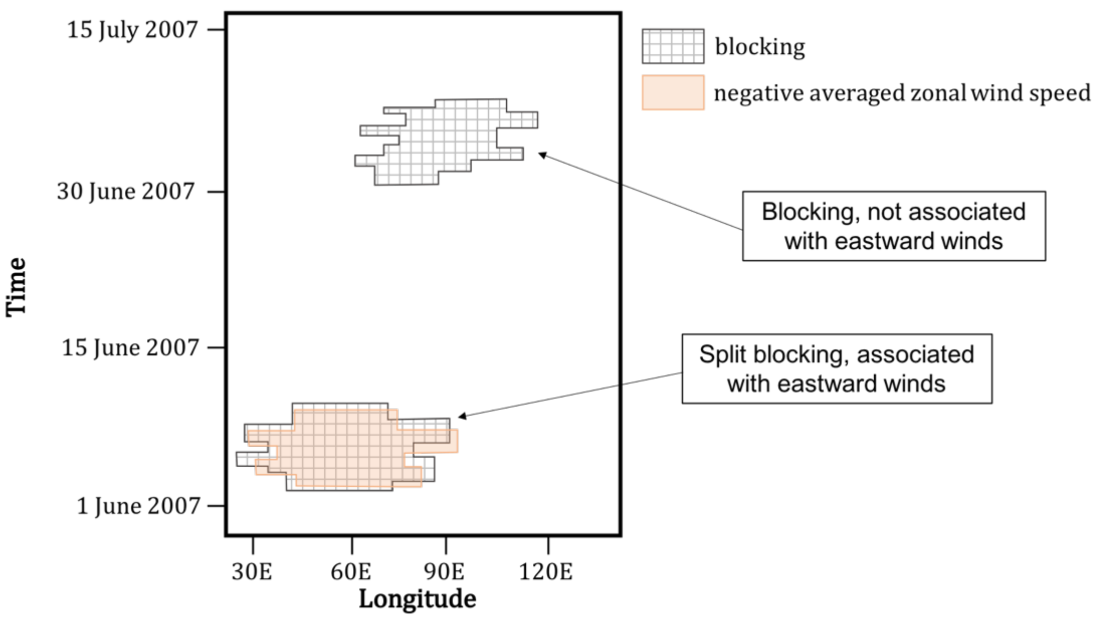
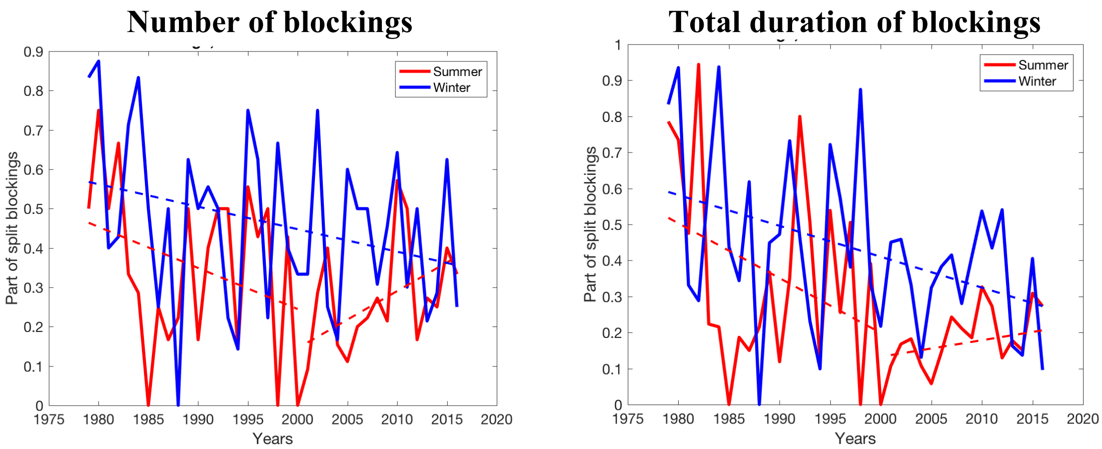


Figure 1. Hovmöller diagram for Lejenas-Okland blocking index and for zonal wind component at 500 hPa between 40ºN and 60ºN.

Figure 2 shows variations of relative contribution of dipole-type (split) blockings to the total number of blockings and total duration of blockings in the Northern Hemisphere in summer (red color) and winter (blue color) during the period 1979-2016. Corresponding dotted lines characterize linear trends for winter for the total period (1979-2016) and for summer for two sub-periods (1979-2000, 2001-2016).



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According to Fig. 2 there is a general tendency of decrease for relative contribution of split blockings to the total blockings number and duration. At the same time, it should be noted that in recent years there has been a growing tendency for the relative role of splitting blockings, particularly for the period 2001-2016 in the summer.

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