

Atmospheric blockings in the Northern Hemisphere: Effects of El Niño and Pacific Decadal Oscillation

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Extreme regional hydrometeorological anomalies are related to atmospheric blockings. We analyze here anomalies in blocking activity in the Northern Hemisphere during the last decades in dependence on the key global-scale quasi-cyclic processes like El Niño phenomena and Pacific Decadal Oscillation (PDO, see also (Mokhov et al., 2014; Mokhov, Timazhev, 2014)).

Figure 1 shows the meridional distribution of the atmospheric blocking frequency in the Northern Hemisphere in summer for the period of 1969-2013 for different phases of El Niño phenomena.

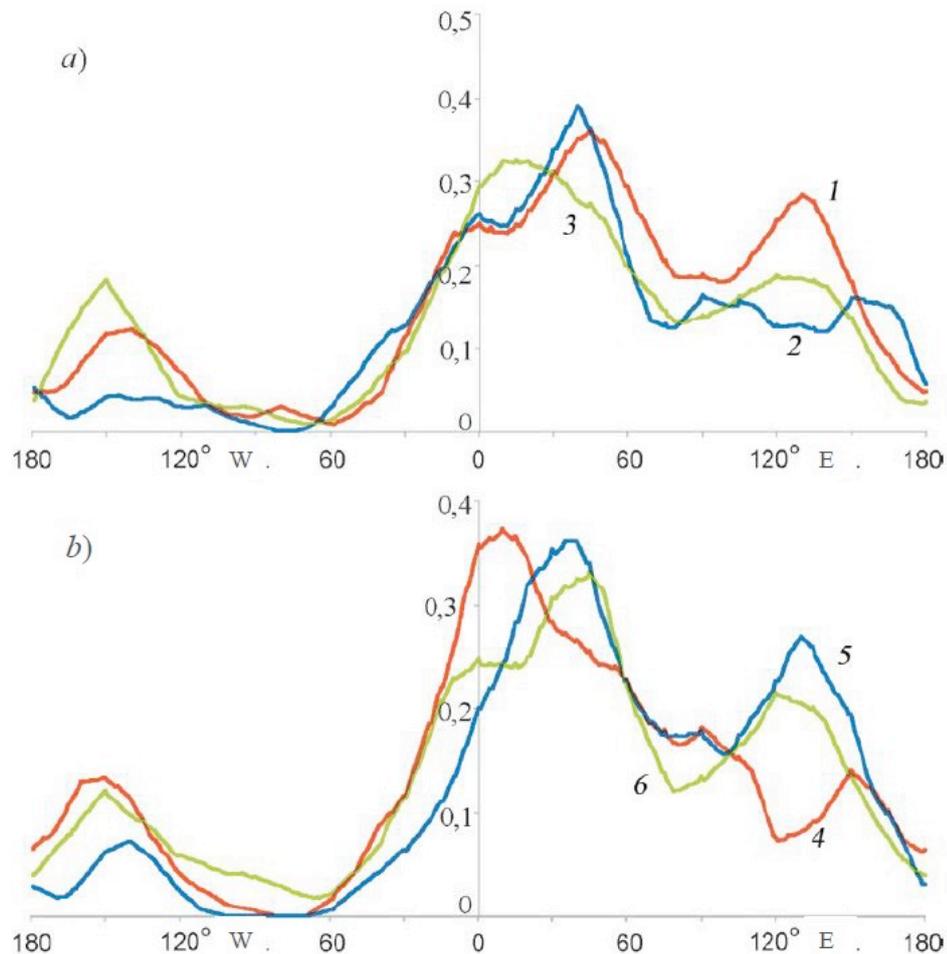


Fig. 1. Meridional distribution of the atmospheric blocking frequency in the Northern Hemisphere in summer for the period of 1969-2013 for different phases of El Niño phenomena: (a) for years with the beginning (a) or ending (b) in the El Niño (La Niña) phase – 1 (4), La Niña phase – 2 (5), or neutral phase – 3 (6).

According to Fig. 1a, the frequency of summer atmospheric blockings in middle latitudes over the eastern part of Asia and western part of the Pacific Ocean is maximum in the years beginning in the El Niño phase and minimal in the years beginning in the phase / La Niña. In this region the frequency of summer blocking is minimal in years ending in the El Niño phase and maximum in years ending in the phase / La Niña (Fig. 1b). Significant variations in the atmospheric blocking frequency in summer for different phases of El Niño / La Niña phenomena occur at mid-latitudes of the eastern part of Northern Eurasia near Lake Baikal and east (see also (Mokhov, Timazhev, 2016)).

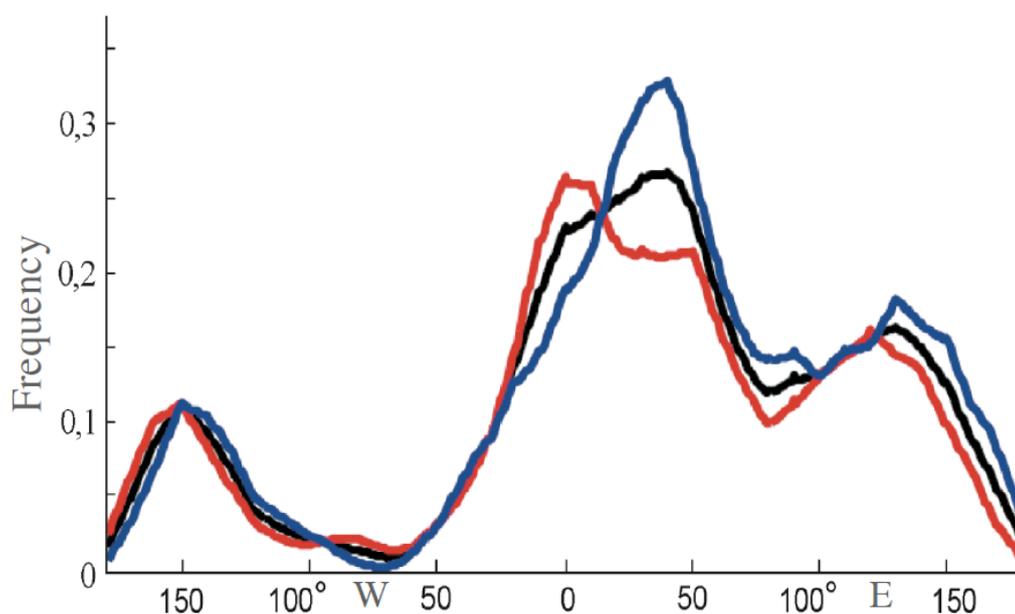


Fig. 2. Mean meridional distribution of the summer blocking frequency in the Northern Hemisphere for the period 1969-2013 (black curve) and separately for the negative (PDO-, blue curve) and positive (PDO+, red curve) PDO phase.

Figure 2 shows mean meridional distribution of the summer blocking frequency in the Northern Hemisphere for the period of 1969-2013 and separately for the negative and positive PDO phase. According to Fig. 2, the frequency of summer atmospheric blockings in middle latitudes in the eastern Hemisphere, particularly in Russian regions, is larger in the negative PDO phase than in the positive PDO phase.

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References

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