SPRING-SUMMER CLIMATE ANOMALIES IN EUROPEAN RUSSIA: ASSESSMENT OF ENSO EFFECTS

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Probabilities of climate anomalies in the Eurasian regions by observations from the end of 19th century to the beginning of the 21st century with an assessment of ENSO effects are studied (Mokhov, 2005; Mokhov, 2011; Mokhov et al., 2013). In particular, anomalies of surface air temperature, precipitation and drought index during May-July (growing season) in mid-latitudes for the European (ER) and Asian parts of Russia by data from (Mesherskaya and Blazhevich, 1997; Meshcherskaya et al., 2011) for the period 1891-2010 are analyzed.

Table 1 shows estimates of probabilities for temperature anomalies in the ER during May-July in different ENSO phases change during 1891-2010 (n – number of years for different ENSO phases). There are probabilities for positive and negative temperature anomalies and also for large (±1K) positive and negative temperature anomalies. Positive temperature anomalies and large positive anomalies in May-July are more frequent for ER for years starting with El Niño (E) events and the most frequent for transition to the years starting with La Niña (L) events (E→L). The E→L transition is characterized also by the lowest probability for negative temperature anomalies. The biggest probability of large negative temperature anomalies was obtained for the L→E transition and also for the N→E transition.

Table 1. Probabilities of the May-July temperature anomalies in ER for different ENSO phases during 1891-2010.

Temperature anomaly probability	Year starts with neutral phase of ENSO			Year starts with El Niño			Year starts with La Niña		
	N→E (n=17)	*N→L (n=11)*	*N→N (n=37)*	*E→E (n=3)*	*E→L (n=9)*	*E→N (n=15)*	*L→E (n=7)*	*L→L (n=9)*	*L→N (n=12)*
>0	0.47	0.64	0.57	0.67	0.89	0.47	0.29	0.33	0.17
	0.52			0.63			0.25		
>1K	0.06	0.18	0.22	0	0.56	0.13	0.29	0.11	0
	0.17			0.26			0.11		
<0	0.47	0.36	0.35	0.33	0.11	0.53	0.57	0.56	0.58
	0.38			0.37			0.57		
≤-1K	0.24	0.18	0.11	0	0	0.20	0.29	0	0.08
	0.15			0.11			0.11		

Table 2 shows estimates of probabilities for positive and negative precipitation anomalies in the ER during May-July in different ENSO phases change during 1891-2010. The most significant positive difference between probabilities for positive and negative precipitation anomalies are for years starting with El Nino, in particular for E→L and E→E transitions and also for L→N transition. These transitions are characterized by the most frequent positive precipitation anomalies and by the lowest probabilities for negative precipitation anomalies. The biggest probabilities of negative precipitation anomalies were obtained for the L→E and N→N transitions.

Table 2. Probabilities of the May-July precipitation anomalies in ER for different ENSO phases during 1891-2010.

Precipitation anomaly probability	Year starts with neutral phase of ENSO			Year starts with El Niño			Year starts with La Niña		
	N→E (n=17)	*N→L (n=11)*	*N→N (n=37)*	*E→E (n=3)*	*E→L (n=9)*	*E→N (n=15)*	*L→E (n=7)*	*L→L (n=9)*	*L→N (n=12)*
>0	0.58	0.55	0.46	0.67	0.67	0.60	0.43	0.56	0.67
	0.49			0.63			0.57		
<0	0.47	0.45	0.54	0.33	0.33	0.40	0.57	0.44	0.33
	0.51			0.37			0.43		

Table 3 shows estimates of droughts probabilities in the ER during May-July in different ENSO phases change during 1891-2010. There are probabilities conditions with drought index larger (or equal) 10%, 20% and 30%. The largest probability of drought conditions of different intensity was obtained for the E→L transition.

Table 3. Drought index probability for different cases of ENSO phases change for May-July from observations (1891-2010).

Drought index probability	Year starts with neutral phase of ENSO			Year starts with El Niño			Year starts with La Niña		
	N→E (n=17)	*N→L (n=11)*	*N→N (n=37)*	*E→E (n=3)*	*E→L (n=9)*	*E→N (n=15)*	*L→E (n=7)*	*L→L (n=9)*	*L→N (n=12)*
≥10%	0.47	0.55	0.76	0.67	1	0.53	0.57	0.56	0.67
	0.65			0.70			0.61		
≥20%	0.35	0.45	0.57	0.33	0.78	0.33	0.29	0.22	0.25
	0.49			0.48			0.25		
≥30%	0.12	0.27	0.24	0	0.44	0.13	0.29	0.22	0.08
	0.22			0.22			0.18		

According to obtained results the largest frequency of conditions with hot temperature and drought during May-July in ER is characteristic for the E→L transition. Such conditions were realized for European part of Russia in summer 2010.

References

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