Predictability of weather-climate anomalies in the North Eurasian regions during transitions from the La Niña conditions

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The impact of the El Niño / La Niña events is significant on a global scale, including in the Russian regions (Mokhov, Timazhev, 2015). In (Mokhov, Timazhev, 2016) estimates of possible anomalies in Russian regions in 2016 in May-July are obtained, taking into account the beginning of the year in the El Niño phase and the forecasts of its transformation by the end of the year. Here we present similar estimations for 2018 with the beginning in the La Niña phase with negative anomalies of sea surface temperature (SST) in the east-central and eastern equatorial regions of the Pacific Ocean. According to early-April CPC/IRI official probabilistic ENSO forecast on the basis of ensemble model simulations the probability of the *L*-phase continuation to the end of 2018 is about 10%. The corresponding probabilities for *N*-phase and *E*-phase are about 40% and 50%, correspondingly.

We analyze the spring-summer (May-July) anomalies of surface air temperature (SAT) δT and precipitation δP, and also drought (*D*) and excessive moisture (*M*) indices for European (ER) and Asian (AR) parts of Russia in mid-latitudes from observations since 1891 from (Meshcherskaya et al., 2011). For estimation of the El Niño / La Niña effects, we used their indices characterized by the sea surface temperature (SST) in the Niño3, Nino3,4 and Nino4 regions in the equatorial latitudes of the Pacific Ocean. The El Niño (*E*), La Niña (*L*) and neutral (*N*) phases are defined similar to (Mokhov, Timazhev, 2015).

Table 1 shows the estimates for probability of spring–summer temperature anomalies δT in the ER for different transitions from the *L*-phase at the beginning of the year with the use of different indices.

Table 1. Probability of positive and negative surface air temperature anomalies (δT) in the ER (and AR) in May-July for different transitions from La-Nina conditions at the beginning of the year (characterized by indices Nino3, Nino3,4 and Nino4) from observations since 1891.

δT, K		**Nino3 *n*=29**			**Nino3,4 *n*=36**			**Nino4 *n*=28**		
		***L→E* *n*=7**	***L→L* n=9**	***L→N* n=13**	***L→E* *n*=11**	***L→L* *n*=14**	***L→N* *n*=11**	***L→E* *n*=4**	***L→L* *n*=10**	***L→N* *n*=14**
>0	**>0**	**4/7 (5/7)**	**3/9 (5/9)**	**5/13 (8/13)**	**6/11 (7/11)**	**5/14 (9/14)**	**7/11 (4/11)**	**2/4 (2/4)**	**4/10 (5/10)**	**6/14 (8/14)**
	>1K	**2/7 (1/7)**	**1/9 (2/9)**	**2/13 (3/13)**	**3/11 (2/11)**	**3/14 (3/14)**	**3/11 (4/11)**	**1/4 (1/4)**	**2/10 (2/10)**	**3/14 (4/14)**
≤0	**≤0**	**3/7 (2/7)**	**6/9 (4/9)**	**8/13 (5/13)**	**5/11 (4/11)**	**9/14 (6/14)**	**4/11 (6/11)**	**2/4 (2/4)**	**6/10 (5/10)**	**8/14 (6/14)**
	≤-1K	**2/7 (2/7)**	**0/9 (0/9)**	**2/13 (1/13)**	**2/11 (2/11)**	**1/14 (0/14)**	**0/11 (2/11)**	**0/4 (1/4)**	**1/10 (0/10)**	**1/14 (1/14)**

Table 2 shows corresponding estimates for probability of positive and negative precipitation anomalies (δP) in the ER (and AR) in May-July for different transitions from La-Nina conditions at the beginning of the year.

Table 2. Probability of positive and negative precipitation anomalies (δP) in the ER (and AR) in May-July for different transitions from La-Nina conditions at the beginning of the year.

δP **[%]**		**Nino3** ***n*=29**			**Nino3,4** ***n*=36**			**Nino4** ***n*=28**		
		***L→E n*=7**	***L→L*** **n=9**	***L→N*** **n=13**	***L→E n*=11**	***L→L n*=14**	***L→N n*=11**	***L→E n*=4**	***L→L n*=10**	***L→N n*=14**
<0	**<0**	3/7 (4/7)	5/9 (5/9)	4/13 (4/13)	7/11 (5/11)	6/14 (5/14)	7/11 (3/11)	2/4 (3/4)	6/10 (5/10)	6/14 (5/14)
	<-20%	1/7 (2/7)	2/9 (1/9)	0/13 (1/13)	1/11 (2/11)	2/14 (1/14)	1/11 (1/11)	0/4 (1/4)	2/10 (1/10)	1/14 (2/14)
≥0	**≥0**	4/7 (3/7)	4/9 (4/9)	9/13 (9/13)	4/11 (6/11)	8/14 (9/14)	4/11 (8/11)	2/4 (1/4)	4/10 (5/10)	8/14 (9/14)
	>20%	0/7 (1/7)	0/9 (0/9)	1/13 (2/13)	0/11 (1/11)	0/14 (0/14)	1/11 (2/11)	0/4 (0/4)	0/10 (0/10)	1/14 (1/14)

Table 3 shows corresponding estimates for probability of different drought (*D*) and excess moisture (*M*) conditions in the ER (and AR) in May-July for different transitions from La-Nina conditions at the beginning of the year.

Table 3. Probability of different drought (*D*) and excess moisture (*M*) conditions in the ER (and AR) in May-July for different transitions from La-Nina conditions at the beginning of the year.

D, M **[%]**		**Nino3** ***n*=29**			**Nino3,4** ***n*=36**			**Nino4** ***n*=28**		
		***L→E n*=7**	***L→L*** **n=9**	***L→N*** **n=13**	***L→E n*=11**	***L→L n*=14**	***L→N n*=11**	***L→E n*=4**	***L→L n*=10**	***L→N n*=14**
<0	**≥20%**	2/7 (3/7)	2/9 (4/9)	3/13 (5/13)	4/11 (4/11)	4/14 (5/14)	6/11 (2/11)	1/4 (2/4)	3/10 (3/10)	4/14 (5/14)
	≥30%	2/7 (2/7)	2/9 (2/9)	2/13 (2/13)	3/11 (3/11)	4/14 (2/14)	3/11 (1/11)	1/4 (1/4)	3/10 (2/10)	3/14 (3/14)
≥0	**≥20%**	3/7 (2/7)	3/9 (0/9)	3/13 (3/13)	3/11 (2/11)	3/14 (0/14)	3/11 (3/11)	1/4 (2/4)	4/10 (1/10)	3/14 (4/14)
	≥30%	2/7 (1/7)	1/9 (0/9)	2/13 (0/13)	2/11 (1/11)	1/14 (0/14)	2/11 (0/11)	0/4 (0/4)	2/10 (0/10)	0/14 (2/14)

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