



**WMO RA VI**  
**WMO RA II**  
**RCC-Network**



## **SEASONAL OUTLOOK FOR SUMMER 2019**

**NEACOF-16**

***Tishchenko V., Ganieva E., Khan V., Kulikova I., Kruglova E.***

***North Eurasia Climate Centre***



## CONTENT

### About NEACC

### Seasonal forecasts

1. Sea Surface Temperature (SST) and El Nino
2. Atmosphere: General circulation
3. Temperature and precipitation
4. Verification

### Summary



## NEACC background



**For RA-VI Region** NEACC functions as one of Long-Range Forecast nodes of the RA-VI Regional Climate Network.

**For RA-II Region** NEACC functions as a Multifunctional Regional Climate Center.

NEACC is a contributor to FOCRA, PRESANORD, ARABCOF, PARCOF, MEDCOF, SEECOF

**The North Eurasia Climate Centre (NEACC) coordinated by the Roshydromet under the auspices of the Commonwealth of Independent States (CIS).**

**NEACC was formally designated as a WMO RCC NEACC by WMO Executive Council in May 2013 after completing demonstration phase**

### **NHMSs of CIS**

**+**

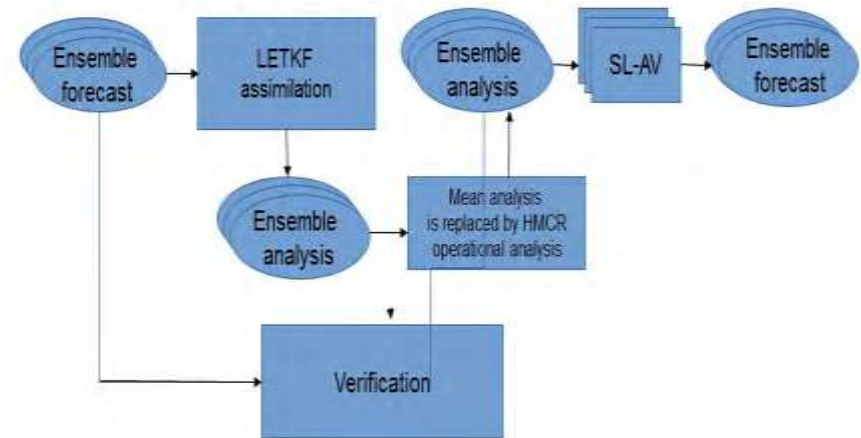
### **Consortium of the Roshydromet organizations:**

1. Hydrometeorological Research Centre of the Russian Federation
2. Institute of Global Climate and Ecology
3. Russian Research Institute for Hydrometeorological Information – World Data Centre
4. A.I. Voeikov Main Geophysical Observatory
5. Droughts Monitoring Centre, Russian Research Institute of Agricultural Meteorology
6. Main Computer Centre (Russian Federation)
7. Aviamettelecom (Russian Federation)

## Seasonal hydrodynamic models

- **Seasonal version of SL-AV model at Hydrometcentre of Russia**

The 28-level semi-Lagrangian finite-difference atmospheric prognostic global model developed at the Hydrometcenter of Russia and the Institute of Numerical Mathematics of the Russian Academy of Sciences SLAV-2008 (grid  $0.72^{\circ} \times 0.9^{\circ}$ ) is used operationally. The forecasting results are delivered as the GRADS maps (basic fields for different areas), and distributed via GTS [GRIB code (full set of meteorological parameters on the grid  $2.5^{\circ} \times 2.5^{\circ}$ )] at [www.meteoinfo.ru](http://www.meteoinfo.ru).



- **Global Coupled Atmosphere-Ocean General Circulation Model from MGO**

The global spectral atmospheric general circulation model (T63L25) and an ensemble approach developed in the Voeikov Main Geophysical Observatory (MGO). The horizontal resolution of the model is  $1.9^{\circ} \times 1.9^{\circ}$ , 25 levels. Ensemble size for the forecast is 10. The forecast ensemble is configured by the original and perturbed analysis fields of the HMC of Russia. SSTs are taken from the inertial forecasts.

- **The AGCM SL-AV and MGO**

The maps of temperature and precipitation forecasts from Individual Atmospheric General Circulation Models of HMC of Russia and MGO are placed at the site of NEACC. The multi-model seasonal forecasts are presented too.

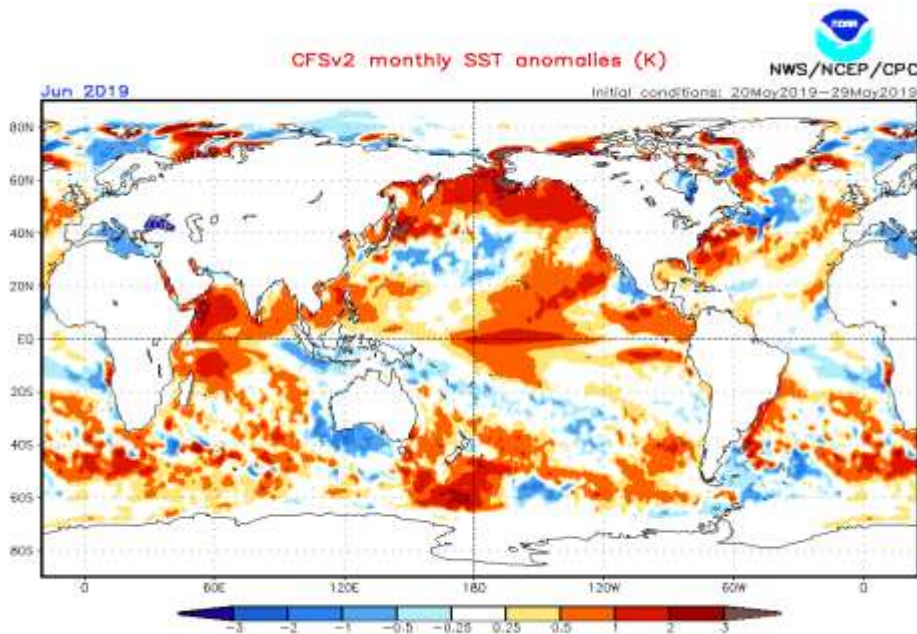


## **Seasonal forecast for summer 2019**

## OCEANIC FORECAST SEA SURFACE TEMPERATURE (SST)

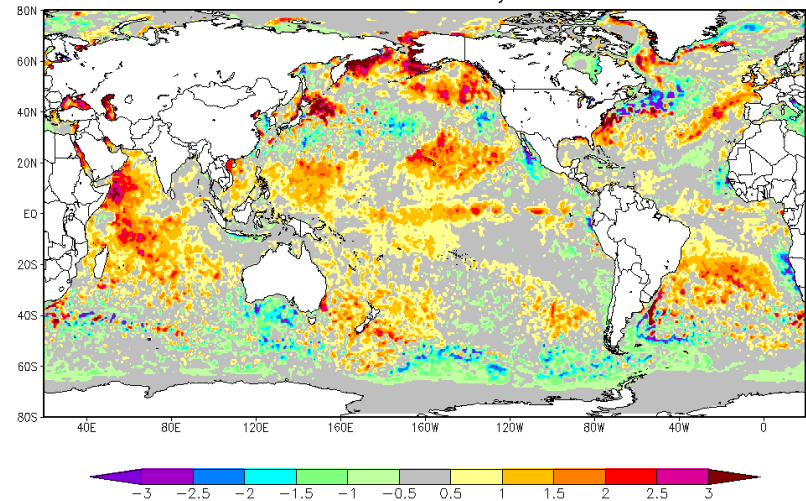
**In the Indian Ocean:** According to the forecasts of most centers the positive significant SST anomalies are found in the equatorial latitudes and in the Southern Hemisphere.

**In the Pacific Ocean:** The positive anomalies are forecasted in the equatorial latitudes, except for the west part of the ocean. The significant positive SST anomalies are expected in the north-east of the middle and high latitudes.



[https://www.emc.ncep.noaa.gov/research/cmb/sst\\_analysis/](https://www.emc.ncep.noaa.gov/research/cmb/sst_analysis/)

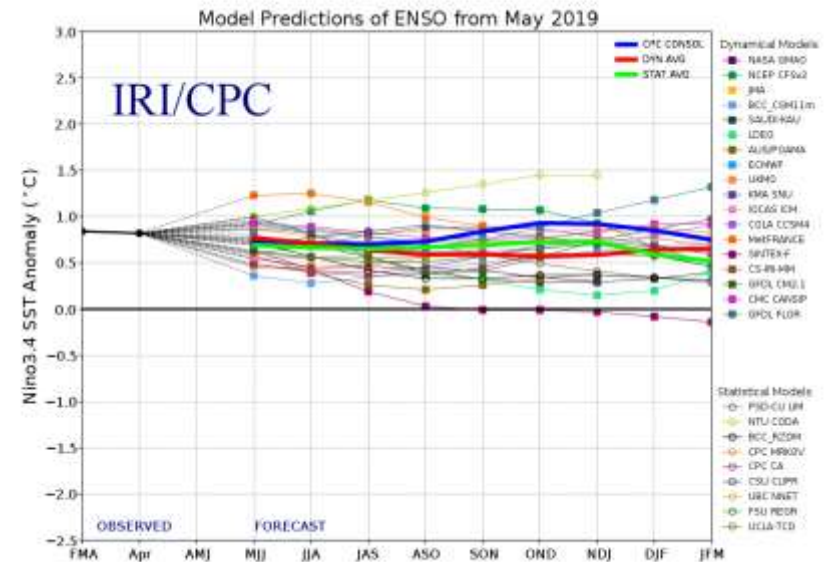
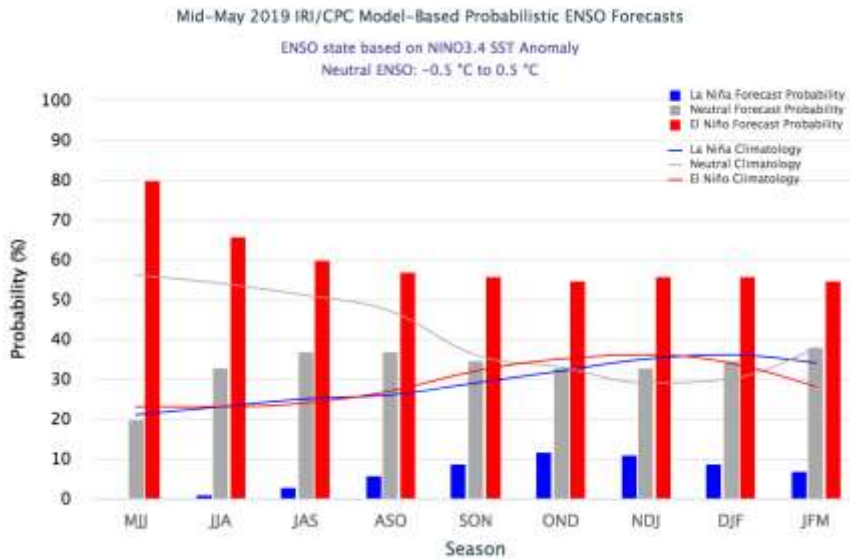
Daily OISST Anomaly intv2: 30MAY2019  
AVHRR - only



<https://www.ncdc.noaa.gov/oisst>



## The IRI/CPC probabilistic ENSO forecast issued in April 2019. Nino 3.4 forecasts (120°-170°W, 5°S-5°N)



<http://iri.columbia.edu/our-expertise/climate/forecasts/enso/current/>

Most of models predict a weak El Niño for the summer 2019 (June-August). According to the CPC/IRI Consensus Probabilistic Forecast the probabilities for La Niña, neutral and El Niño conditions (using -0.5C and 0.5C thresholds) over the coming JJA 2019 season are: 1%, 25% and 74%.

## ENSO FORECASTS



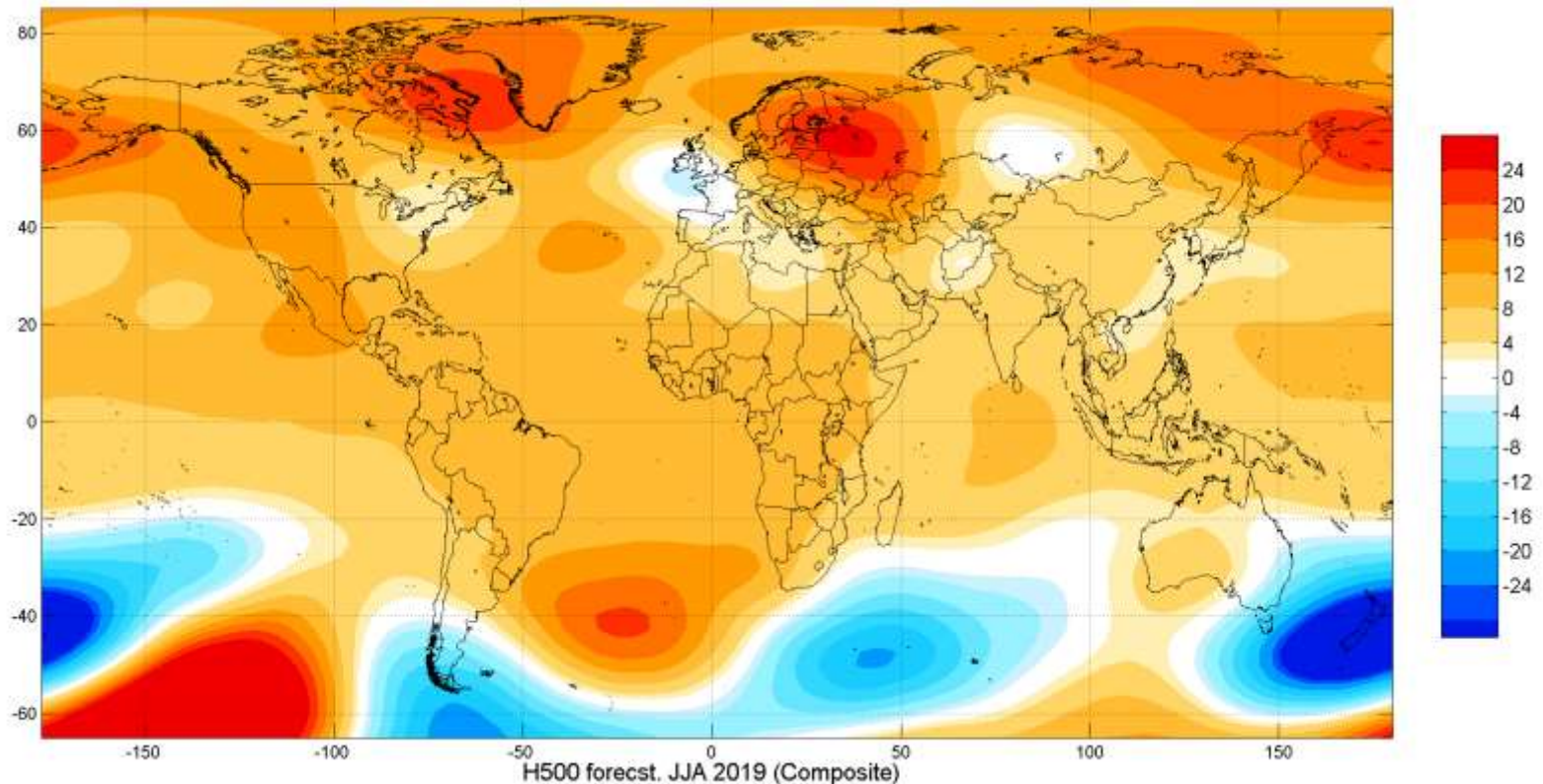




## GENERAL CIRCULATION

Deterministic Multi-Model Ensemble Forecast  
Composite map of H-500

June - August 2019



- MODELS:**
- > Montreal
  - > Tokyo
  - > Washington
  - > Moscow

- According to the forecasts of most centers negative anomalies are expected in mid-latitudes of the North-West Atlantic ocean.
- The positive anomalies are forecasted over north-east of Europe and north-east of Russia.

<https://origin.cpc.ncep.noaa.gov/products>

<http://ds.data.jma.go.jp/tcc>

<http://dd.weatheroffice.ec.gc.ca>

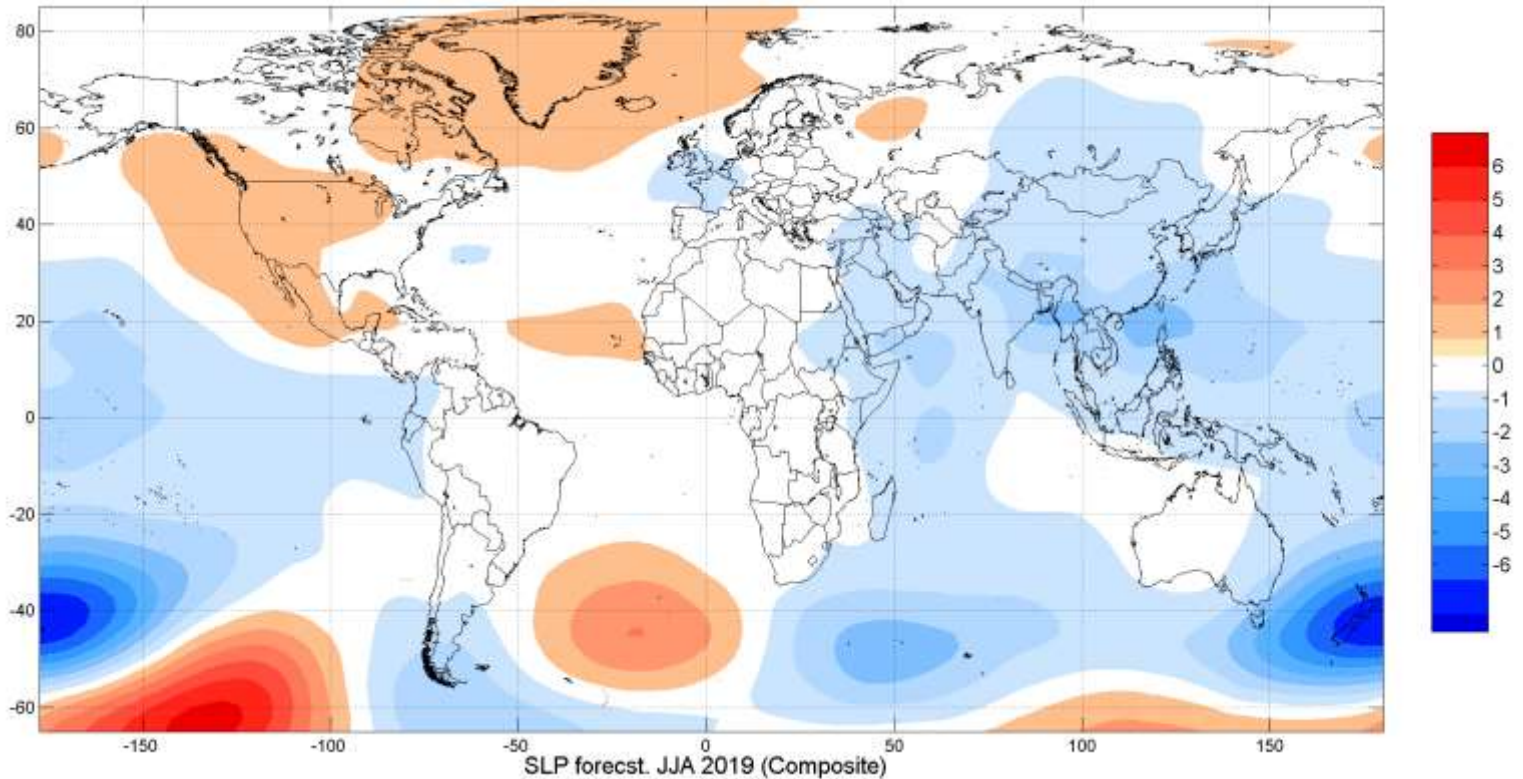
<http://www.neacc.meteoinfo.ru>

The forecast is issued in 2019, June, 1

## GENERAL CIRCULATION

Deterministic Multi-Model Ensemble Forecast  
Composite map of mean sea level pressure

June - August 2019



- According to the forecasts of most centers negative anomalies are expected in mid-latitudes of the North-West Atlantic ocean and Siberia.
- The positive anomalies are forecasted over north-east of Europe.

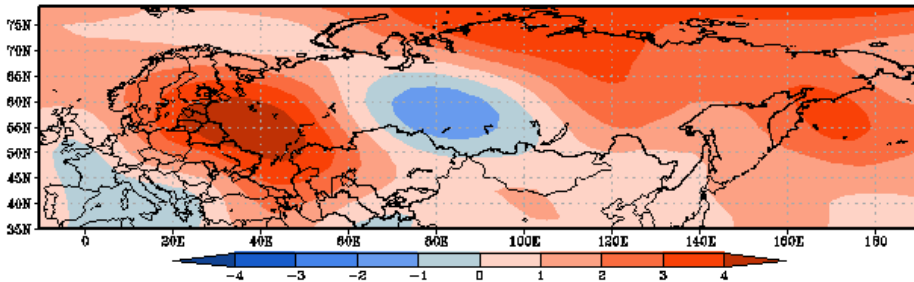
## THE GENERAL CIRCULATION: 500 hPa height

Composite probabilities of categorical forecast outcomes for H500 seasonal anomalies (dm). Producer: HMC (SL-AV)+MGO

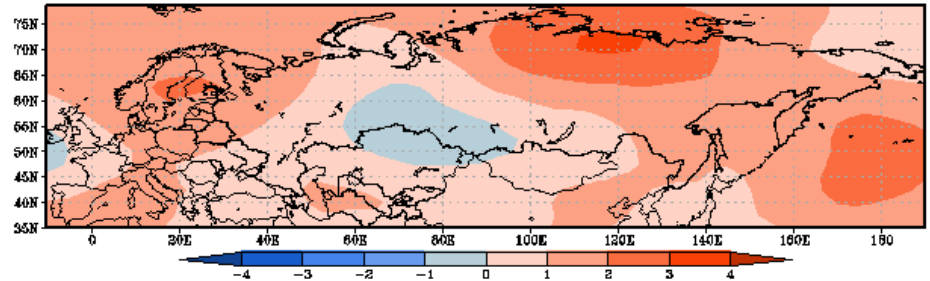
June 2019

July 2019

H500 seasonal anomalies (dm). Producer: HMC+MGO  
Forecast period: June\_2019



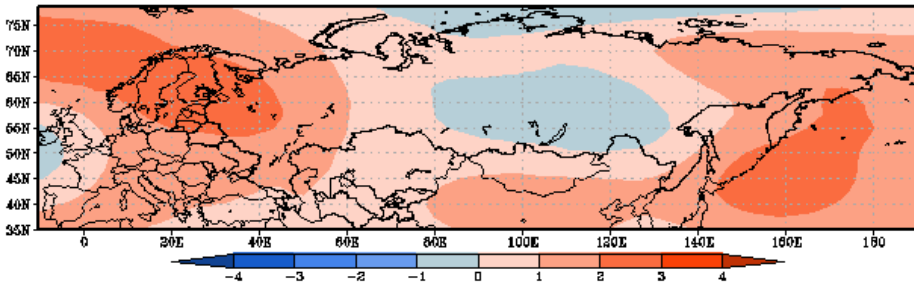
H500 seasonal anomalies (dm). Producer: HMC+MGO  
Forecast period: July\_2019



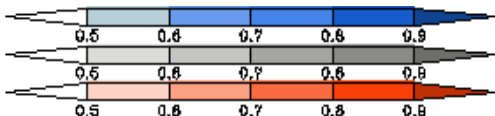
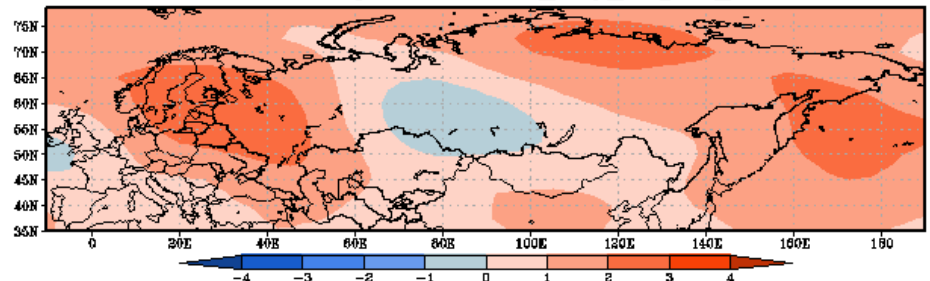
August 2019

June - August 2019

H500 seasonal anomalies (dm). Producer: HMC+MGO  
Forecast period: August\_2019



H500 seasonal anomalies. Producer: HMC+MGO  
Forecast period: June\_July\_August\_2019



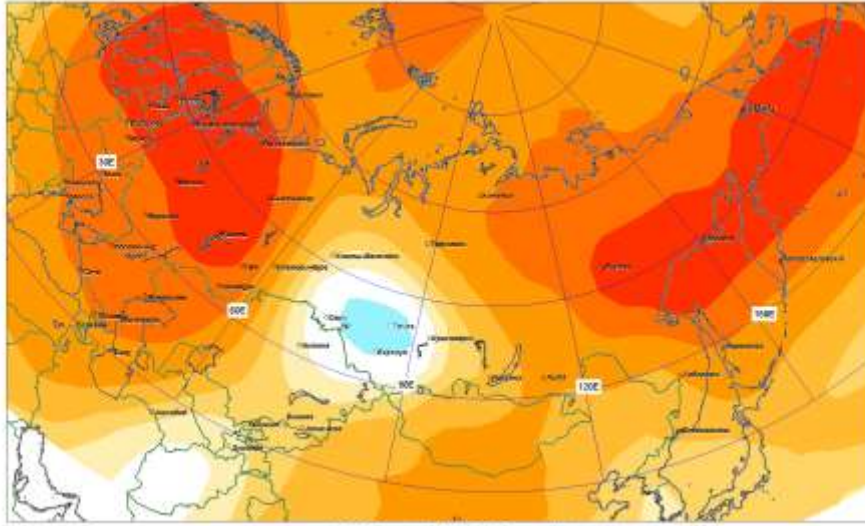
Below normal  
Near normal  
Above normal



## GENERAL CIRCULATION

Composite maps

H500

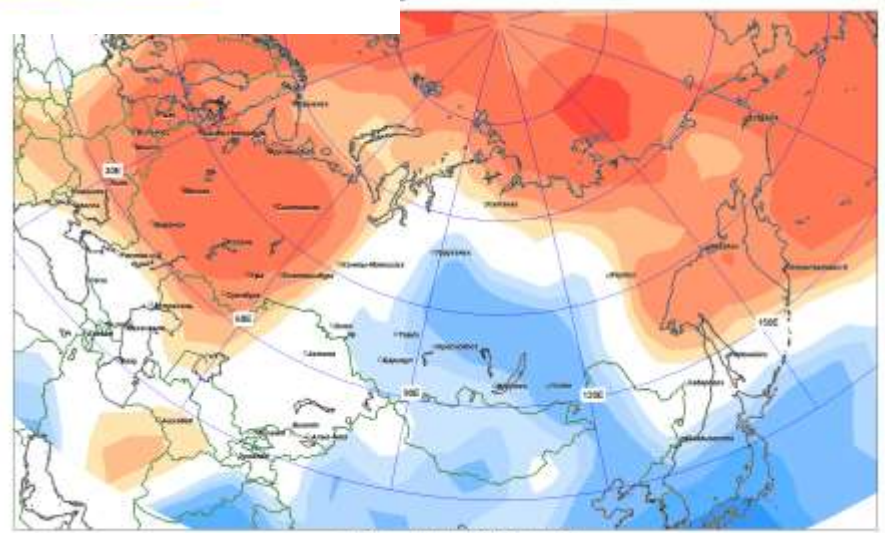


H500 forecast. JJA 2019 (Composite)

June - August 2019

- MODELS:**
- > Montreal
  - > Tokyo
  - > Washington
  - > Moscow

MSLP

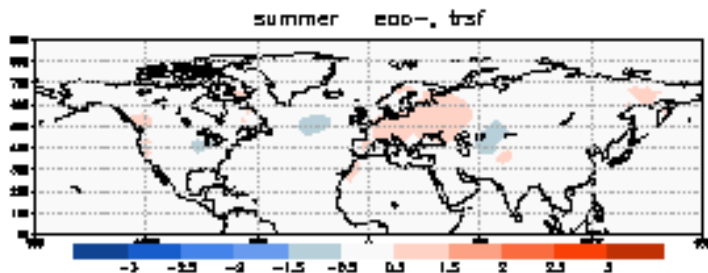
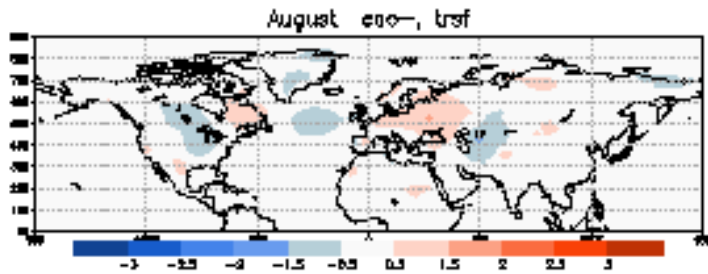
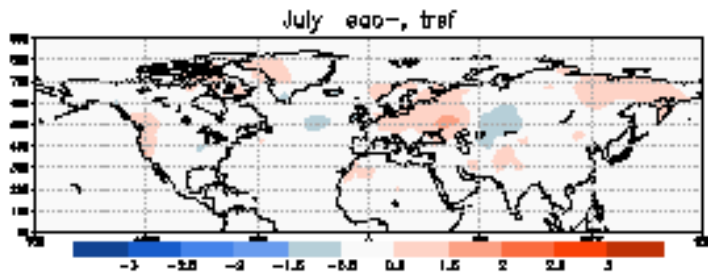
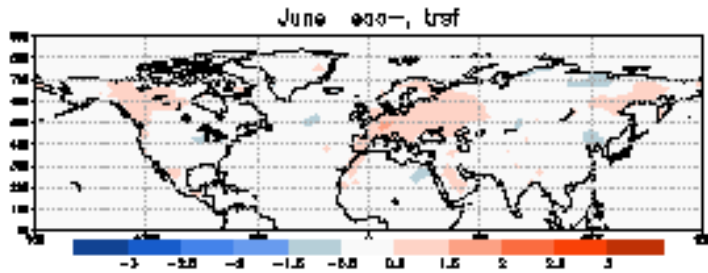


SLP forecast. JJA 2019 (Probability)

The forecast is issued in June 2019

## INDICES OSCILLATION FORECASTS

HYDROMETEOROLOGICAL CENTRE OF RUSSIA (SL-AV)



индекс	ИЮНЬ, ИЮЛЬ, АВГУСТ, СЕНТЯБРЬ 2019					
	1 месяц	2 месяц	3 месяц	4 месяц	1 сезон	2 сезон
EA	-0,3	-0,81	-0,63	-0,69	-0,65	-0,76
WA	-0,53	-1,88	-0,79	-2,2	-1,08	-1,68
EU	-0,98	-0,03	-0,39	0,58	-0,99	0,08
WP	0,39	-0,36	-0,22	-0,2	0,03	-0,22
PNA	0,01	-0,56	0,53	1,78	0,17	0,72
NAO	0,67	0,46	0,22	-0,28	0,6	0,13
POL	-0,27	-0,52	-0,74	-0,87	-0,67	-0,8
AOS	-0,28	-0,02	-0,14	-0,29	-0,15	-0,15

### Обозначения

EA - Восточно-атлантическое колебание

WA - Западно-атлантическое колебание

EU - Евразийское колебание

WP - Западно-тихоокеанское колебание

PNA - Тихоокеанское-северо-американское колебание

NAO - Северо-атлантическое колебание

POL - Полярное колебание

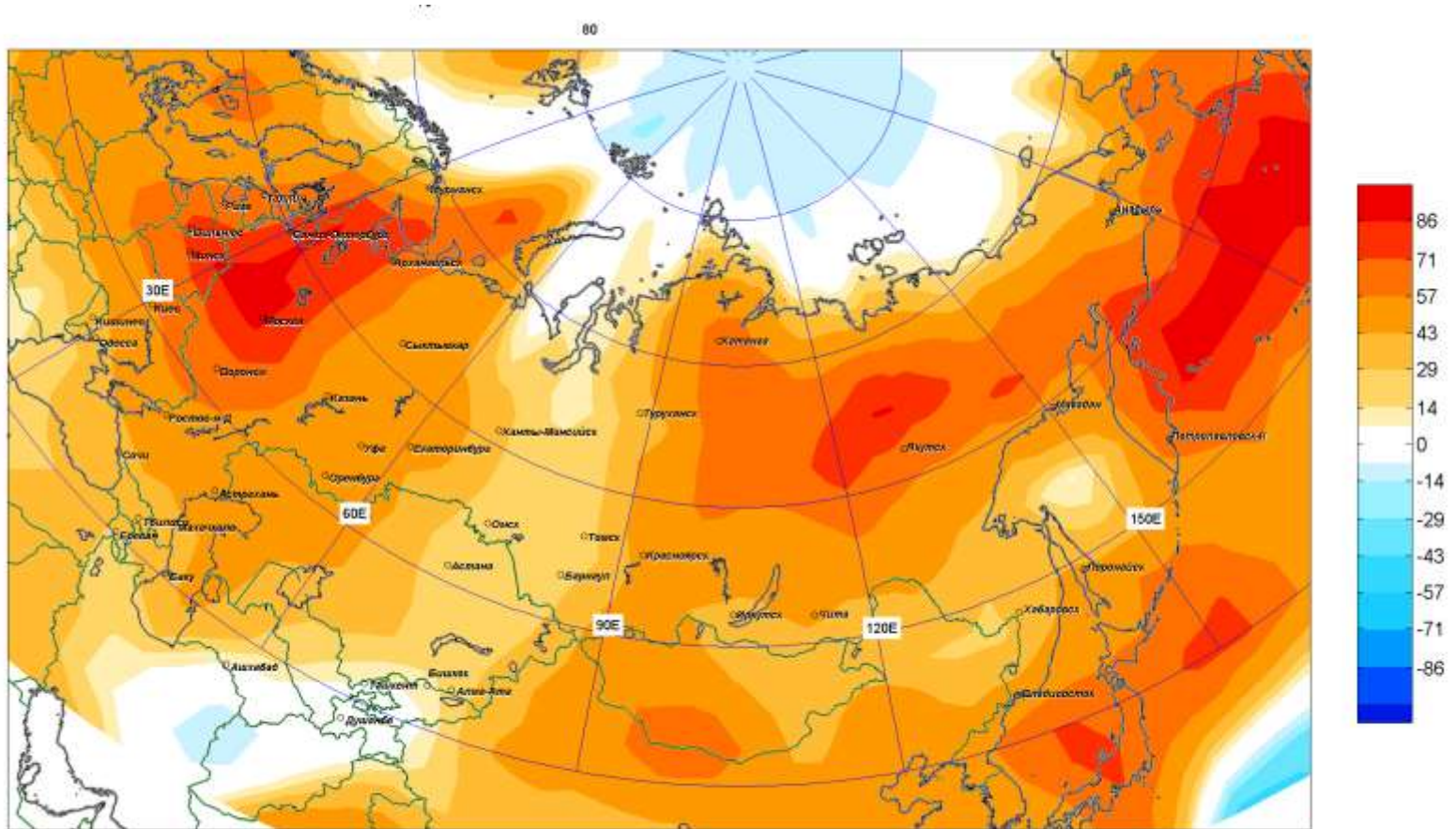
AOS - Арктическая осцилляция

## FORECASTS OF AIR TEMPERATURE

Probabilistic Multi-Model Ensemble Forecast

June - August 2019

Composite map of 2m temperature



T2M deg anomalies. JJA 2019 (Composite)

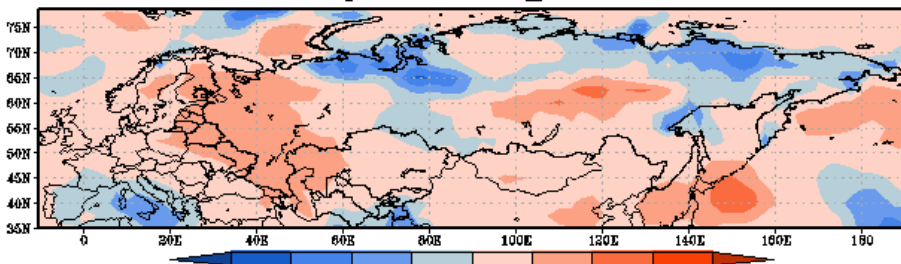
## ANOMALIES OF AIR TEMPERATURE

Composite probabilities of categorical forecast outcomes for T2m (grad K) seasonal anomalies. Producer: HMC (SL-AV)+MGO

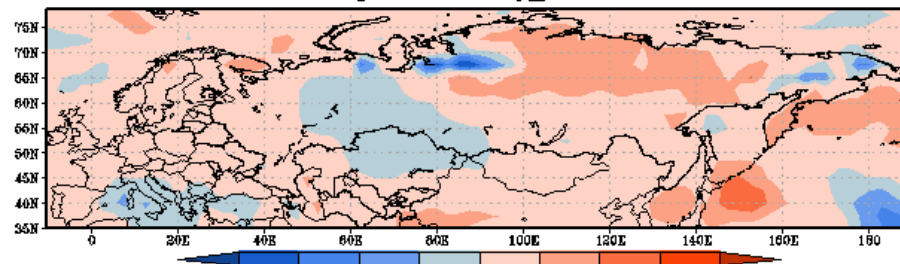
June 2019

July 2019

T2m seasonal anomalies (grad K). Producer: HMC+MGO  
Forecast period: June\_2019



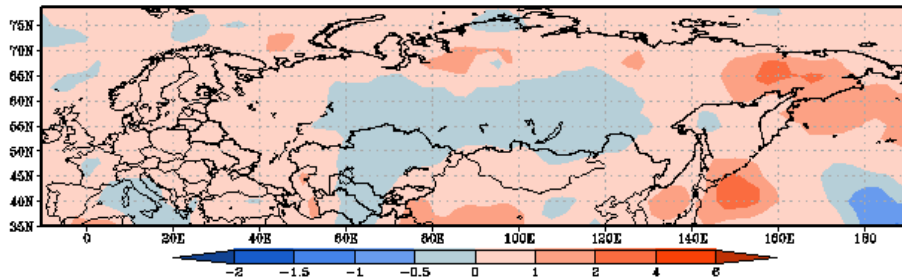
T2m seasonal anomalies (grad K). Producer: HMC+MGO  
Forecast period: July\_2019



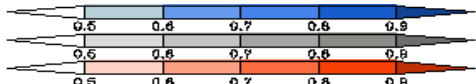
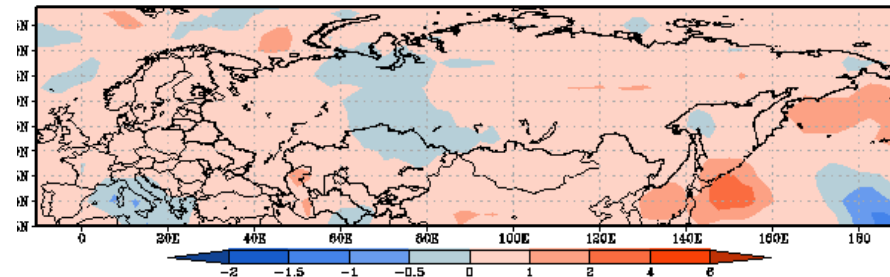
August 2019

June - August 2019

T2m seasonal anomalies (grad K). Producer: HMC+MGO  
Forecast period: August\_2019



T2m seasonal anomalies. Producer: HMC+MGO  
Forecast period: June\_July\_August\_2019

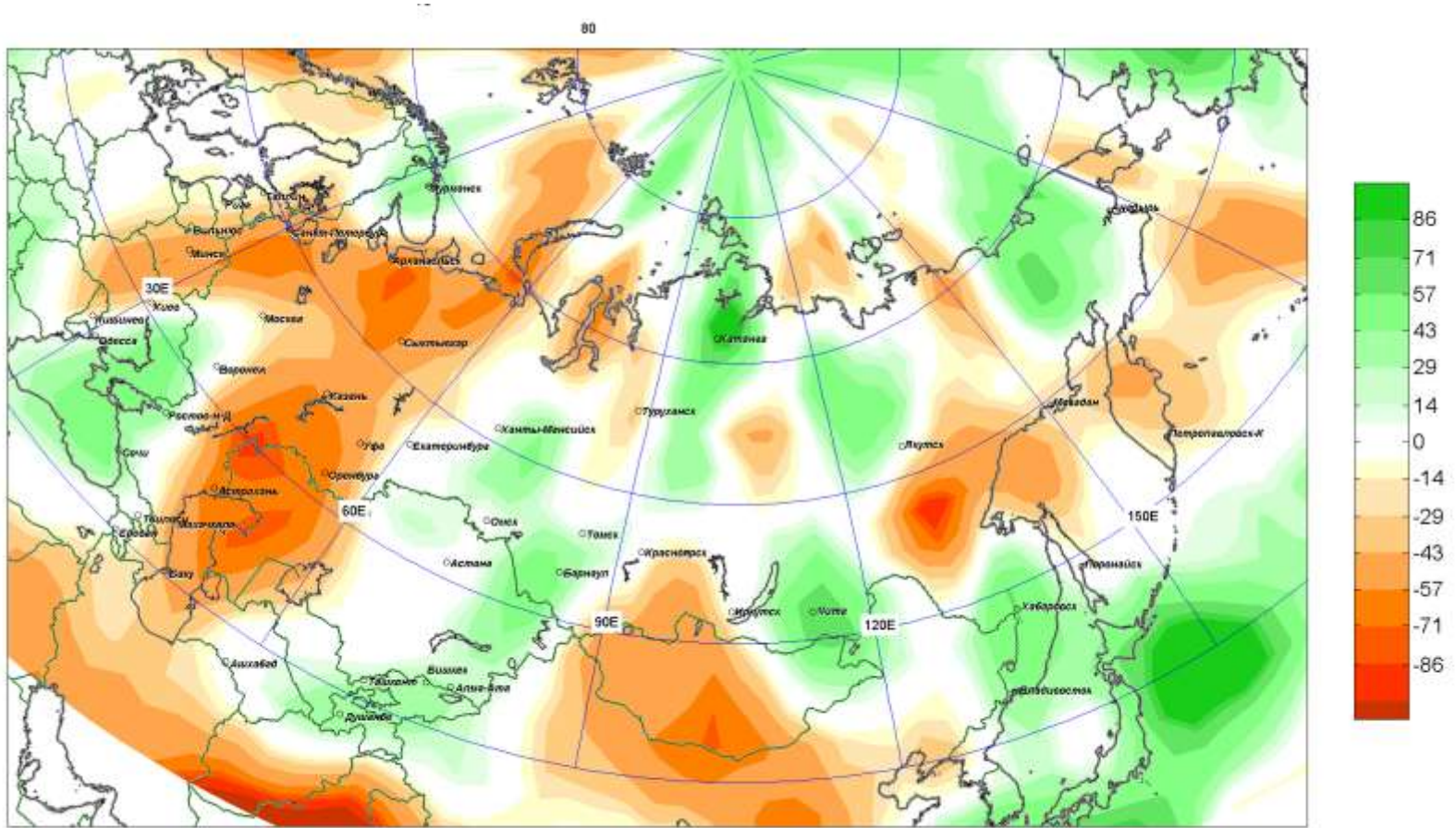


Below normal  
Near normal  
Above normal

## FORECASTS OF PRECIPITATION

Probabilistic Multi-Model Ensemble Forecast  
Composite map: precipitation

June - August 2019



PREC mm anomalies. JJA 2019

- MODELS:**
- Montreal
  - Tokyo
  - Washington
  - Moscow



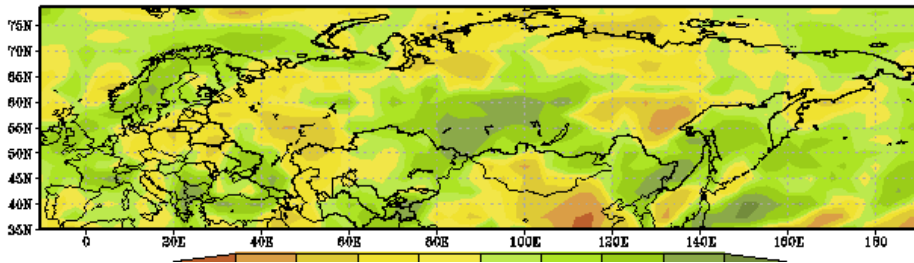


## ANOMALIES OF PRECIPITATION

Composite probabilities of categorical forecast outcomes for precipitation seasonal anomalies (mm/day). Producer: HMC (SL-AV)+MGO

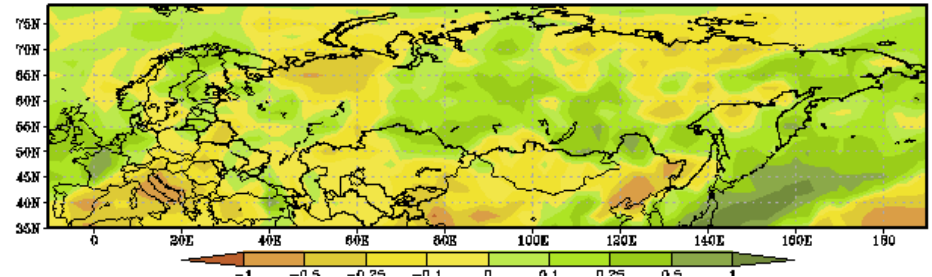
### June 2019

Precipitation seasonal anomalies (mm/day). Producer: HMC+MGO  
Forecast period: June\_2019



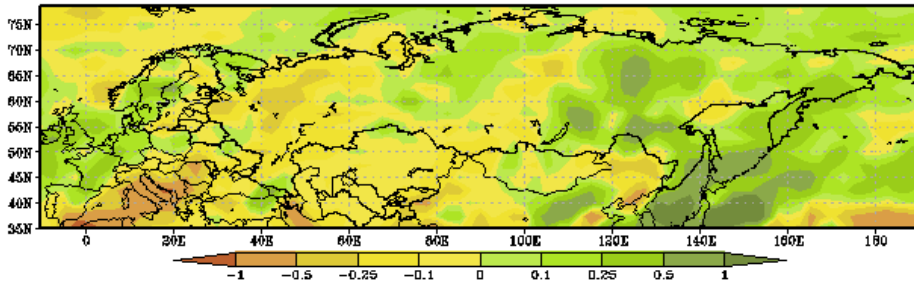
### July 2019

Precipitation seasonal anomalies (mm/day). Producer: HMC+MGO  
Forecast period: July\_2019



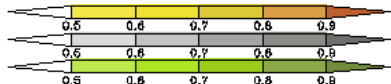
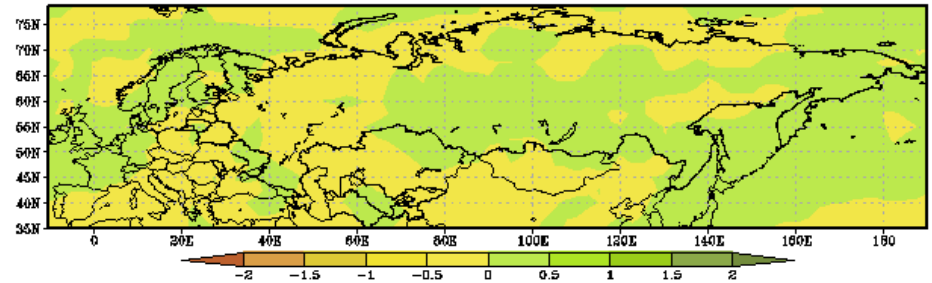
### August 2019

Precipitation seasonal anomalies (mm/day). Producer: HMC+MGO  
Forecast period: August\_2019



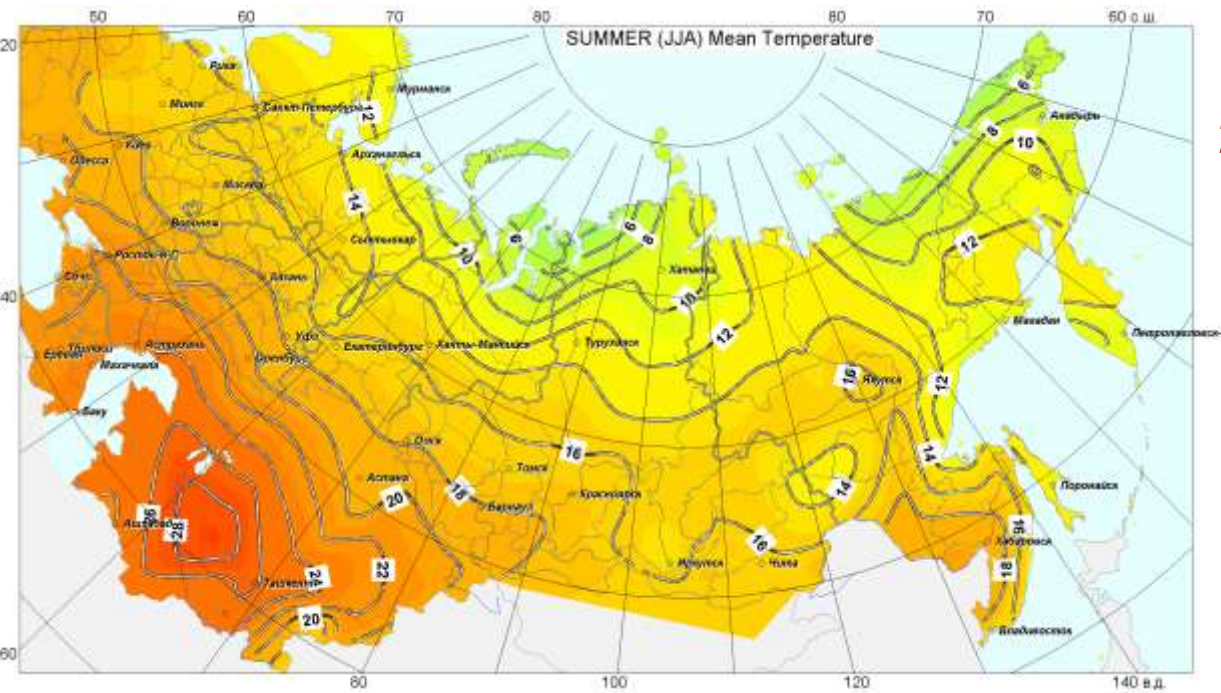
### June - August 2019

Precipitation seasonal anomalies. Producer: HMC+MGO  
Forecast period: June\_July\_August\_2019

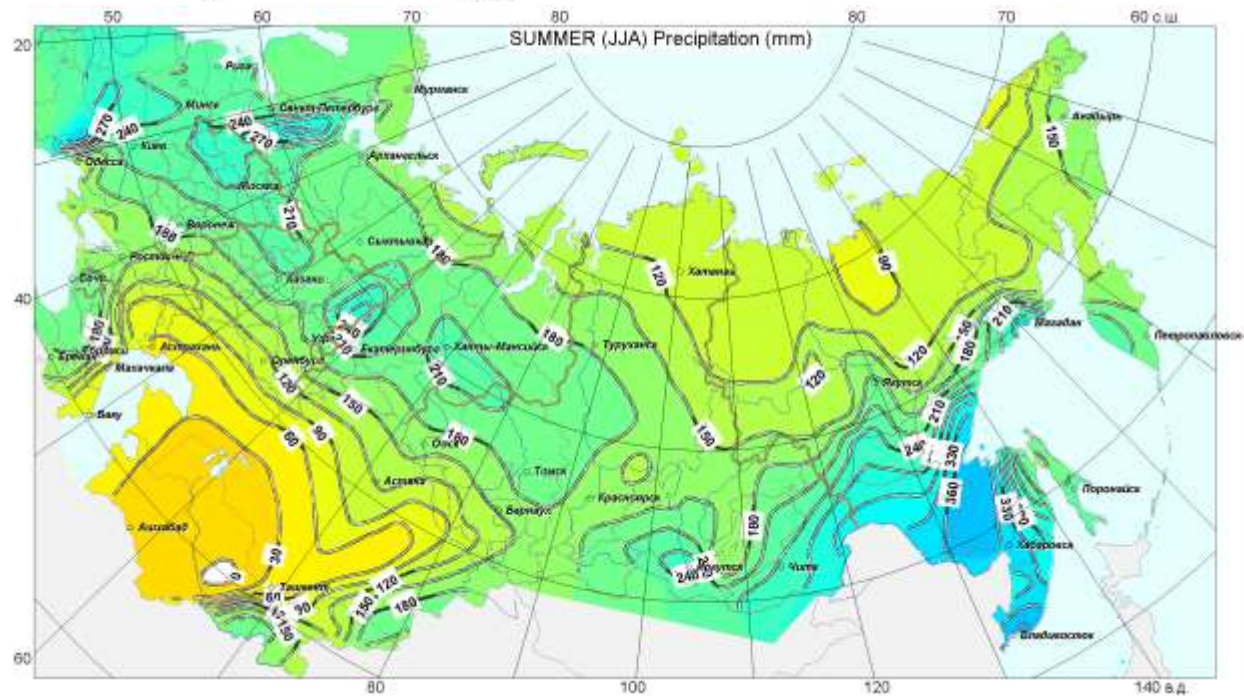


Below normal  
Near normal  
Above normal

## 2m Temperature Norms

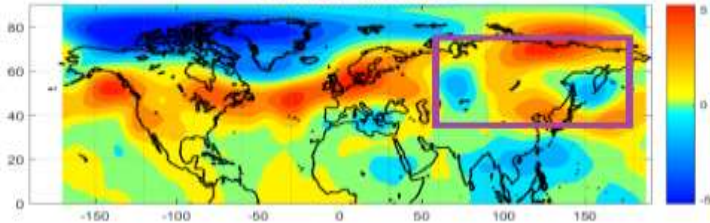


## Precipitation Norms

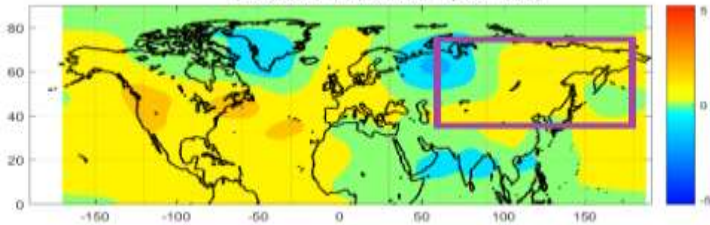


## FORECAST VERIFICATION: H500 and Mean sea Level Pressure

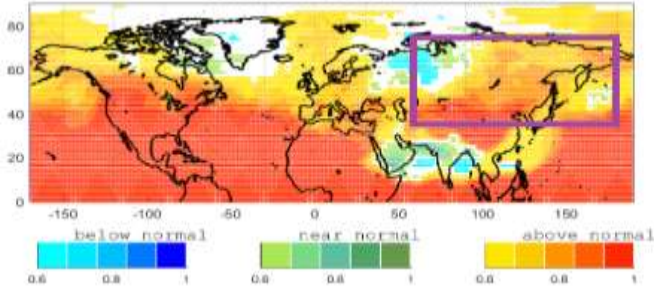
ANOMALIES h500 (GPH).JJA 2018. Season  
OBSERVED ANOMALIES



FORECAST ANOMALIES (HMC+MGO)



PROBABILISTIC FORECAST (HMC+MGO)



Parameter: H500  
Region: North Eurasia (35N - 75N; 20E - 180E)  
Date: 2018-06-01

Model	Verifications						Maps
	ROC_A	ROC_N	ROC_B	RO	ACC	RMSE	
Season							
PLAV	0.48	0.51	0.39	0.52	0.54	20.03	<a href="#">Open</a>
MGO	0.65	0.5	0.7	0.54	0.66	18.38	<a href="#">Open</a>
PLAV+MGO	0.59	0.5	0.6	0.58	0.66	18.47	<a href="#">Open</a>

Skill scores:

- ROC\_A - ROC Score Above Normal
- ROC\_N - ROC Score Near Normal
- ROC\_B - ROC Score Below Normal
- RO - sign consistency coefficient
- ACC - anomaly correlation coefficient
- RMSE - root mean square error

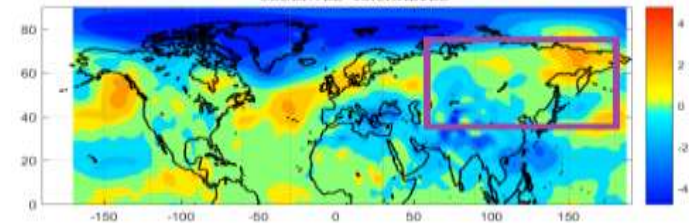
Verification scores are made on a historical material (1981-2010) for summer season.

Guidance: Standardised Verification System for Long-Range Forecasts, SVSLRF, 2002. New Attachment II-8 to the *Manual on the GDPFS* (WMO-No. 485), Volume I.

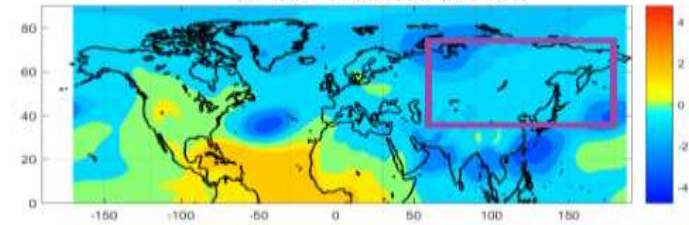
Verification characteristics are operationally presented on the NEACC web-site:

<http://seakc.meteoinfo.ru>.

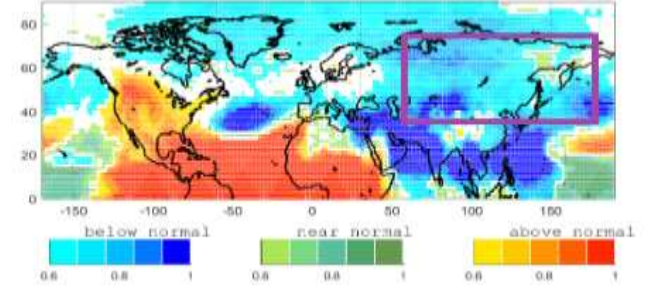
ANOMALIES mslp (qPa).JJA 2018. Season  
OBSERVED ANOMALIES



FORECAST ANOMALIES (HMC+MGO)



PROBABILISTIC FORECAST (HMC+MGO)



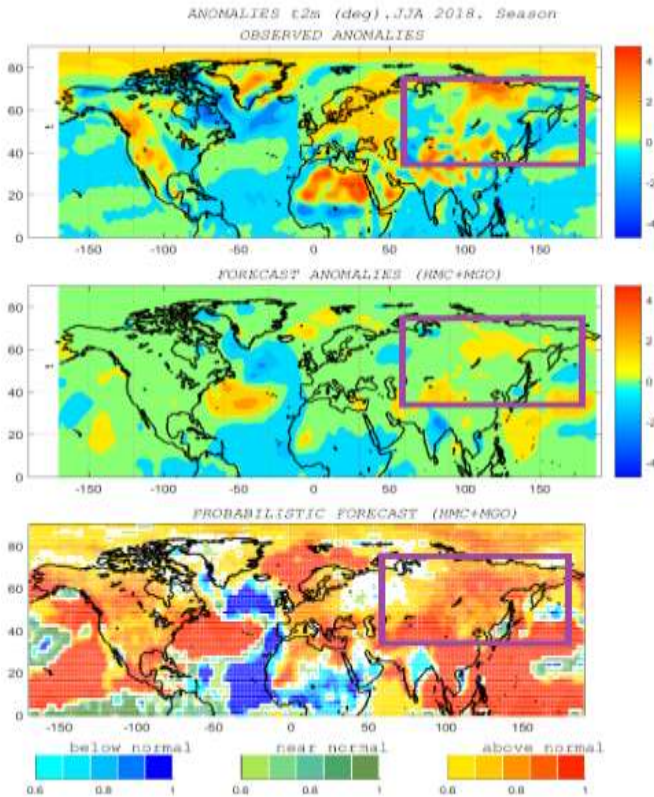
Parameter: P0  
Region: North Eurasia (35N - 75N; 20E - 180E)  
Date: 2018-06-01

Model	Verifications						Maps
	ROC_A	ROC_N	ROC_B	RO	ACC	RMSE	
Season							
PLAV	0.49	0.52	0.49	-0.07	-0.19	1.77	<a href="#">Open</a>
MGO	0.6	0.47	0.63	-0.02	0.1	1.17	<a href="#">Open</a>
PLAV+MGO	0.57	0.48	0.59	-0.07	-0.18	1.39	<a href="#">Open</a>

<http://neacc.meteoinfo.ru>



## FORECAST VERIFICATION: Temperature and Precipitation



Parameter: T2m  
Region: NorthEast Asia (35N - 75N; 60E - 180E)  
Date: 2018-06-01

Model	Verifications						Maps
	ROC_A	ROC_N	ROC_B	RO	ACC	RMSE	
Season							
PLAV	0.45	0.54	0.52	0.32	0.42	1.27	<a href="#">Open</a>
MGO	0.63	0.54	0.56	0.39	0.56	1.07	<a href="#">Open</a>
PLAV+MGO	0.54	0.56	0.57	0.38	0.52	1.12	<a href="#">Open</a>

Skill scores:

- ROC\_A - ROC Score Above Normal
- ROC\_N - ROC Score Near Normal
- ROC\_B - ROC Score Below Normal
- RO - sign consistency coefficient
- ACC - anomaly correlation coefficient
- RMSE - root mean square error

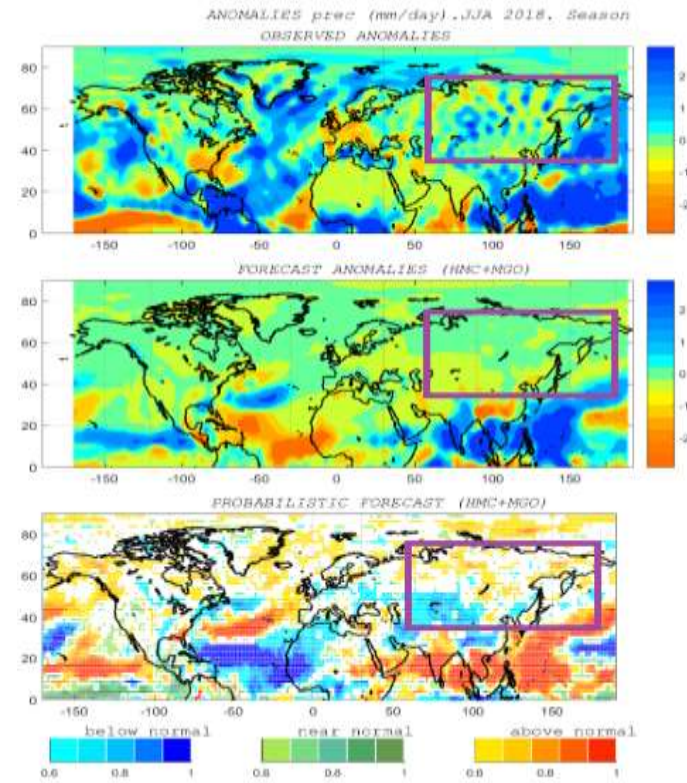
Verification scores are made on a historical material (1981-2010) for summer season.

Guidance: Standardised Verification System for Long-Range Forecasts, SVSLRF, 2002. New Attachment II-8 to the *Manual on the GDPFS* (WMO-No. 485), Volume I.

Verification characteristics are operationally presented on the NEACC web-site:

<http://seakc.meteoinfo.ru>.

<http://neacc.meteoinfo.ru>



Parameter: Precipitation  
Region: NorthEast Asia (35N - 75N; 60E - 180E)  
Date: 2018-06-01

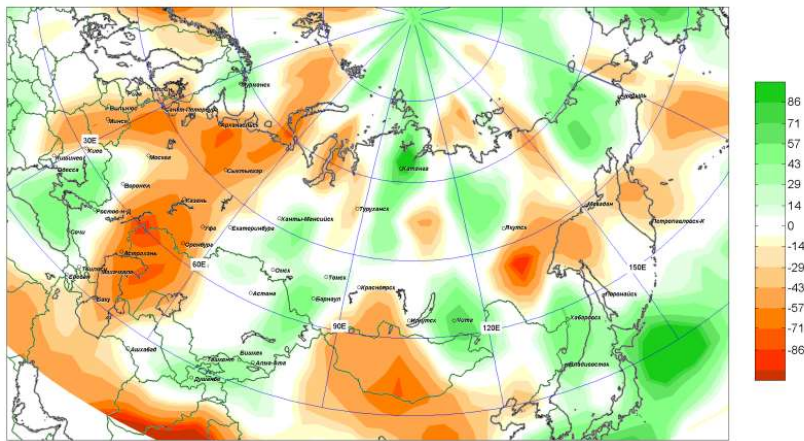
Model	Verifications						Maps
	ROC_A	ROC_N	ROC_B	RO	ACC	RMSE	
Season							
PLAV	0.51	0.54	0.48	0.03	0.28	1.42	<a href="#">Open</a>
MGO	0.53	0.57	0.51	0.07	0.24	1.42	<a href="#">Open</a>
PLAV+MGO	0.52	0.56	0.49	0.04	0.3	1.42	<a href="#">Open</a>

## ЗАКЛЮЧЕНИЕ

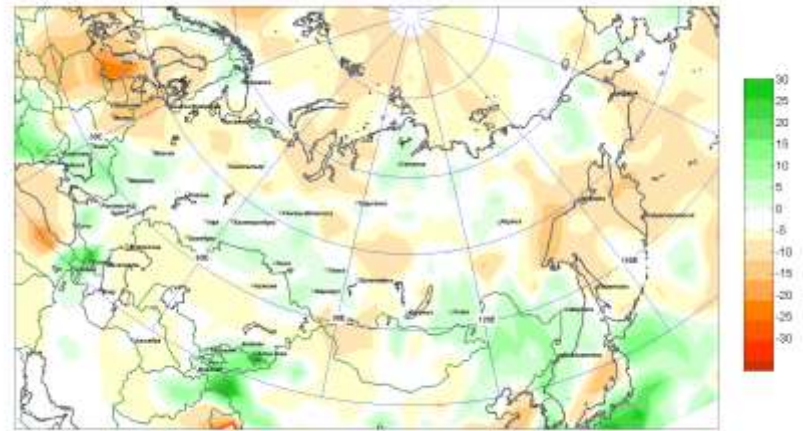
- Большинство моделей прогнозируют сохранение положительных АТПО в экваториальных широтах Тихого океана. Согласно прогнозу CPC/IRI, вероятности реализации в период июнь-август 2019 явлений Ла-Нинья, нейтральной фазы и Эль-Ниньо (Nino3.4, пороговые значения:  $-0.5^{\circ}\text{C}$  и  $0.5^{\circ}\text{C}$ ) составляют соответственно: 1%, 33% и 66 %.
- В полях ТПО на акватории Северной части Тихого океана ожидаются значительные отклонения от климата, связанные с положительной фазой PDO. При этом возможны существенные изменения географического положения и интенсивности Тихоокеанского максимума, а затем и Алеутского минимума и, как следствие, появления значительных отклонений от климата в полях температуры и осадков на территории Дальнего Востока.
- В Северной Атлантике основная мода изменчивости представлена отрицательными аномалиями ТПО в центральной части Северной Атлантики. В то же время в районе Гольфстрима и Ньюфаундлендской энергоактивной зоны ожидаются значительные положительные АТПО. Таким образом, в Северной Атлантике сигнал со стороны океана, связанный с положительной фазой Северо-атлантического триполю, указывает на возможность реализации, по крайней мере, в начале летнего периода положительной фазы NAO колебания.
- На большей части территории Северной Евразии, по данным большинства прогностических центров, лето 2019 г. ожидается теплее обычного. Наиболее значительные аномалии предполагаются на Европейской территории и в Якутии. Выше нормы средняя температура ожидается на западе Казахстана. На востоке Казахстана, в Средней Азии, на юге Западной Сибири более вероятны значения температуры близкие к норме
- В прогнозах осадков много противоречий и неопределенностей. Наличие четкого сигнала отмечается в Закавказье, на востоке Узбекистана и Туркменистана, где ожидается **избыточное увлажнение**. На территории Европы в прогнозах некоторых моделей отмечается **дефицит осадков**.
- *Информация бюллетеня носит консультативный характер и должна применяться к конкретным регионам с учетом предсказуемости атмосферных процессов, региональных климатических особенностей и качества современных гидродинамических моделей.*



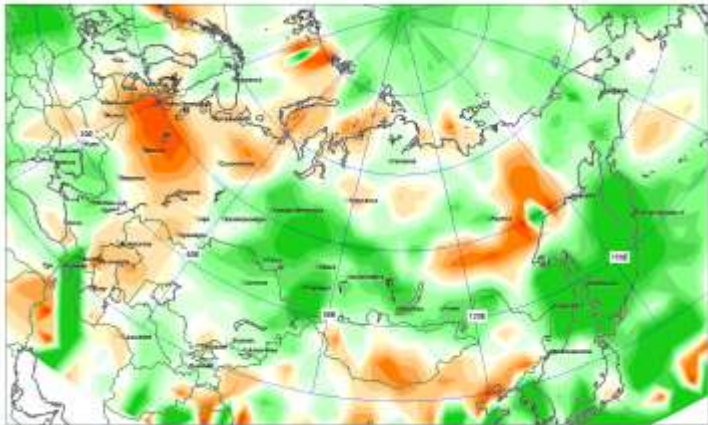
**Thank you for your attention**



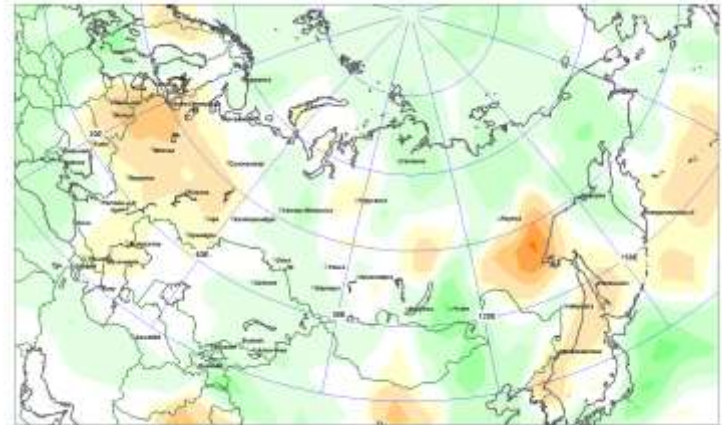
PREC mm anomalies, JJA 2019



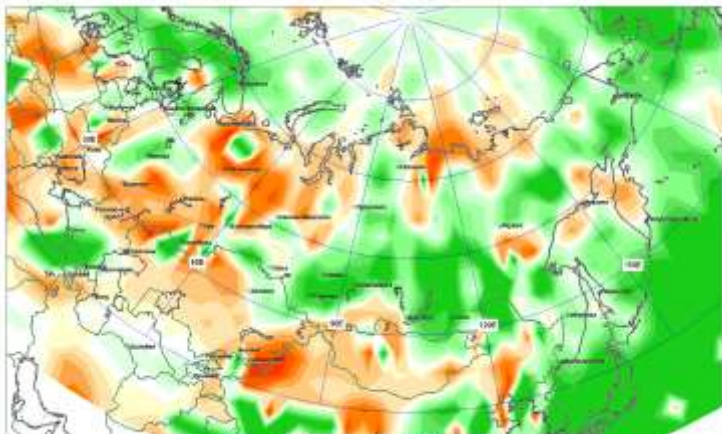
PREC mm anomalies, JJA 2019 (NCEP)



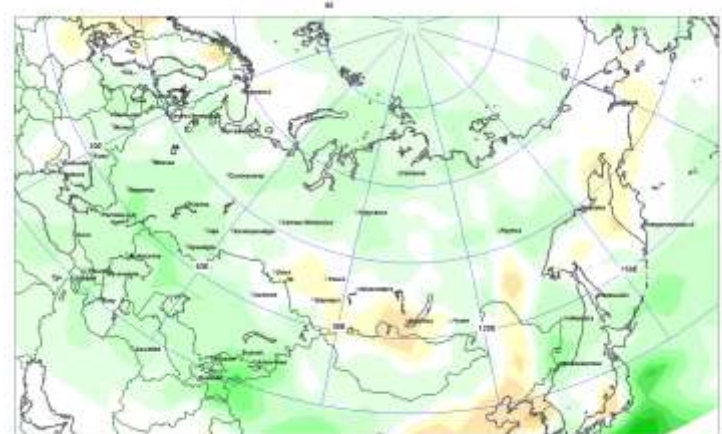
PREC mm anomalies, JJA 2019 (HMC)



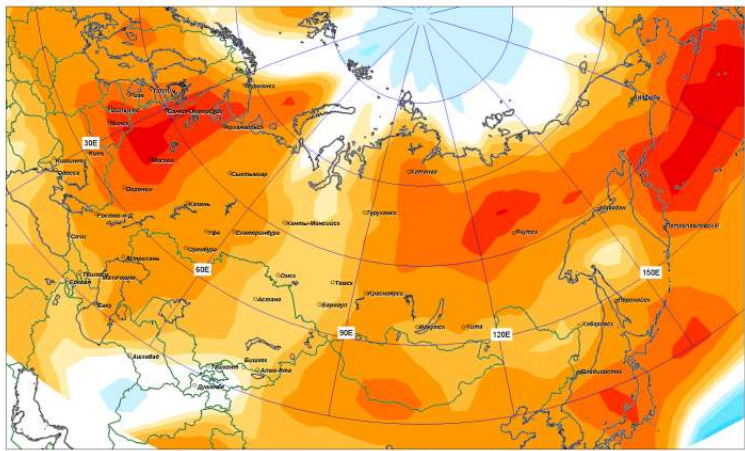
PREC mm anomalies, JJA 2019 (Canada)



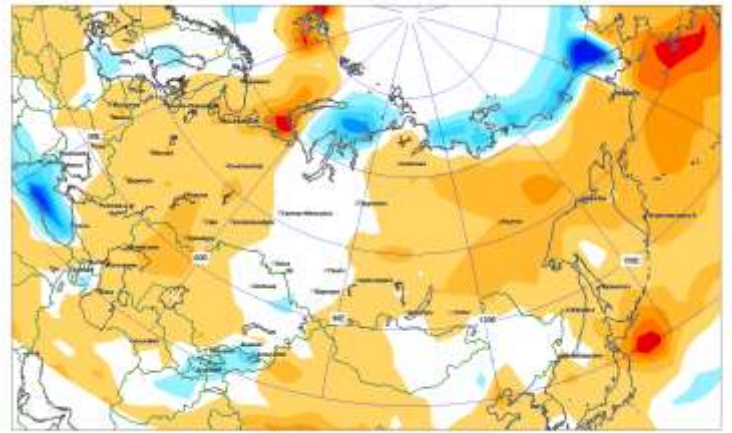
PREC mm anomalies, JJA 2019 (MGO)



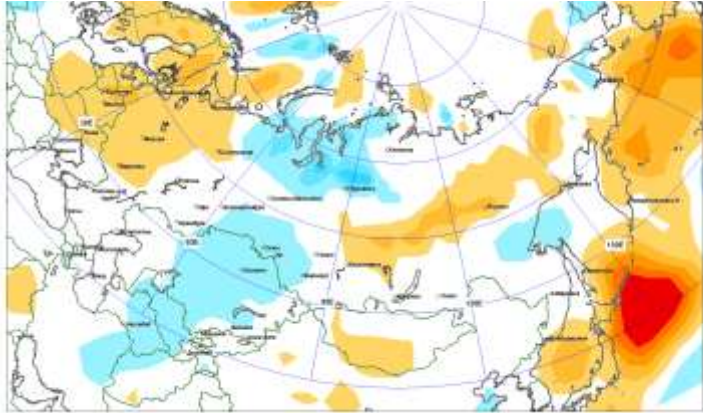
PREC mm anomalies, JJA 2019 (Japan)



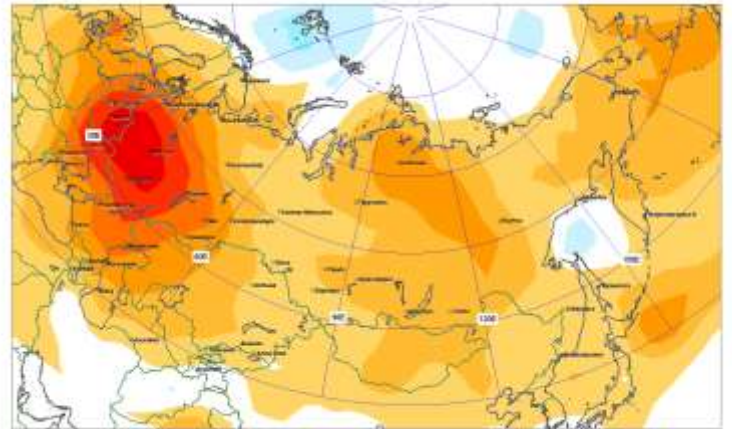
T2M deg anomalies. JJA 2019 (Composite)



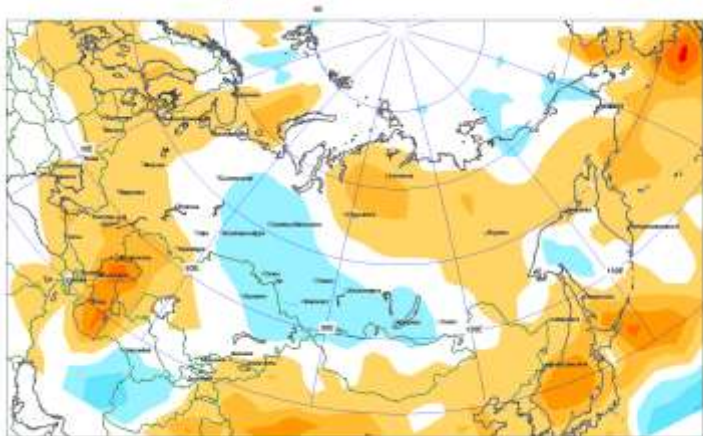
T2M deg anomalies. JJA 2019 (NCEP)



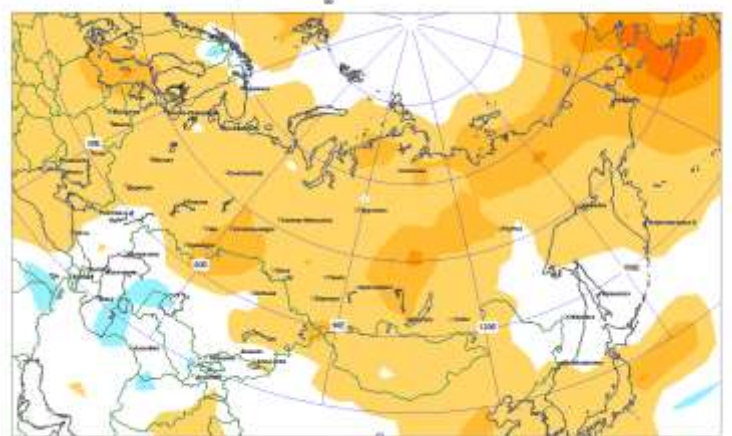
T2M deg anomalies. JJA 2019 (HMC)



T2M deg anomalies. JJA 2019 (Canada)



T2M deg anomalies. JJA 2019 (MGO)



T2M deg anomalies. JJA 2019 (Japan)