WMO RA VI RCC-Network

SEASONAL FORECAST OUTLOOK WINTER 2018-2019 FROM GPC-MOSCOW/NEACC

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MEDCOF-11, SEECOF-20, PRESANOF13, ACOF3
November 26-29, 2018
Cairo, Egypt

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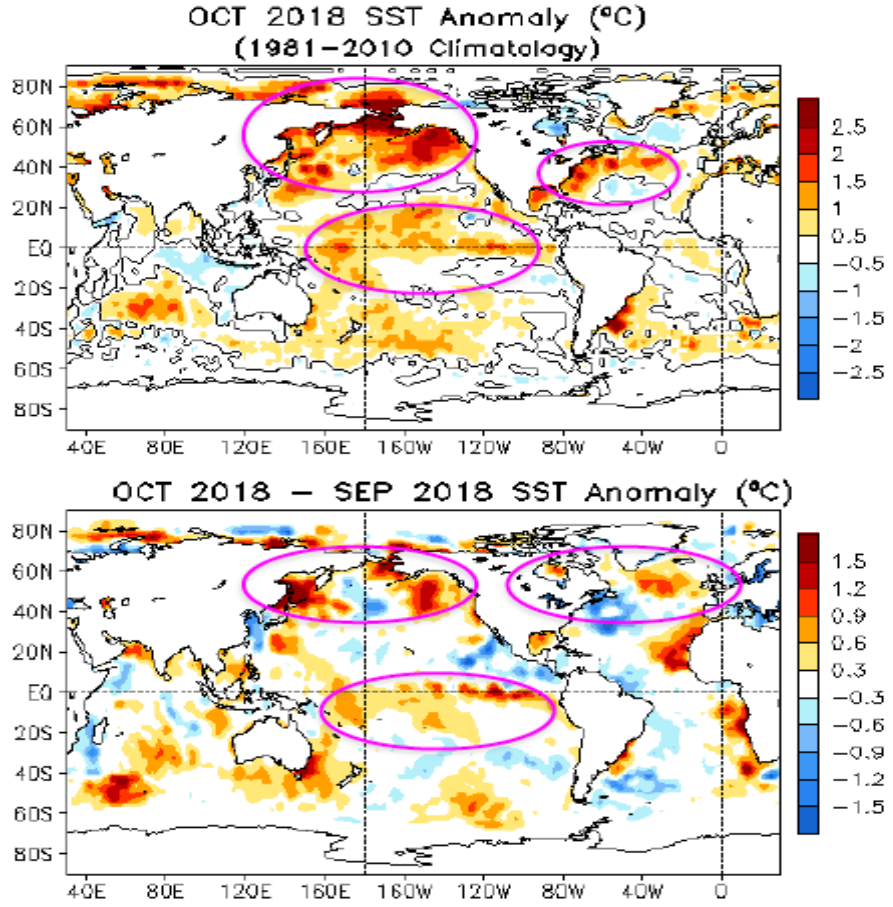
Global SST Anomaly (°C) and Anomaly Tendency



- SSTs were above average across most of the tropical Pacific Ocean.
- Strong positive SSTAs continued in the mid-high latitudes of N. Pacific and Artic Oceans.
- Strong positive SSTAs presented in the Gulf of Mexico and along the Gulf Stream.
- SST warming dominated in the Southern Oceans.

- Positive SSTA tendencies strengthened across much of the equatorial Pacific Ocean.
- Large SSTA tendencies were observed in the mid-high latitude of N. Pacific and N. Atlantic.

Fig. G1. Sea surface temperature anomalies (top) and anomaly tendency (bottom). Data are derived from the NCEP OI SST analysis, and anomalies are departures from the 1981-2010 base period means.

-SST warming in the northeast Pacific (Pacific "Blob") and the Arctic Ocean enhanced in the last three months.

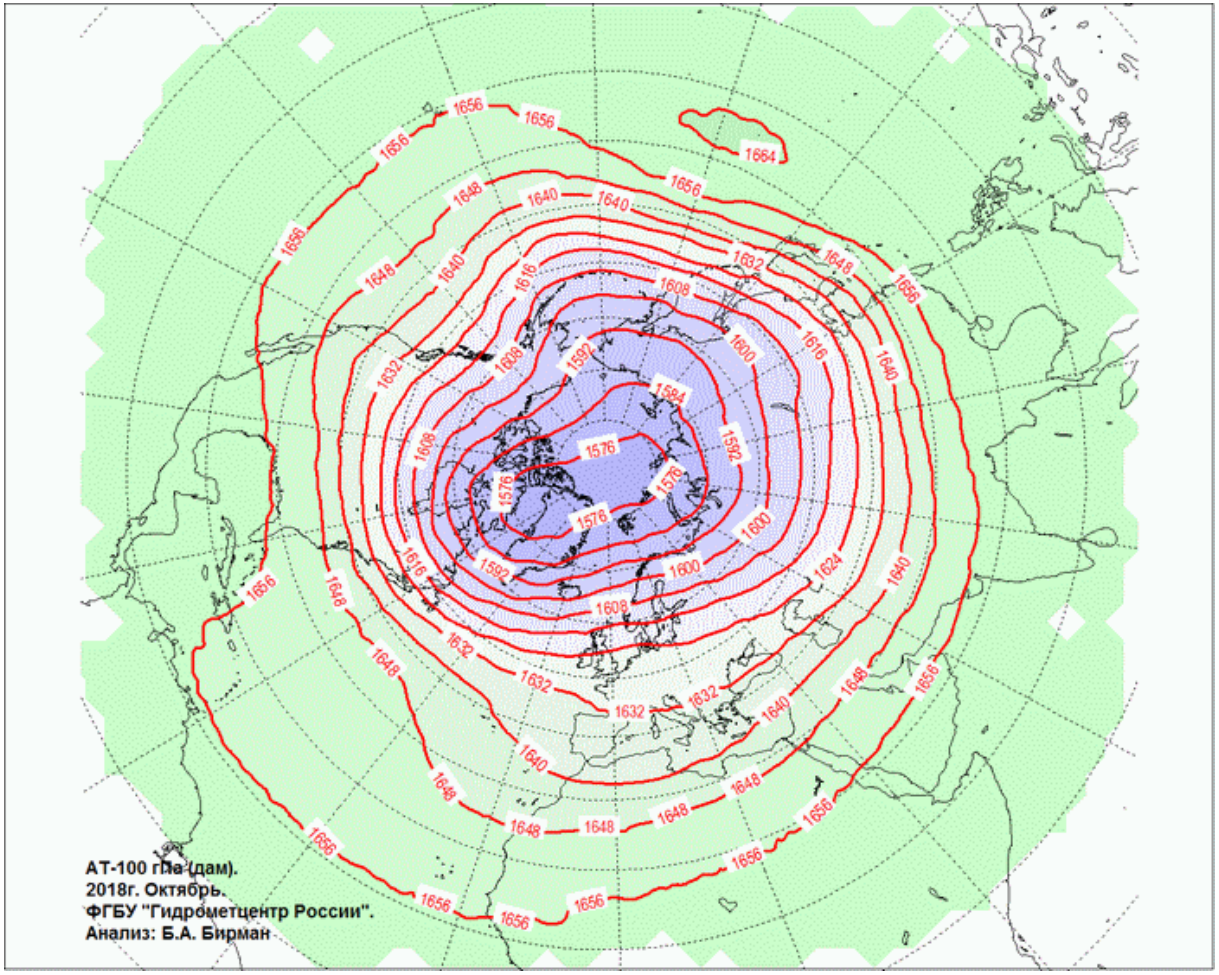
-Distribution of SST anomalies between 20 - 50N varied month by month, owing to the high frequency changes in the atmospheric circulation.

From CLIMATE PREDICTION CENTRE

http://www.cpc.ncep.noaa.gov/products/GODAS/ocean_briefing_gif/global_ocean_monitoring_current.pdf

October 2018

Northern Hemisphere Circulation



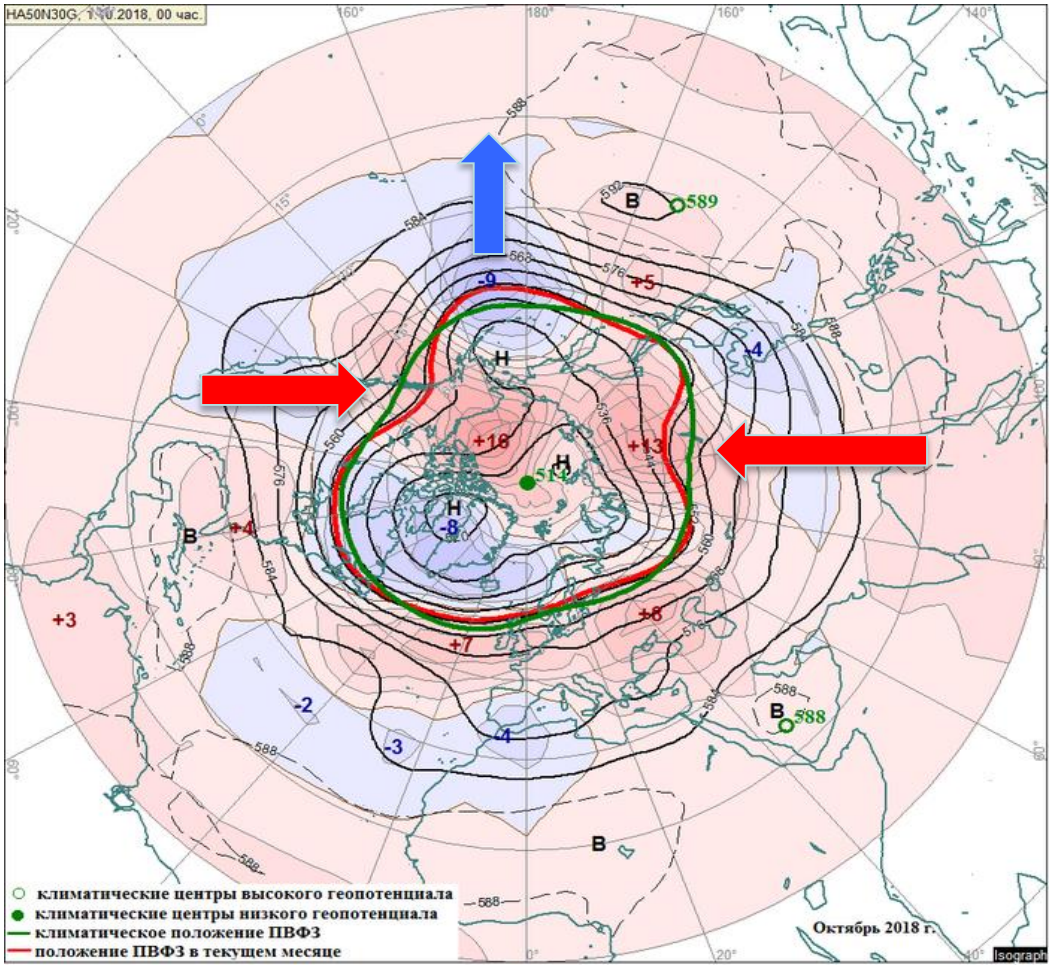
In the upper stratosphere, the circumpolar vortex continues to deepen. Its position has stabilized near the pole, the Geopotential in the center is slightly below the norm.
In the equatorial stratosphere there was a significant weakening of the eastern phase of the winds of the QBO.

Monthly geopotential height
and its anomalies at 100-hPa. Contour: geopotential height (m)

Source: Hydrometcenter of Russia

October 2018

Northern Hemisphere Circulation



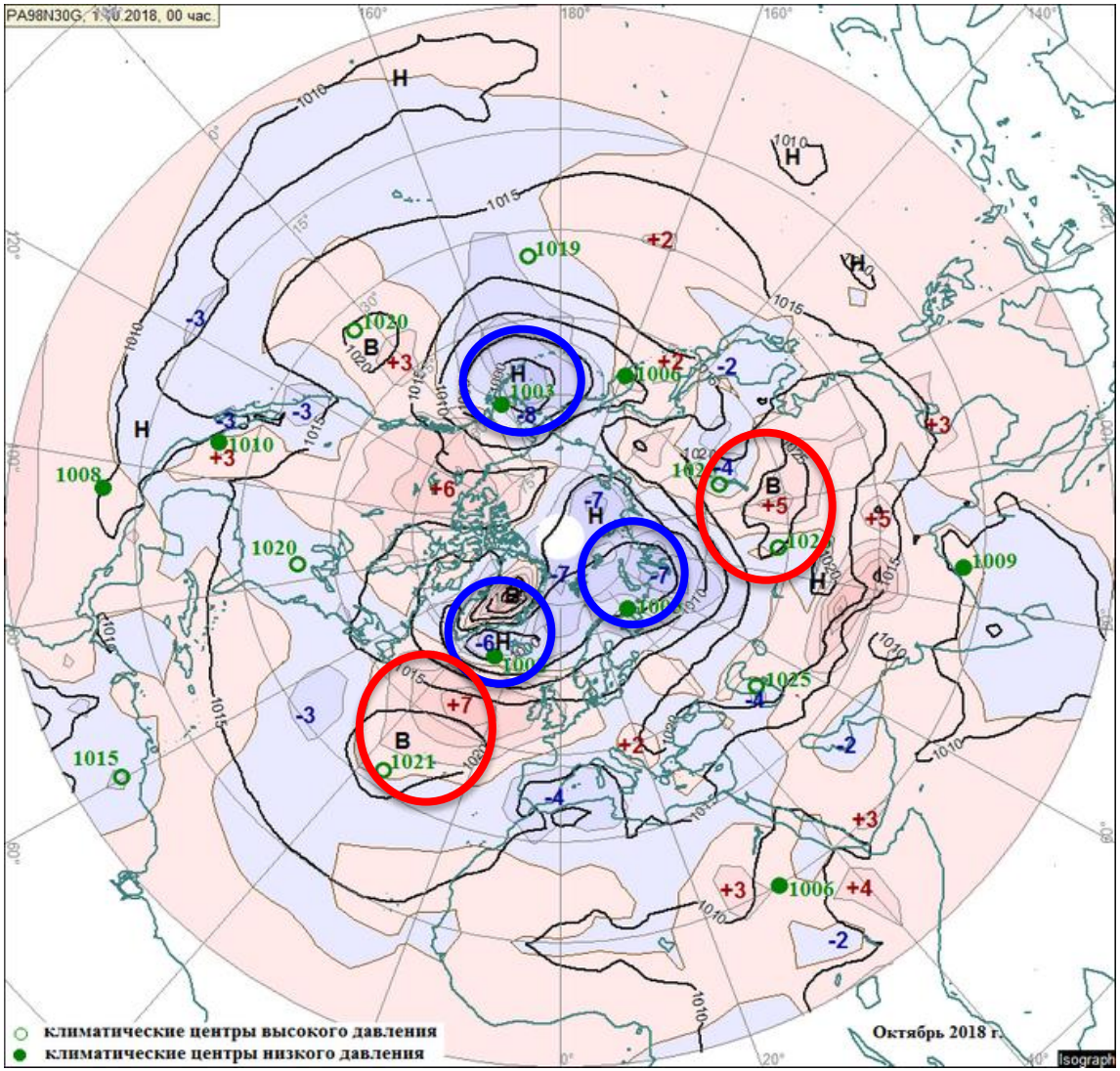
The position of the polar front basically corresponded to the normal. Small deviations to the north occurred in areas of tropospheric ridges in western Canada and over Siberia; on average per month they were 3-5º. A displacement to the south of PF was observed in the association of Aleutian low.
Zonal flow in the middle troposphere was most intense in the high latitudes of the European region (30% higher than the normal), while in middle and high latitudes of Asia, the North American continent, it was weakened (by 28% and 39%, respectively).

Monthly geopotential height and its anomalies at 500-hPa. Contour: geopotential height (m) Shading: geopotential height anomalies (m)

Source: Hydrometcenter of Russia

October 2018

Northern Hemisphere Circulation



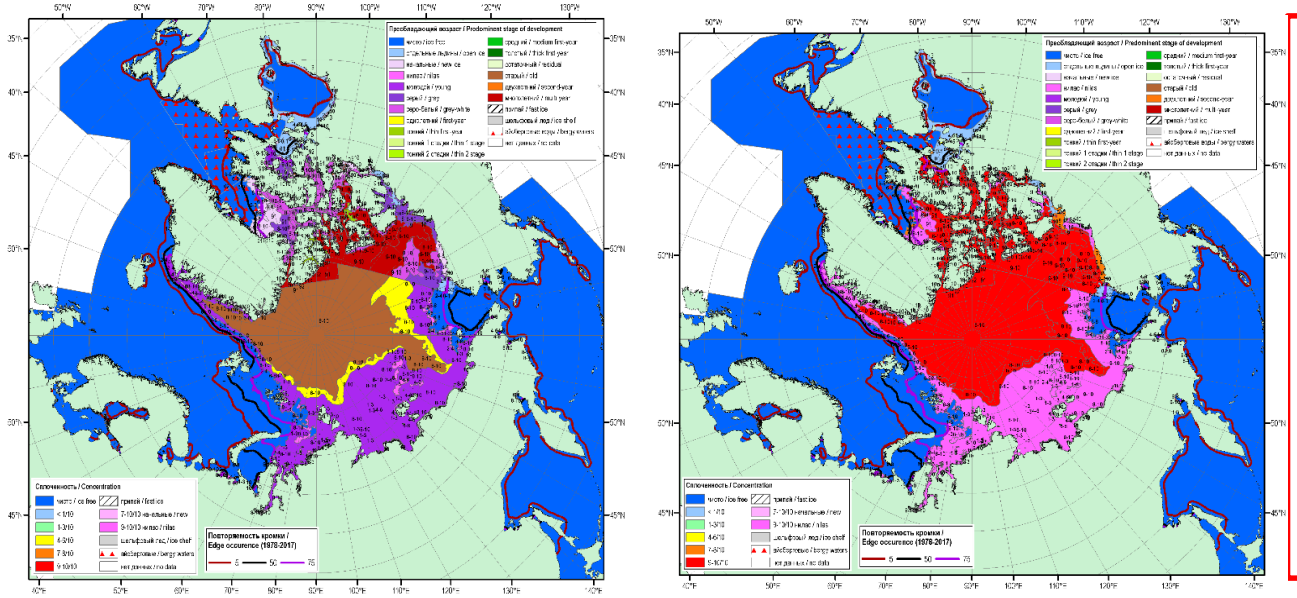
Monthly mean sea level pressure and its anomalies. Contour: sea level pressure (hPa) Shading: sea level pressure anomalies (hPa)

The Azore high is moderately intensive and shifted to north.
The Icelandic low occupied its normal position, but it was deeper than usual: pressure anomalies near the center were -6 hPa, on the Kara Sea coast -7 hPa.

The Siberian high had a normal intensity. Its center was shifted to the east and located in central Mongolia (pressure anomalies up to +5 hPa). The area occupied by SH also corresponded to the norm, but on the western periphery of the anticyclone the pressure was 2 ... 4 hPa below normal.
The pressure in the center of the Aleutian low turned out to be 6 hPa below normal

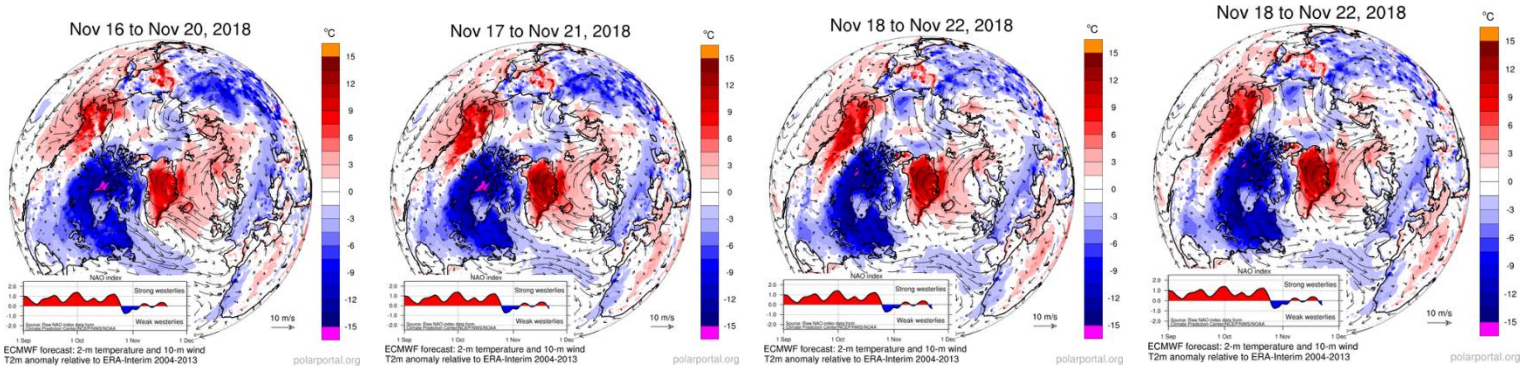
Source: Hydrometcenter of Russia

Current Ice Conditions (29 October-6 November 2018)



✓ Till the end of November 2018, with exception of Canadian archipelago and Hudson Bay, strong westerly winds (NAO>0) continued to preserve positive temperature anomalies over the Eastern and Central Arctic, slowing the ice formation process

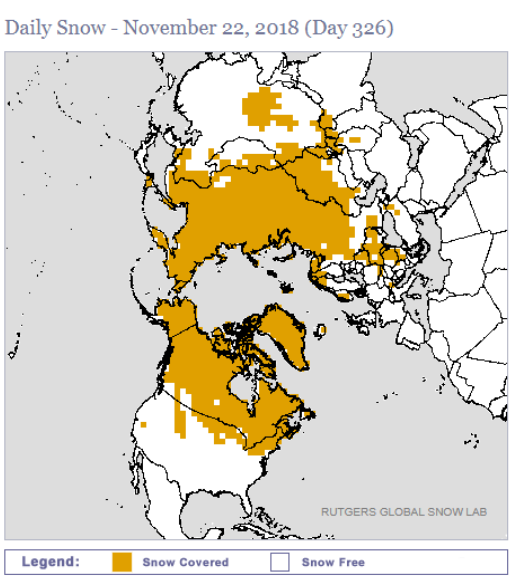
Blended AARI/CIS ice charts for 29 October – 6 November 2018

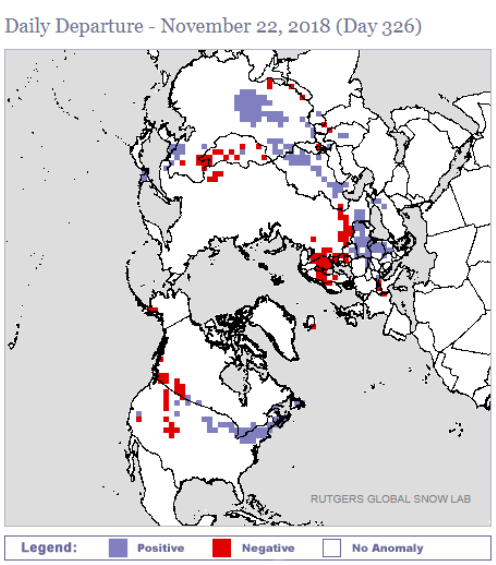


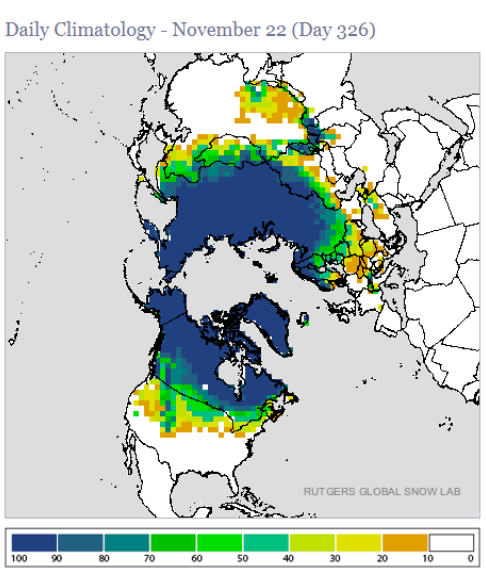
Surface air temperature anomalies (2m) relative to 2004-2013 and mean wind vectors (10 m) for 16.11-23.11.2018 (http://polarportal.dk)

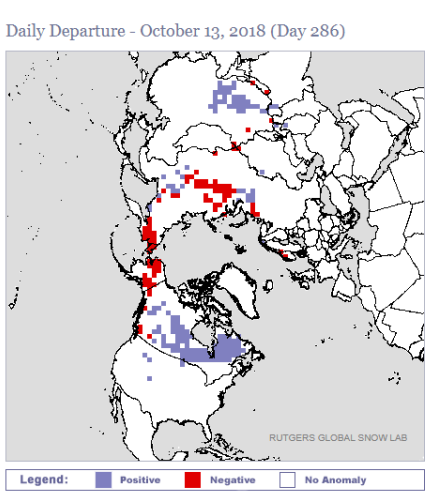
According to NSIDC the Arctic sea ice extend in Oct 2018 ranked the third lowest Oct since 1979.

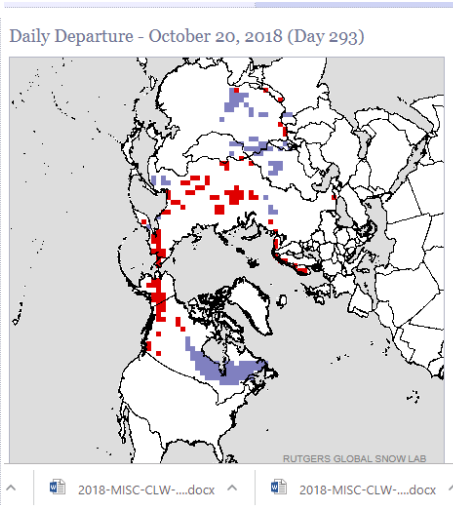
SNOW COVER CONDITIONS

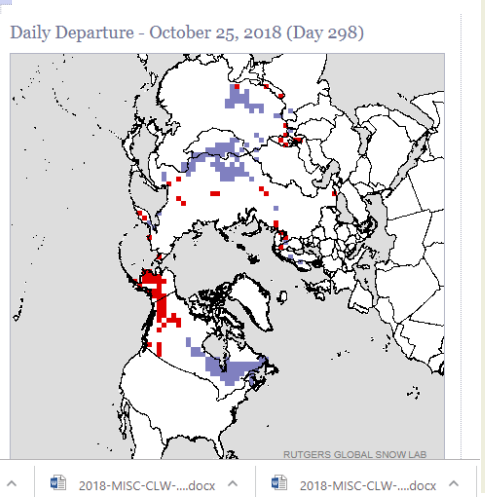


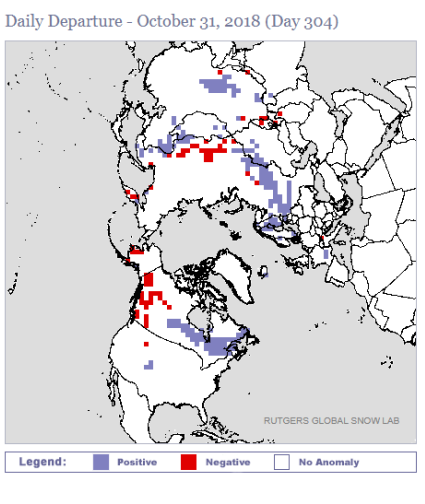












2018-MISC-CLW-....docx 2018-MISC-CLW-....docx 2018-MISC-CLW-....docx 2018-MISC-CLW-....docx

Source: Rutgers University Global Snow Laboratory (GSL). All anomalies are relative to the 1981–2010 average.

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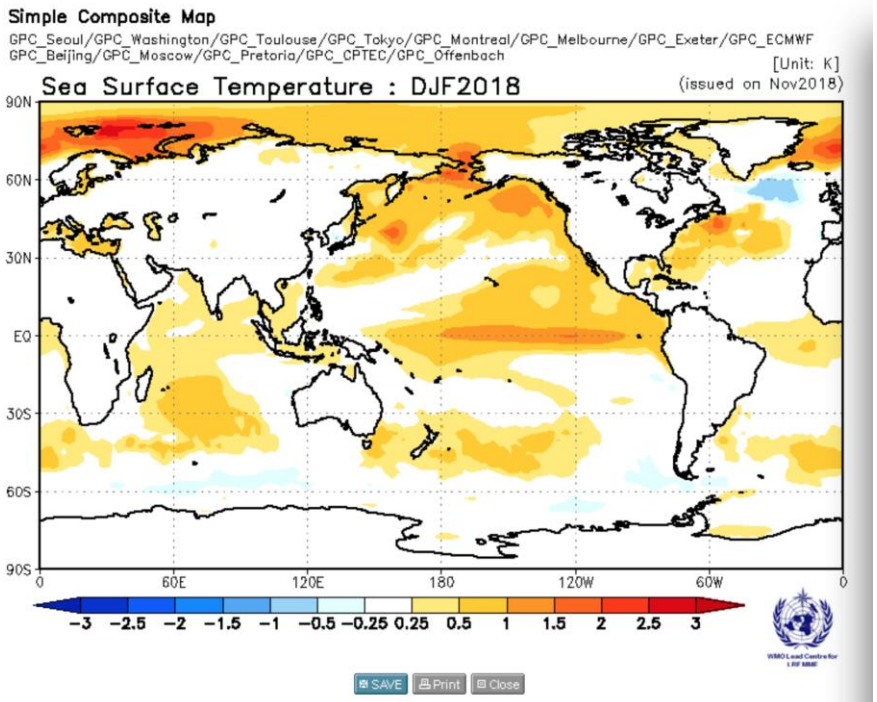
SST and IMPACTS OF TROPICAL SST

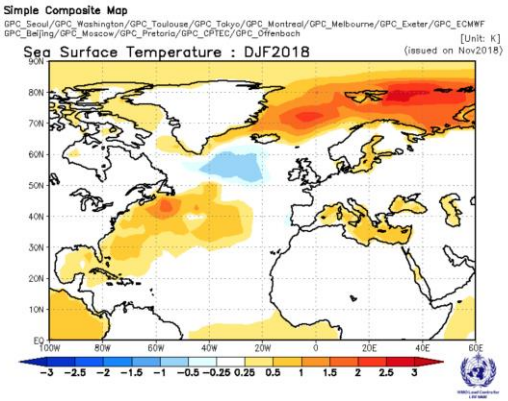
December – February 2018/2019

Three month mean SST anomalies (°K)



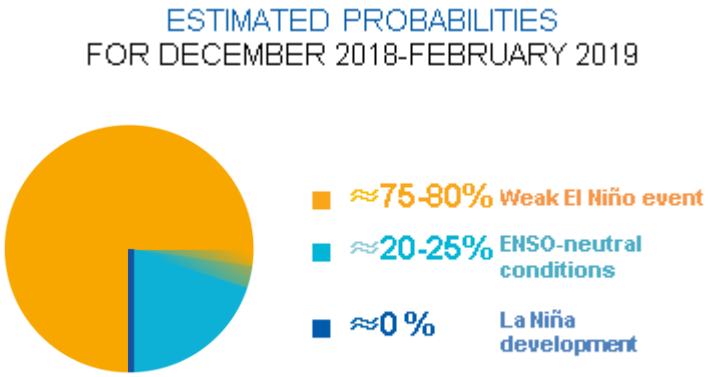
The tripole structure of SST variablity with negative in the mid-latitudes and positive in lower and higher latitude will be in the North Atlantic. The distribution of predicted anomalies is consistent with the positive phase of NAO.

- **Indian Ocean:** the most significant SST anomalies are expected in the southern hemisphere (positive in the west). In the northern hemisphere, the IOD returned to neutral values.
- **Pacific Ocean:** Most models predict warmer than normal conditions in east-central tropical Pacific. SST warming probably will continue in the northeast Pacific and the Arctic Ocean enhanced in DJF 2018



LC MMELRF-WMO Lead Centre for MME LRF

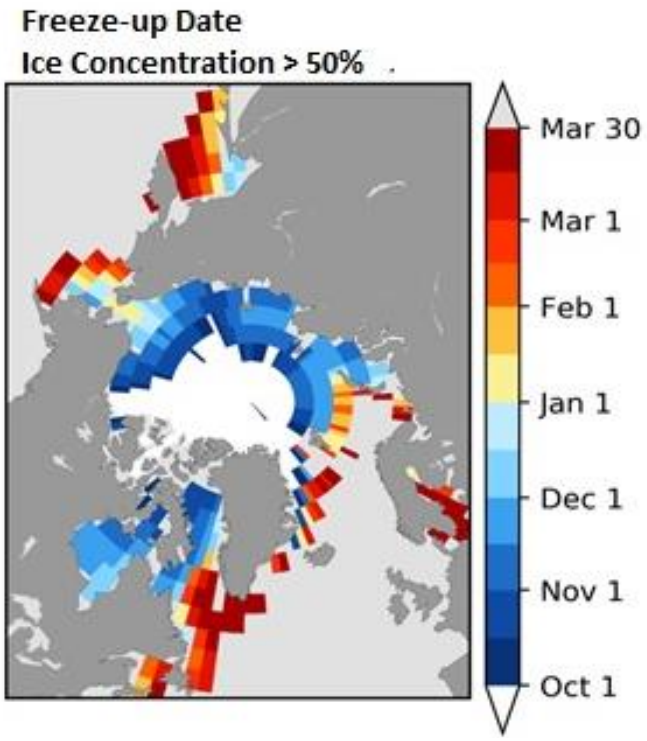
https://www.wmolc.org/

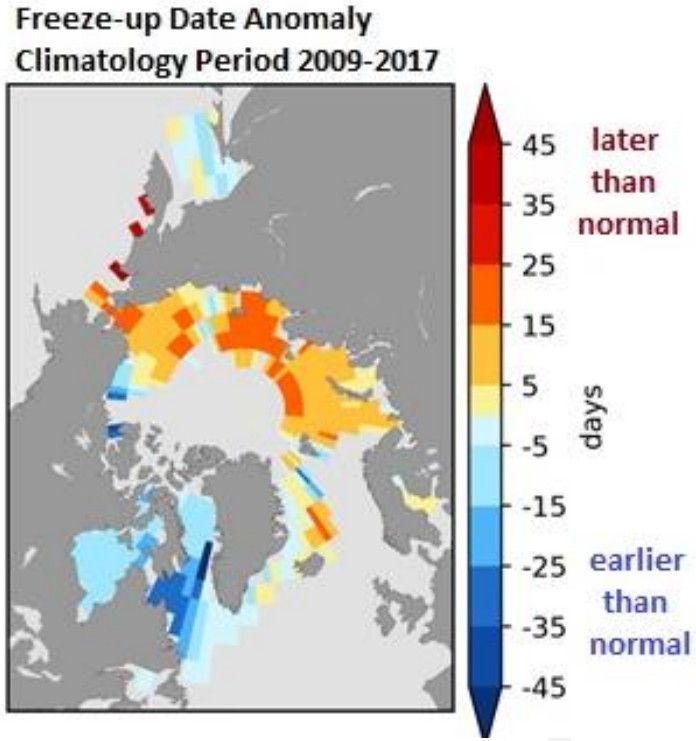


In summary:

- Conditions in the tropical Pacific Ocean have been at a weak El Niño level since October 2018, but the corresponding El Niño patterns have not developed in the atmosphere.
- Model predictions and expert opinion indicate a 75-80% chance that the ocean and atmosphere will couple, leading to the occurrence of an El Niño during the period December 2018-February 2019. Odds are about 60% for El Niño to continue through February-April 2019.
- Model predictions and expert opinion also lead us to expect a weak to moderate El Niño event, with sea surface temperatures of about 0.8 to 1.2 degrees Celsius above average in the east-central tropical Pacific for the December 2018-February 2019 season. A strong El Niño event appears unlikely at this stage.
- Through Northern Hemisphere spring 2019, the development of La Niña is highly unlikely.

2018 Outlook: Freeze-up





Hudson Bay/Baffin Bay/Labrador Sea:	earlier than normal	[moderate to high confidence]
Gulf of St. Lawrence:	near normal	[low confidence]
Greenland Sea:	near normal	[moderate confidence]
Barents Sea:	later than normal	[moderate confidence]
Kara/Laptev/East Siberian Seas:	later than normal	[moderate to high confidence]
Chukchi Sea:	later than normal	[high confidence]
Beaufort Sea:	earlier than normal	[high confidence]
Sea of Okhotsk:	near normal	[low confidence]
Bering Sea:	later than normal	[low confidence]

Source:2018/2019 Winter Sea Ice Outlook PARCOF-2

2018 Outlook: March Ice Extent

2018 Outlook for March Sea Ice Extent:

Greenland Sea: **near normal**
[low confidence]

Gulf of St. Lawrence: **below normal**
[low confidence]

Bering Sea: **below normal**
[moderate confidence]

Barents Sea: **below to near normal**
[moderate confidence]

Sea of Okhotsk: **below to near normal**
[moderate confidence]

Labrador Sea: **below to near normal**
[low confidence]

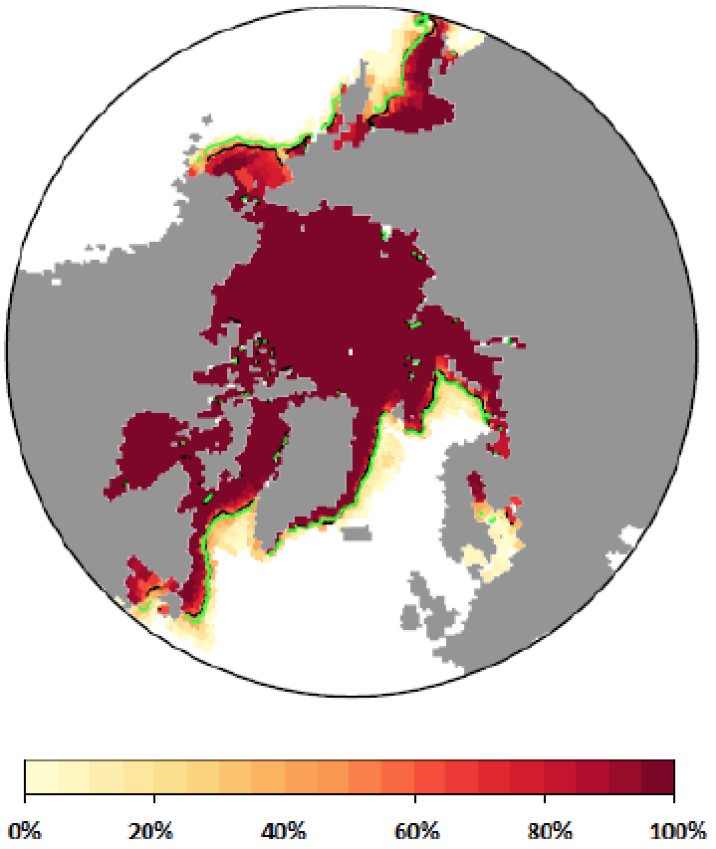
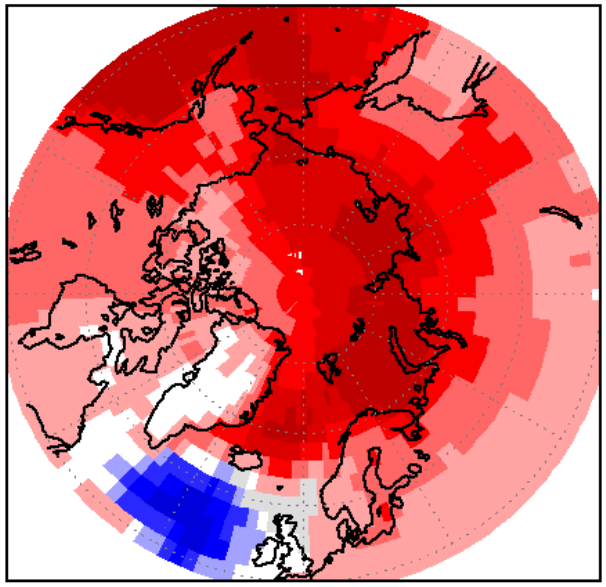


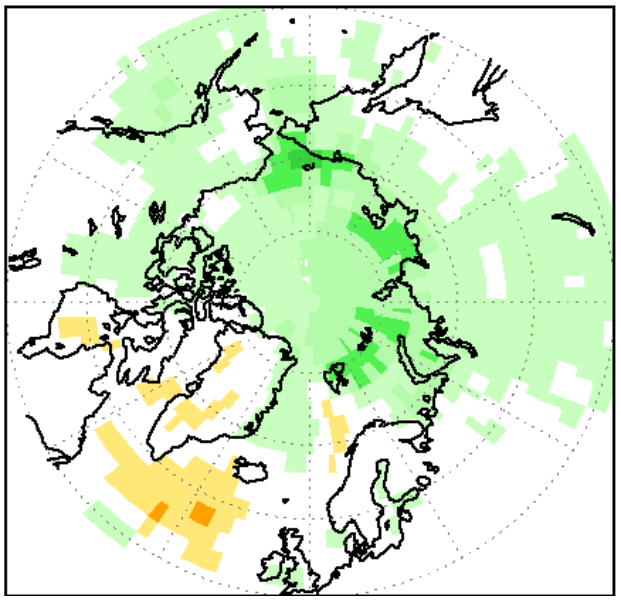
Figure 12: March 2019 probability of sea ice at concentrations greater than 15% from CanSIPS (ECCC). Ensemble mean ice extent from CanSIPS (black) and observed mean ice extent 1998-2017 (green)

Source: 2018/2019 Winter Sea Ice Outlook
PARCOF-2

PARCOF-2 outputs



Equal probability chances are expected over Greenland with an exception of the northern region where there is at least 40% chance for above normal temperatures. Over the Scandinavian region and over Iceland there is at least 40% chance for above normal temperatures. Somewhat higher probabilities (around 60%) are expected over northern Norway and Finland. Over the entire Russian Arctic, above normal temperatures are expected for NDJ 2018-2019. Highest probabilities for this outcome are of at least 70% chance over the central and western Russian Arctic. Over the eastern Russia, there is at least a 50% chance for above normal temperatures.



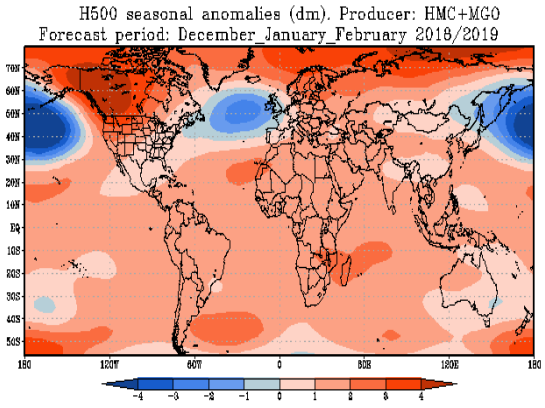
Outlook (NDJ 2018-2019): There is a probability of 40% or more for above normal precipitation over the entire Canadian and Russian Arctic with some exceptions over the eastern Russia, Baffin Island and Hudson Bay where equal precipitation chances are expected (Figure 8). Over Scandinavia, Iceland, Greenland and over most of the Alaskan region we expect equal probability chances. In the northern Atlantic region there are at least 40% chance for below normal precipitation, likely linked to high probabilities for below normal temperatures over this region.

ATMOSPHERIC CIRCULATION

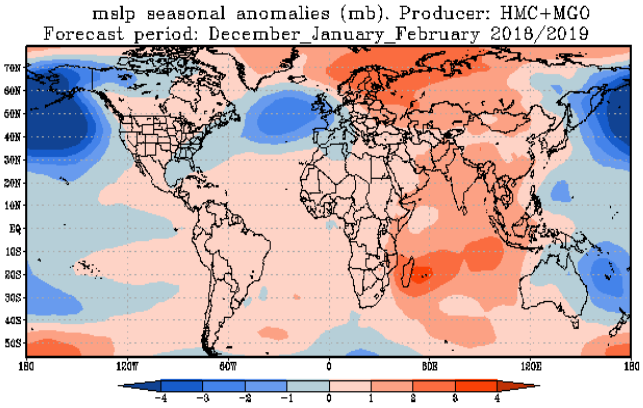
December 2018 - February 2019

GPC-Moscow

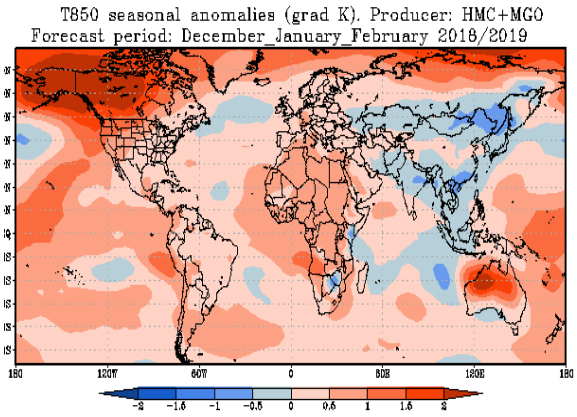
500-hPa Height



Sea level pressure



850 hPa Temperature



- **In the 500-hPa height field**, **positive** anomalies are predicted over high latitudes of NH, negative anomalies are predicted over mid latitudes of NH Atlantic and Pacific oceans.
- **In the sea level pressure field**, **positive** anomalies are predicted mostly in Eurasia except west of Europe and Far East of Russia
- **In the 850-hPa temperature field**, **positive** anomalies are predicted around Arctic polar region. South of Eurasia is under area of negative anomalies.

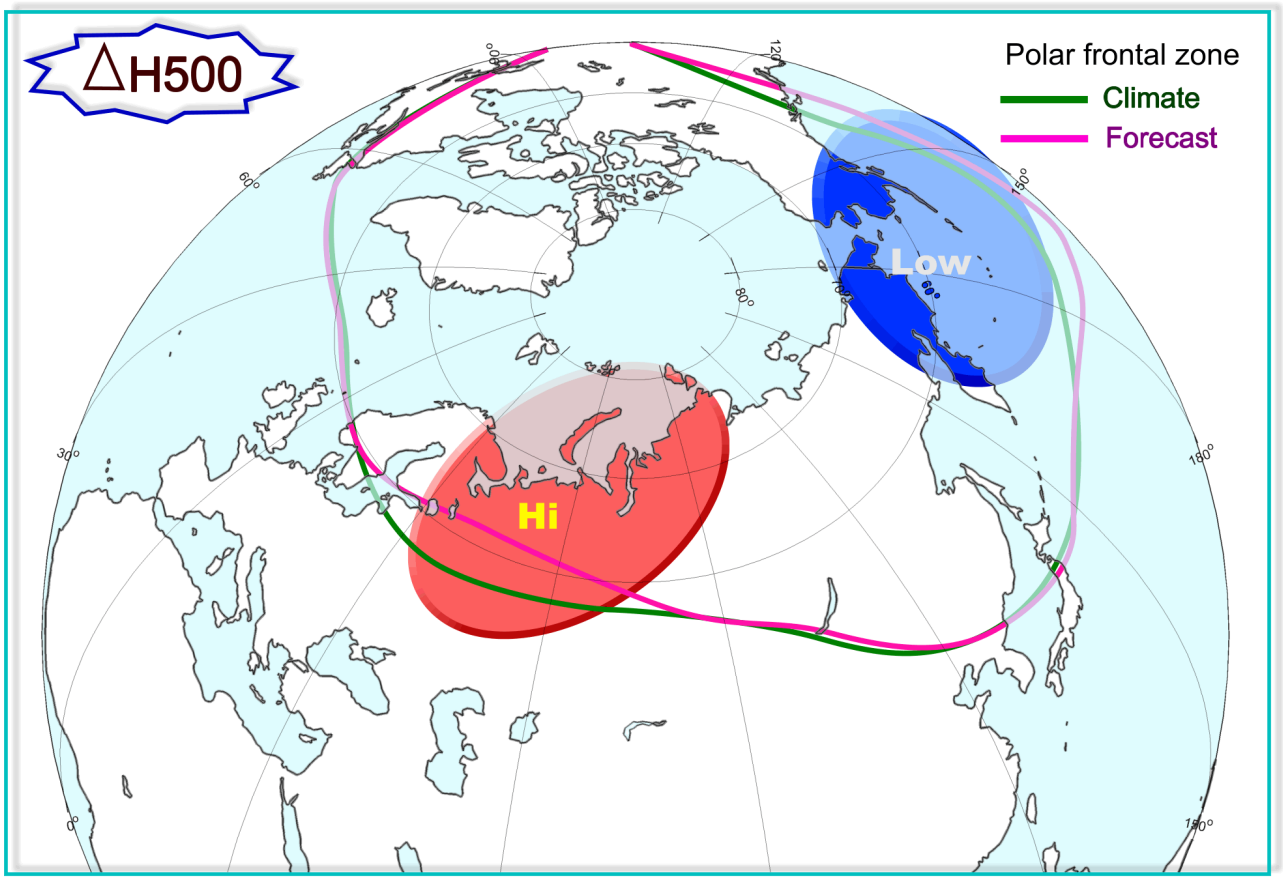
HIDROMETEOROLOGICAL CENTRE OF RUSSIA(SL-AV) and MGO MODEL

http://neacc.meteoinfo.ru

OUTLOOK OF ATMOSPPHERIC CIRCULATION

December 2018 – February 2019

SCHEMATIC FIGURE



PREDICTED ATMOSPHERIC CIRCULATION INDICES

GPC-MOSCOW (SL-AV)

index	NOVEMBER, DECEMBER, JANUARY, FEBRUARY 2018/2019					
	1 month	2 month	3 month	4 month	1 season	2 season
EA	-1,34	-1,02	-0,55	-0,29	-1,52	-0,74
WA	1,49	-0,25	-0,88	0,66	1,08	0,37
EU	-1,55	0,08	-0,74	-0,57	-1,38	-0,29
WP	-0,78	-0,08	0,48	0,09	-0,56	0,36
PNA	-0,89	-0,36	-0,14	-0,3	-0,56	-0,2
NAO	-0,28	1,01	0,87	0,42	0,24	0,6
POL	0,35	-0,24	-0,97	1,22	-0,15	0,35
AOS	-0,15	0,18	0,19	0,04	0,08	0,14

East Atlantic (**EA**), West Atlantic (**WA**), Eurasian (**EU**), west Pacific (**WP**), Pacific-North American (**PNA**) oscillations (Wallace J. M., Gutzler D.S. Teleconnections in the geopotential height field during the Northern Hemisphere winter. – Mon. Wea. Rev., 1981, vol. 109, pp. 784-812).

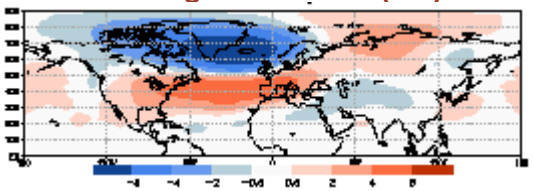
North Atlantic (**NAO**), Polar (POL), Arctic (**AO**) oscillations (Climate Prediction Centre of USA).

ATMOSPHERIC CIRCULATION INDICES

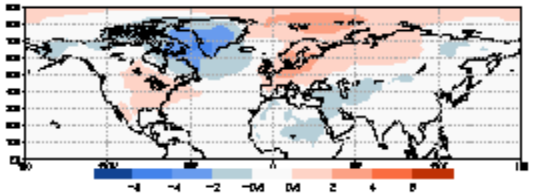
COMPOSITE MAPS

Positive phase of NAO

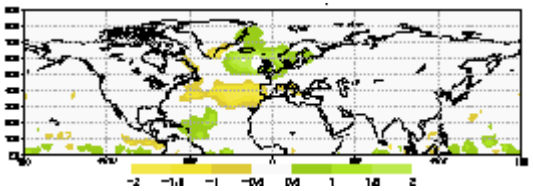
500 hPa Height anomalies (dm)



2m Temperature anomalies (˚C)

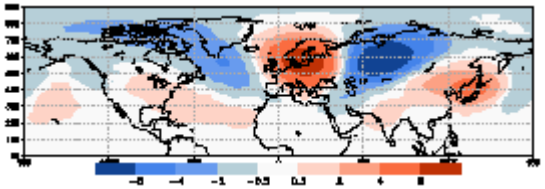


Precipitation anomalies (mm/day)

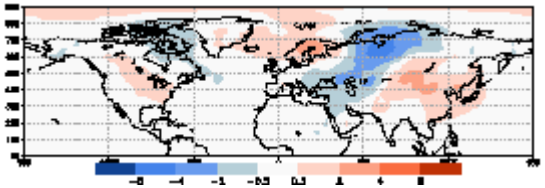


Negative phase of EU

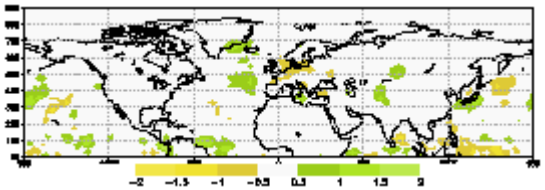
500 hPa Height anomalies (dm)



2m Temperature anomalies (˚C)

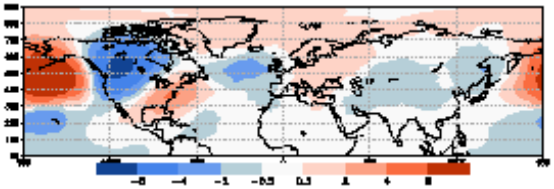


Precipitation anomalies (mm/day)

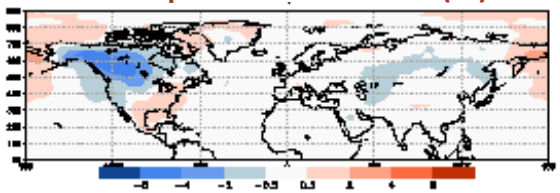


Negative phase of PNA

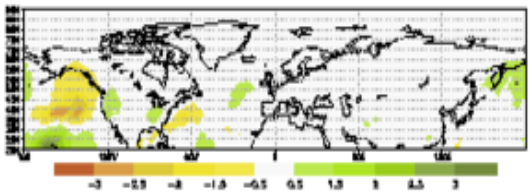
500 hPa Height anomalies (dm)



2m Temperature anomalies (˚C)



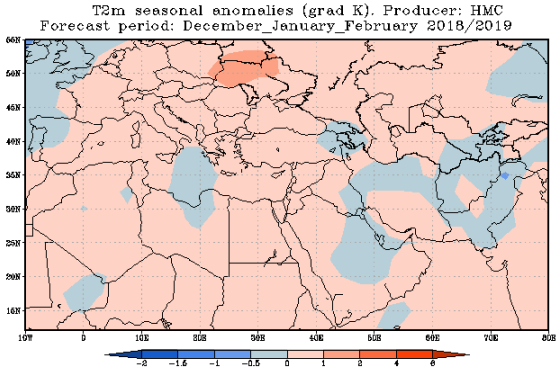
Precipitation anomalies (mm/day)

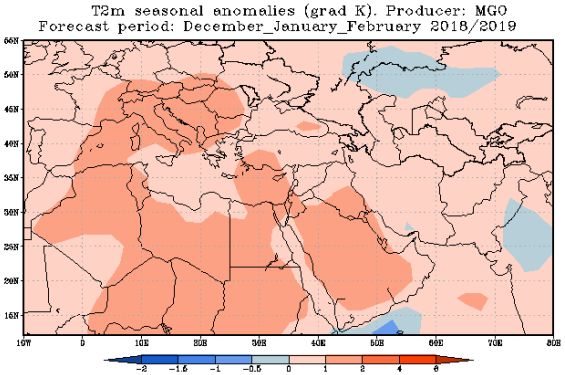


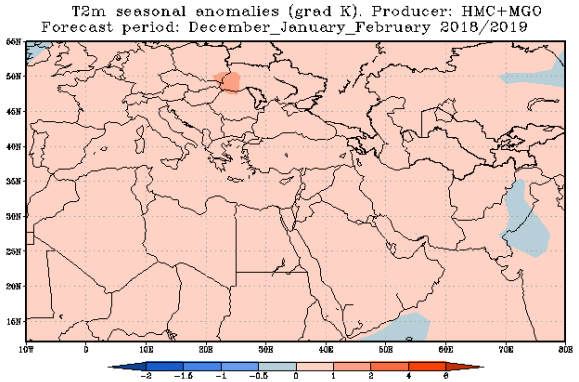
According to the forecasts of the GPC-Moscow, the winter is expected with **positive** values of index NAO and **negative** values of index EU. **Positive** values of index NAO are indicative of an **above normal** temperature in the north of Europe and **below normal** temperature in the southeast of Mediterranean region. **Positive values** of the index are indicative of an **above** (**below**) normal precipitation in the north (south) of some regions in Europe. The **negative** PNA pattern is predicted by GPC-Moscow.

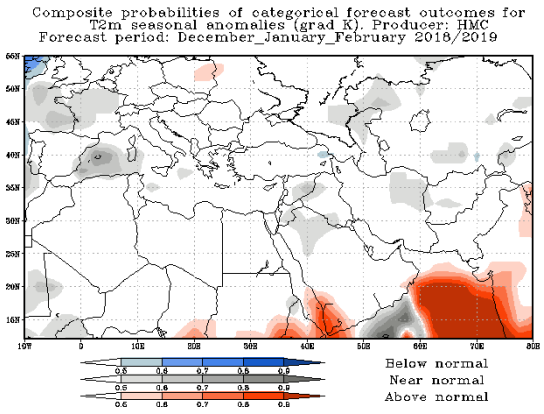
NEACC FORECASTS OF AIR TEMPERATURE

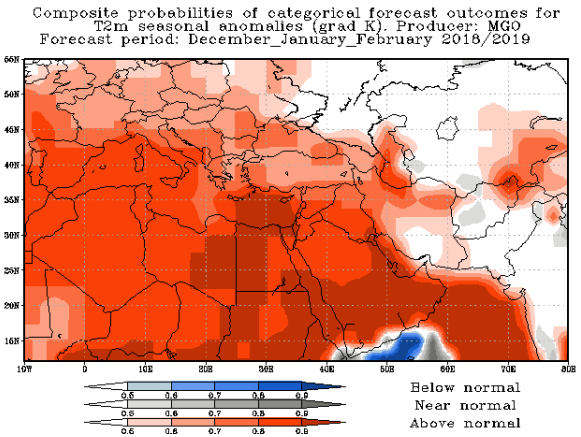
December 2018 - February 2019

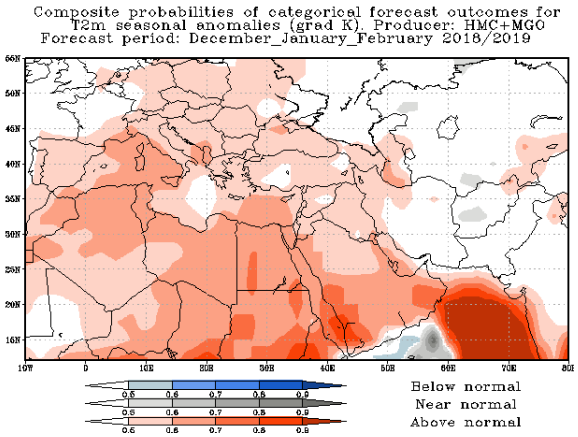










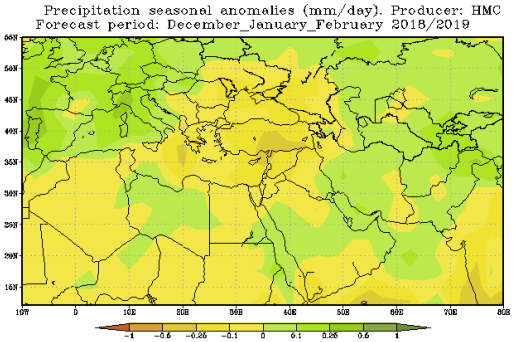


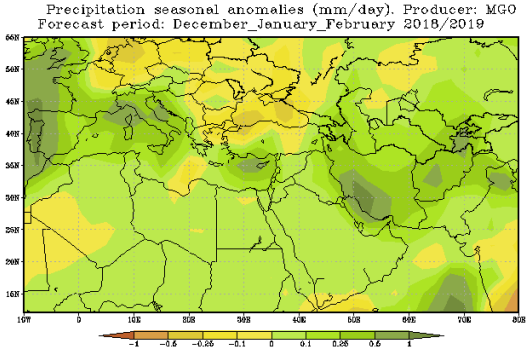
- **According to the forecasts of the HMC**, light **positive** temperature anomalies are expected to be over most of Mediterranean regiona. **Light negative** anomalies can be in the Caucasus, central Mediterranean sea region, and central Arabian peninsula regions. No prediction signal in probabilistic forecasts.
- **MGO** predicts **positive** anomalies over all Mediterranean region (above 50%).
- **HMC+MGO** predicts **positive** anomalies over all Mediterranean region (40%-50%).

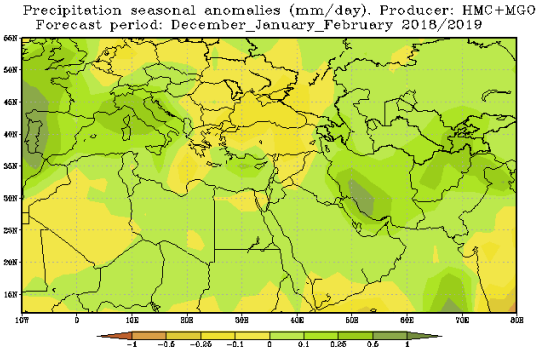
FORECASTS OF PRECIPITATION FROM NEACC

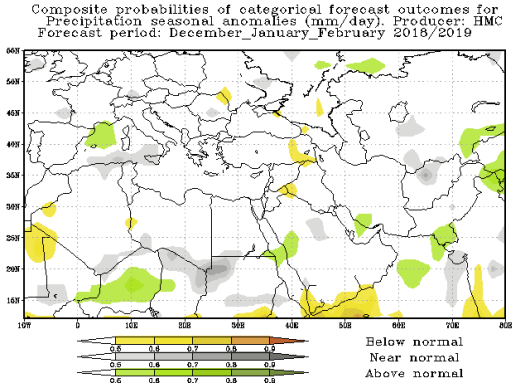
December 2018 - February 2019

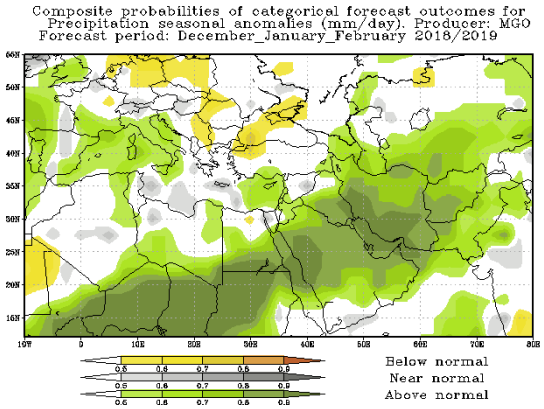
Seasonal anomalies (mm/day)

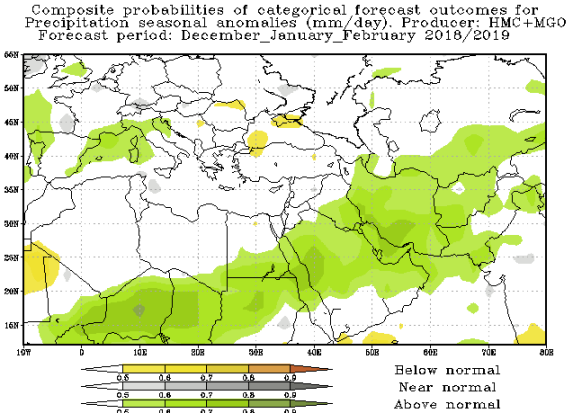












- **According to the forecasts of the HMC positive** anomalies are predicted in the west and northwest of Mediterranean area. **Negative anomalies** are possible in east regions of Mediterranean area. No signal from probabilistic forecasts.
- **MGO** predicts mostly **positive** anomalies in the MA except northern part. High probability of precipitation is in the eastern part of MA and over Arabian peninsula.
- **HMC and MGO** predict mostly **positive** anomalies in the MA except north, northeast and southwest. High probability of precipitation is in the eastern part of MA and over Arabian peninsula.

Method for statistical correction of deterministic predictions of SLAV

Temperature and precipitation are restored by the prognostic fields H500, T850, SLP, as well as by the very values of temperature and precipitation shifted in space relative to the desired point.

The initial prognostic data is pre-adjusted for standard deviation:

$$dX(x,y) = \left(\sigma_F(x,y) \Big/ \sigma_R(x,y) \right) \cdot dX_0(x,y)$$

A scheme with a preliminary decomposition of the normalized series of the initial forecasts for eo. F. Rationing allowed the use of different fields in one sample.

For the selection of optimal predictors in the scheme used regression method. As a criterion for selecting the optimal predictors, the ACC correlation coefficient was applied, which is significant at the 5% level.

In the cross-qualification mode, the search was conducted for the best (in terms of the quality of predictions) combinations of the coefficients of the predictors.

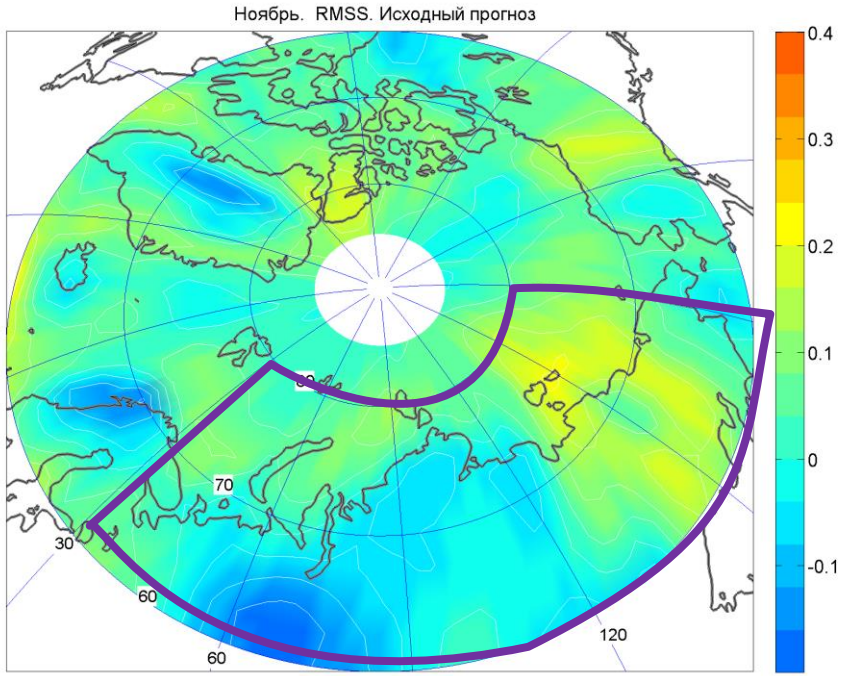
In all cases, the improvement in quality when using more than four predictors is not statistically significant and leads to an increase in the uncertainty of the forecast.

RMSSS Quality Skill Score observed and prognostic temperature anomalies (forecast for November-February)

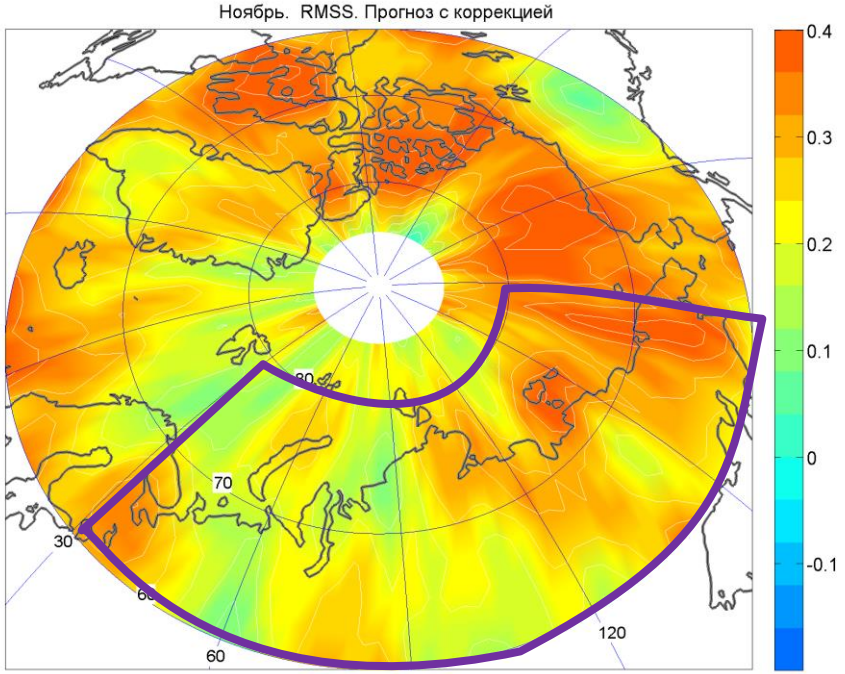
$$RMSS = 1 - (1 - MSSS)^{1/2}$$

$$(MSSS = 1 - \frac{\sum_j w_j MSE_j}{\sum_j w_j MSE_{cj}})$$

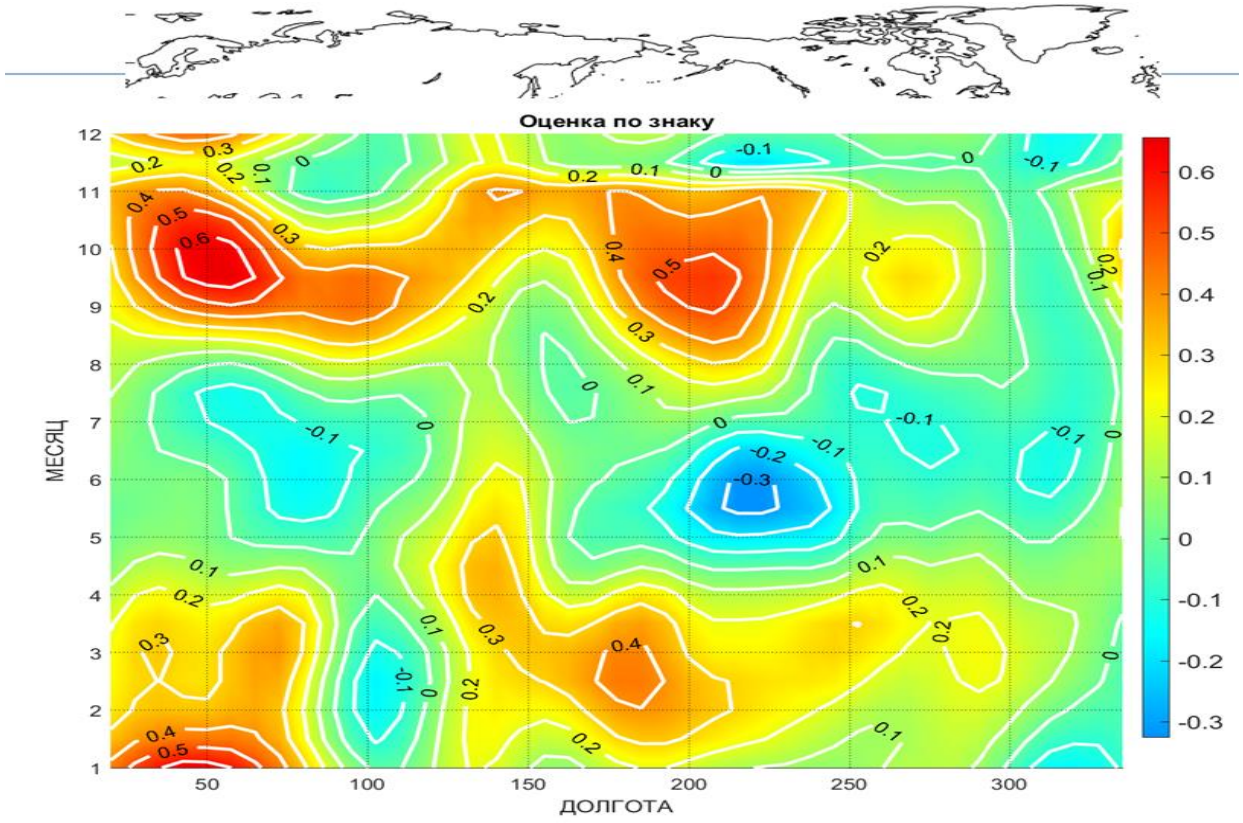
No correction



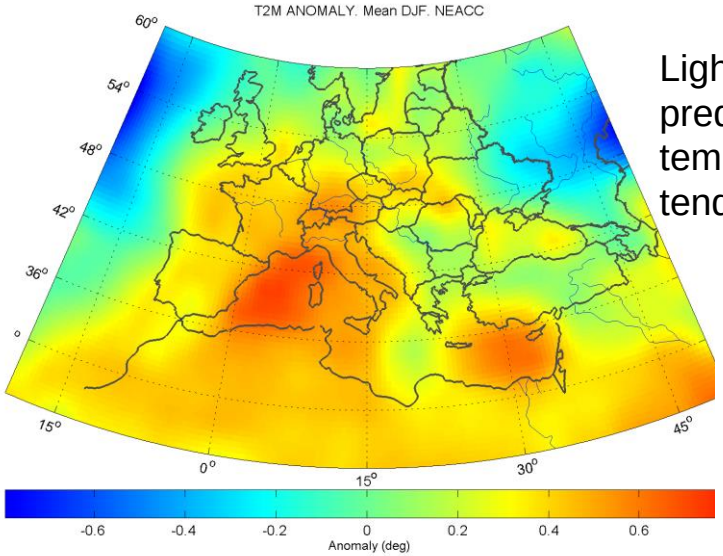
Corrected forecast



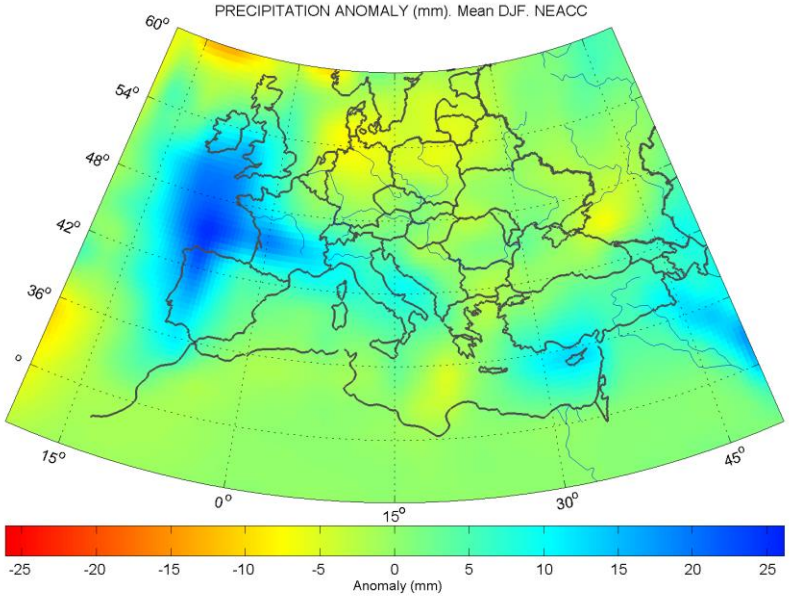
Longitude-monthly dependence of added value of corrected forecasts



DOWNSCALED DETERMINISTIC FORECASTS OF AIR TEMPERATURE AND PRECIPITATION FROM NEACC



Light positive T2m anomalies are predicted over most of MA. Air temperature over SEE and Turkey tends to normal.



Above normal precipitation are predicted over west of Portugal and Spain. Light positive anomalies are predicted over Caucus region.

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3. Consensus forecast from NEACOF-15
4. Summary and Discussion

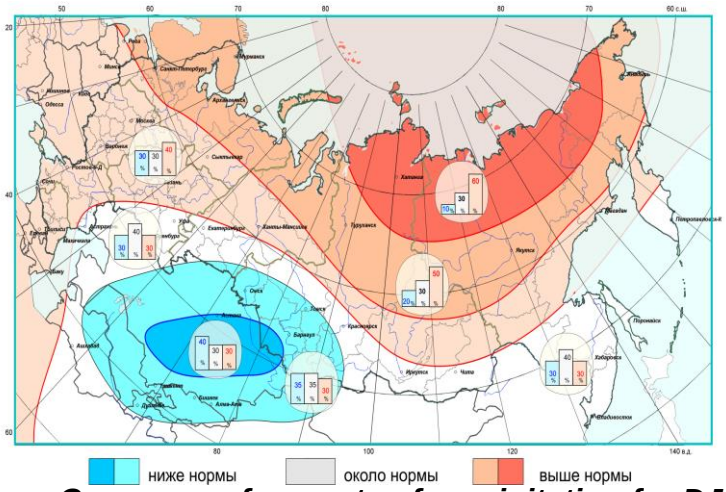
Role of NEACC in RCOF Activities

North EurAsia Climate Centre

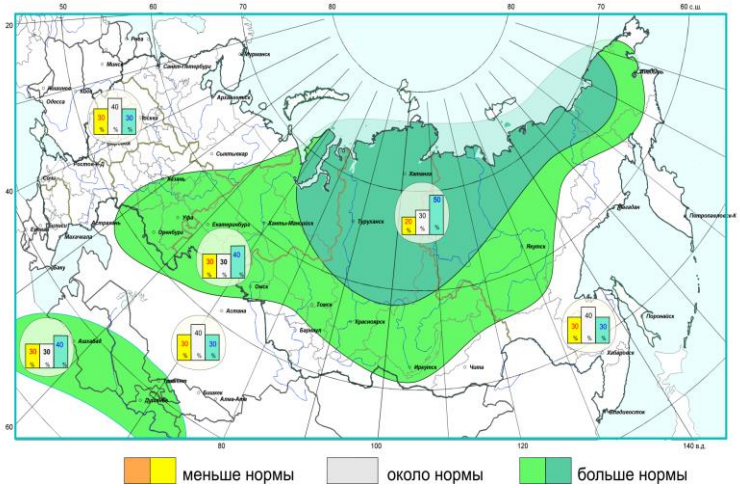
Fifteenth Session of North Eurasian Climate Outlook Forum (NEACOF-15)

Moscow, Russia, 6-8 November 2018

Consensus forecasts of air temperature for DJF 2018/19



Consensus forecasts of precipitation for DJF 2018/19



SUMMARY

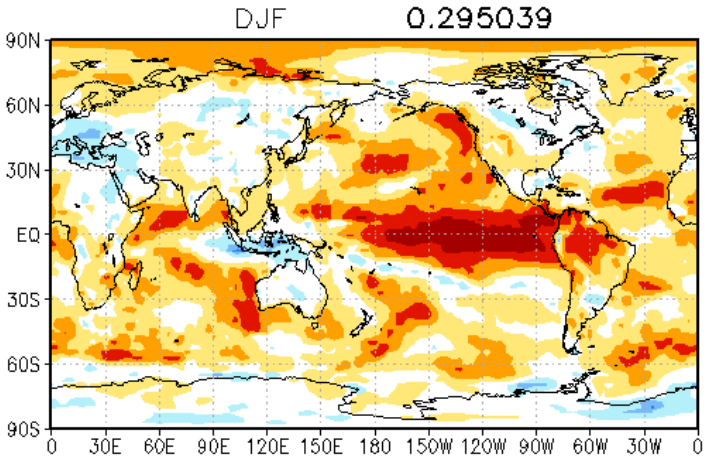
- **Model predictions and expert opinion** lead to expect a **weak to moderate El Niño event**, with sea surface temperatures of about 0.8 to 1.2 degrees Celsius above average in the east-central tropical Pacific for the December 2018-February 2019 season.
- **In the Northern Atlantic** the distribution of predicted anomalies is consistent with the **positive** phase of tripole, associated with the **positive** phase of NAO. The significant **positive** SST anomalies are expected in the Norwegian and Barents Seas at higher latitudes of the North Atlantic. These anomalies are characterized by high stability.
- According to **PARCOF-2 consensus statement,** for the 2019 March **ice extent is expected below normal** in the Bering sea and below to normal ice extent in the Barents Sea and Sea of Okhotsk.
- **According to the forecasts of the GPC-Moscow**, the winter is expected with **positive** values of index NAO and **negative** values of index EU. **Positive** values of index NAO are indicative of an **slightly above normal** temperature in the north of Europe and **light below to normal** temperature in the southeast of Mediterranean region.
- **For the winter season of 2018-2019, NEACC** (Sl-AV + MGO) predicts **positive to normal** air temperature anomalies over the Mediterranean region (40%-50%). **Positive** precipitation anomalies are predicted in **west (littoral) of Spain and Portugal**. There is a chance of **positive to normal** precipitation over regions in Arabian peninsula.
- *The Bulletin information is of advisory character and must be applied to particular regions taking into account the predictability of meteorological processes, regional climate, and quality of state-of-the-art atmosphere and ocean general circulation models.*

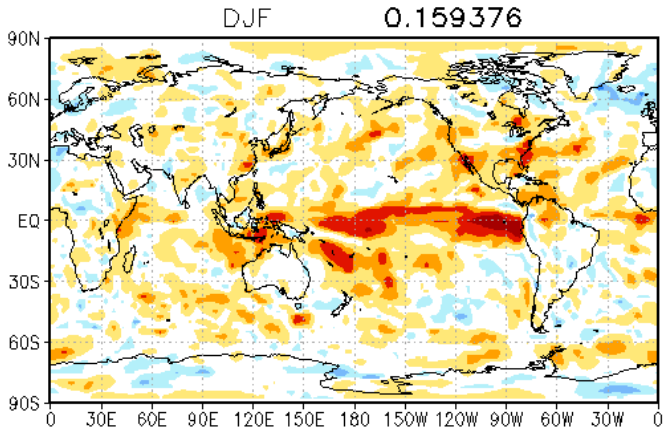
THANK YOU FOR ATTENTION!

http://neacc.meteoinfo.ru

Skill of the model SL-AV

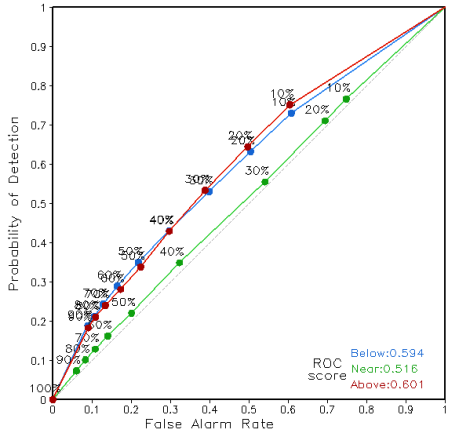
CALCULATION TIME : 1993 – 2009
FORECAST MODEL : moscow
FORECAST VARIABLE : TMP2m
Domain : 0000 0360 –090 0090





CALCULATION TIME : 1993 – 2009
FORECAST MODEL : moscow
FORECAST VARIABLE : TMP2m
Domain : 0000 0360 –90. 0090

ROC Curve and Score



CALCULATION TIME : 1993 – 2009
FORECAST MODEL : moscow
FORECAST VARIABLE : APCP0m
Domain : 0000 0360 –90. 0090

ROC Curve and Score