Federal Service for Hydrometeorology and Environmental Monitoring

HYDROMETEOROLOGICAL CENTRE OF RUSSIA

About weather—at first hand

РОСГИДРОМЕТ

Seasonal forecast from GPC Moscow

V. Khan, E. Kruglova, I. Kulikova, V. Tischenko

7-TH SESSION OF THE MEDITERRANEAN CLIMATE OUTLOOK FORUM

November 21-23, 2016, Rome, Italy

Federal Service for Hydrometeorology and Environmental Monitoring

HYDROMETEOROLOGICAL CENTRE OF RUSSIA

About weather—at first hand

BRIEF INFORMATION ABOUT RHMC

RHMC was created on the 1st of January 1930

RHMC currently has 410 staff

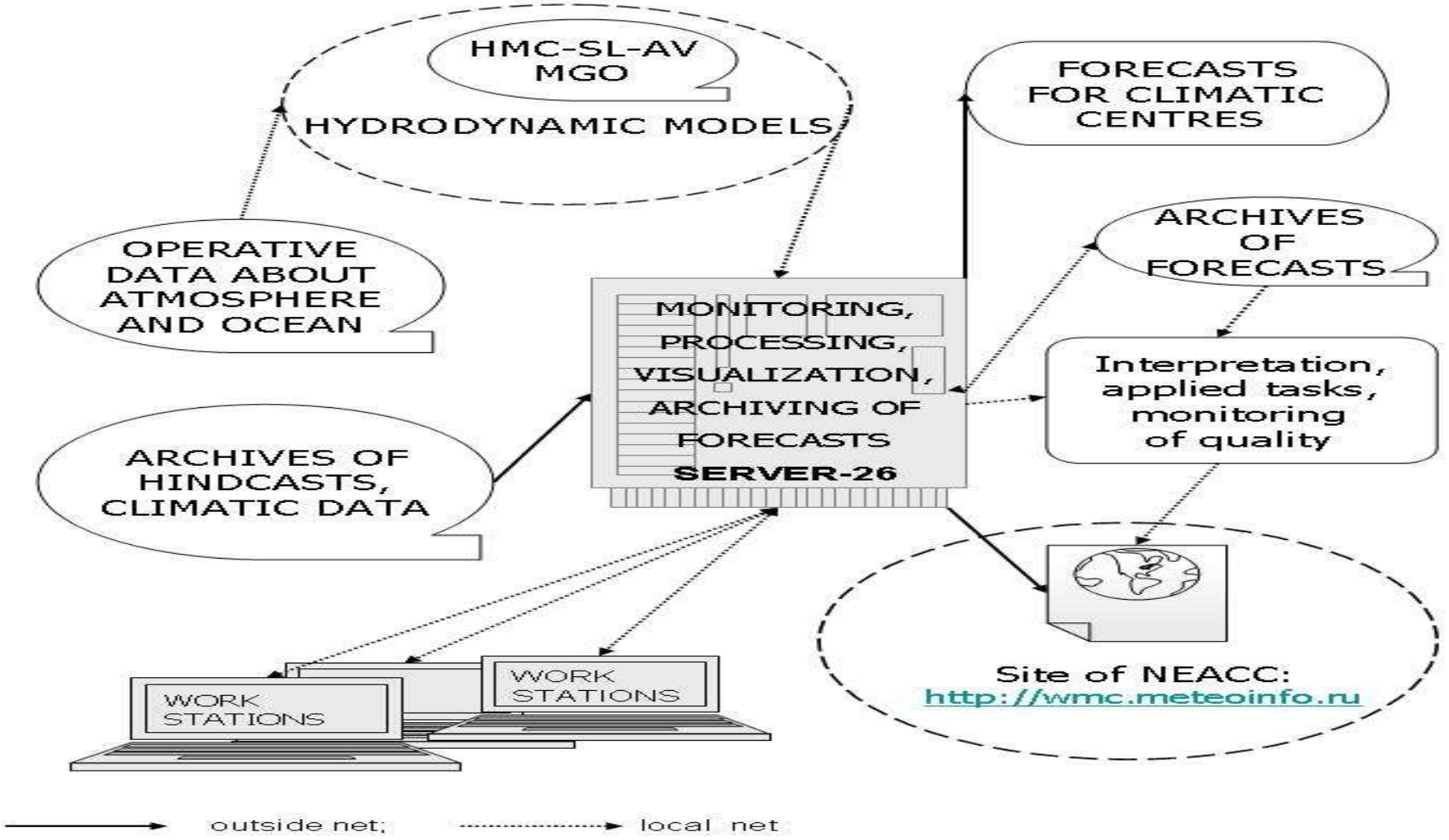
Structure:

18 departments and laboratories
11 administrative and managing entities

In the system of the World Weather Watch of the World Meteorological Organization the RHMC functions as:

- **Regional Specialized Meteorological Centre**
- **North Eurasian Regional Climate Centre WMO since 2013**
- **Global Producing Centre of Long-Range Forecasts since 2009**

THE PROCESSING COMPLEX FOR SEASONAL FORECASTS ISSUE AT GPC-MOSCOW AND NEACC



THE FORECAST MODELS DISCRIPTION

The Semi-Lagrangian 28-level atmospheric prognostic global model **(SL-AV)** developed at the Hydrometeorological centre of Russia and the Institute of Numerical Mathematics of the Russian Academy of Sciences is in active operational use. The model has a spatial resolution of 0.9°x0.72°, L28. Source of atmospheric initial conditions are NCEP Reanalysis 2 (hindcast) / HMC data assimilation system (forecast). Ensemble size for the hindcasts is 10. Ensemble size for the forecast is 20.
The forecast ensemble is configured by the original and perturbed (breeding of fast growing modes) analysis fields from the date 2 days prior to current month. Source of ocean initial conditions is Reynolds-Smith OI. SSTs are taken 3 days before the forecast period.

The model of Voeikov Main Geophysical Observatory (MGO) - T 63 (1.9°×1.9°, L25).
Ensemble size for the forecast is 10. The forecast ensemble is configured by the original and perturbed analysis fields of the Hydrometeorological centre of Russia. SSTs are taken from the inertial forecasts.

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

Experiments on the basis of coupled model of an atmosphere and ocean of the Hydrometeorological centre of Russia and the Institute of Numerical Mathematics of the Russian Academy of Sciences are carried out.

THE FORECAST OUTPUT

At present HMC and NEACC produce:

Probabilistic forecasts of three equiprobable categories for surface air temperature, precipitation rate, 500 hPa height, air temperature at 850 hPa level, and mean sea level pressure with zero and 1 month lead time;

Deterministic forecasts of three seasonal and monthly mean values of meteorological variables (ensemble averages and anomalies) with zero and 1 month lead time;

Forecasts of indices of the atmospheric circulation;

Outlook of forecasts of NEACC and forecasts maps of Multi Model Forecasts Meteorological Services: **the APEC Climate Center – APCC,** the **EUROSIP** forecasting system, **the International Research Institute for Climate and Society (The IRI ʻs), LC MMELRF (WMO Lead Centre for MME LRF).**

PROCEDURE TO ISSUE SEASONAL OUTLOOK

1. Analysis of oceanic forecasts: Sea Surface Temperature (SST)
2. Analysis of the atmosphere characteristics state: General circulation
3. Analysis of temperature and precipitation seasonal forecasts: North Eurasia and areas under consideration
4. Verification analysis

Sources of information

The APEC Climate Center - APCC ((Busan, Korea)- http://www.apcc21.net/eng/service/fore/lmon/japcc030101_lst.jsp

The **EUROSIP** forecasting system is the operational monthly production of 7- month 41-member forecasts by ECMWF, Met Office, Météo-France and NCEP- http://www.ecmwf.int/products/forecasts/d/charts.

The International Research Institute for Climate and Society (The IRI's) (США)- http://iri.columbia.edu.

LC MMELRF (WMO Lead Centre for MME LRF) - http://www.wmolc.org

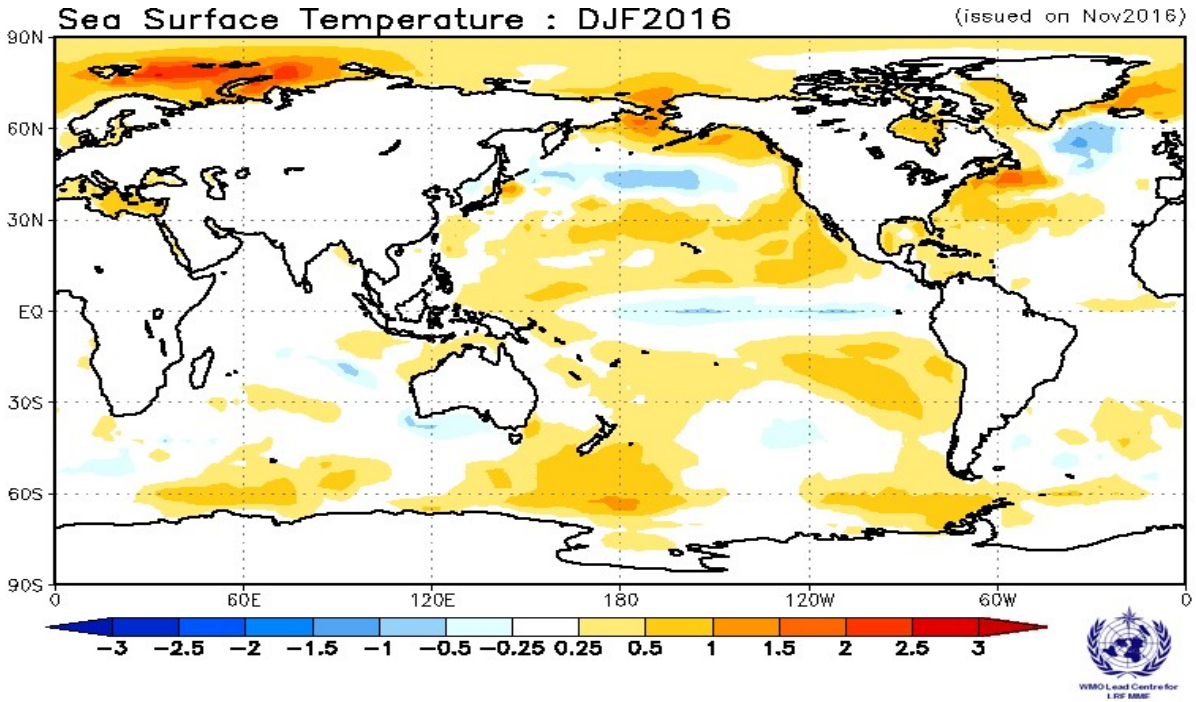
In addition we use the information of
Hydrometeorological centre of Russia, Main Geophysical Observatory (MGO), ECMWF, CPC (CFS), Météo-France, Tokyo Climate Centre (TCC), World Climate Service (W.C.S.) - http://www.worldclimateservice.com

OCEANIC FORECASTS
SEA SURFACE TEMPERATURE (SST)

OUTLOOK December 2016 – February 2017

MODELS:

- Seul
- ECMWF
- Melbourne
- Montreal
- Moscow
- Washington
- Tokyo
- Toulouse
- Exeter
- Pretoria
- CPTEC

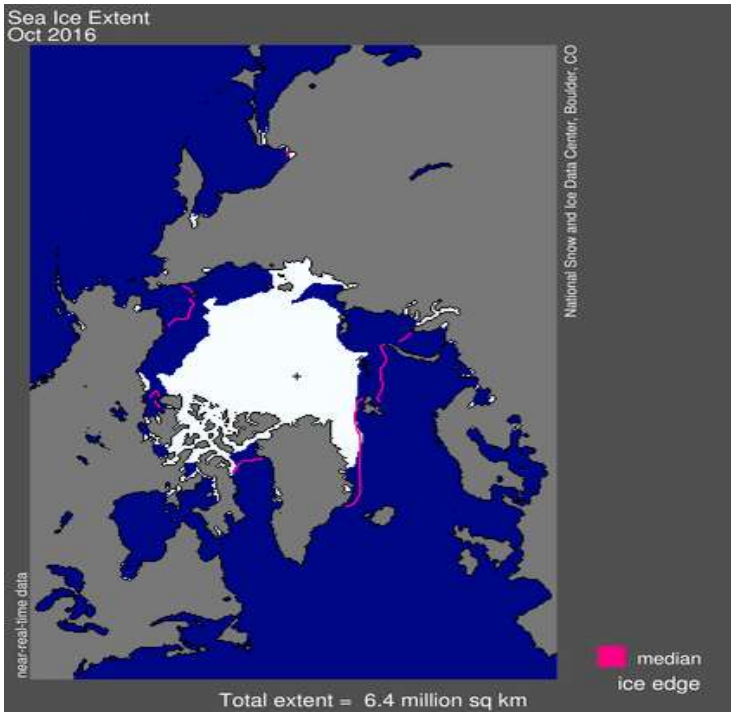


LC MMELRF-WMO Lead Centre for MME LRF

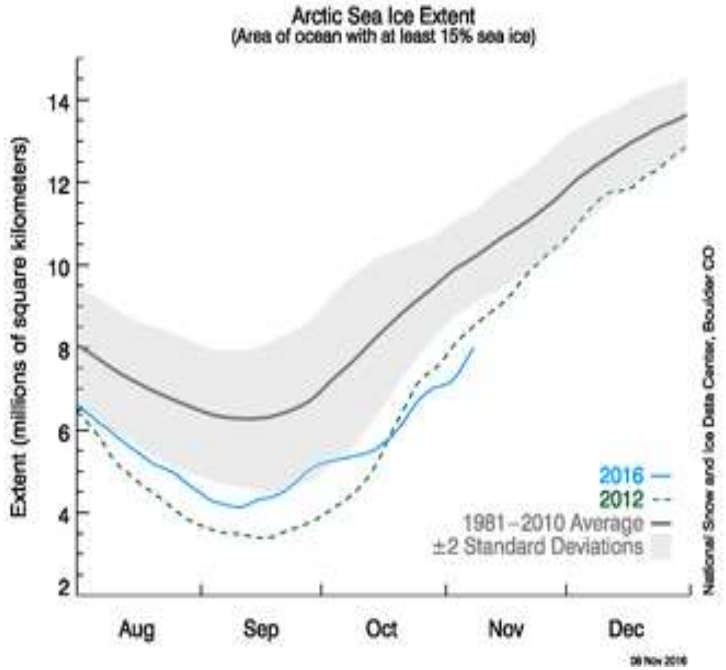
North Atlantic: The tripole is the principal mode of SST variability in the North Atlantic (see picture). According to the most models, it is characterized by negative anomalies in the central part of the area .There are significant positive SST anomalies in the Gulf Stream and the NEO. Increasing temperature contrasts can lead to an exacerbation of atmospheric fronts and increased cyclonic activity . This means that the zonal transport of air mass is more intensive than it is necessary under the climate.

ARCTIC SEA ICE EXTENT

National Snow and Ice Data Centre, Boulder, CO



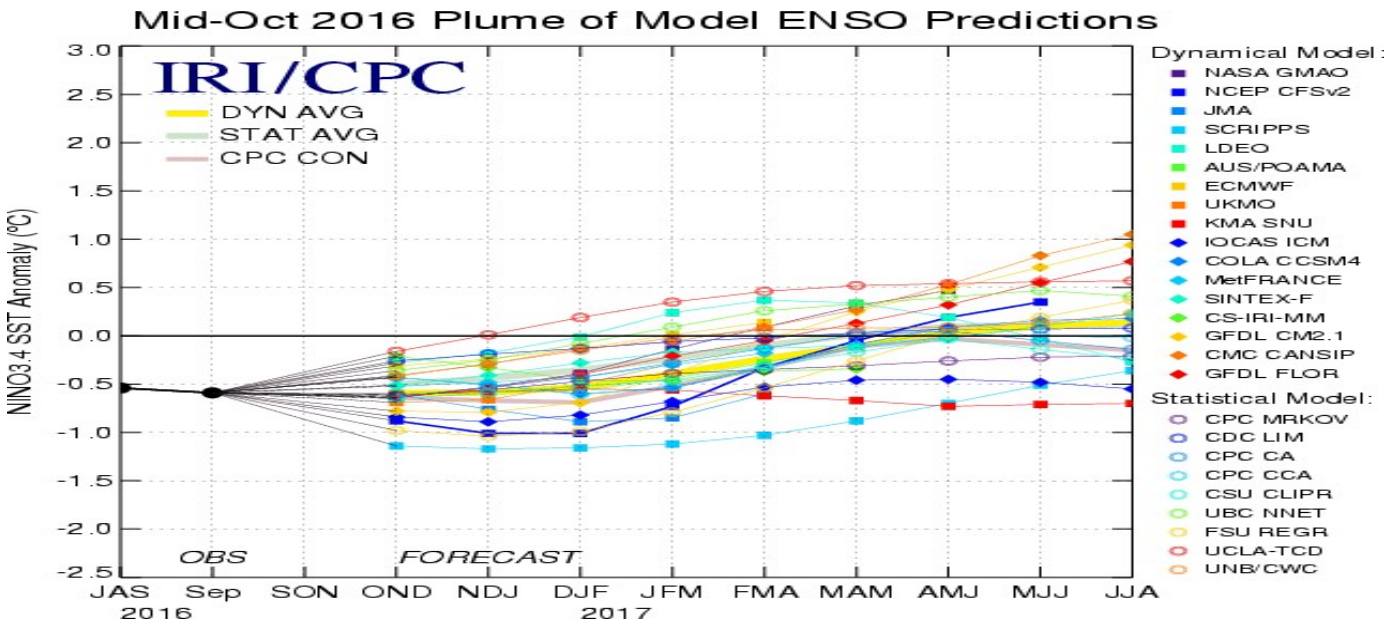
Sea-Ice extension in Arctic. October 2016. The pink line indicates the averaged extension (for the 1979-2000 period).



Arctic Sea Ice Extent (millions of square kilometers).

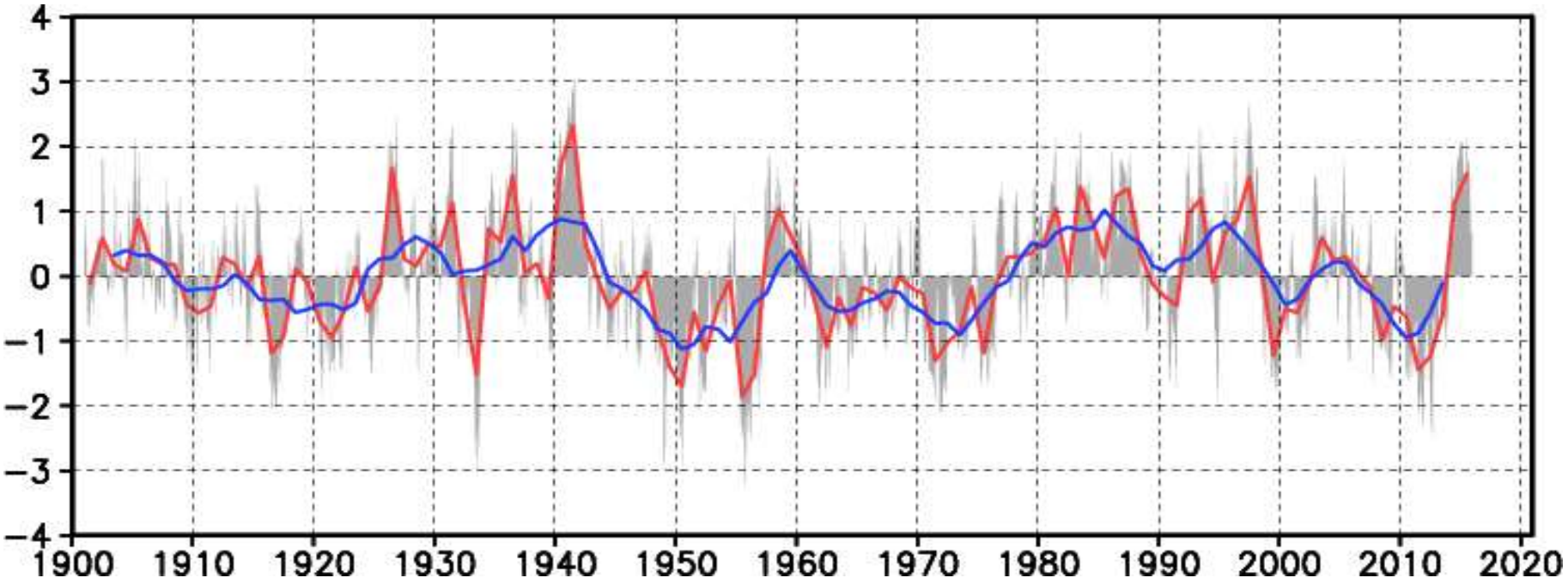
According to the forecasts of most centers the significant positive SST anomalies are expected in the Norwegian and Barents Seas at higher latitudes of the North Atlantic. These anomalies are characterized by high stability. Significant positive SST anomalies that persist for a long time may result in a further reduction in the area of ice cover in the Arctic.

ENSO FORECASTS



Most models predict colder than normal conditions in the central of the equatorial latitudes. Accoding to the IRI/CPC the probabilities for La Nina, neutral and El Nino conditions (using -0.5C and 0.5C thresholds) over the coming DJF season are: 47%, 51% и 2 %. Negative anomalies in the Westen Tropics and positive anomalies in the Eastern Tropics are in the forecasts of some models. Most models indicate possible increased temperature contrasts between the western (eastern) and the central part of the area in the northern hemisphere. Warmer than normal conditions are expected to north of 50˚N. This is typical SST anomalies in the positive phase of PDO.

PACIFIC DECADAL OSCILLATION



The PDO index is defined as the projections of monthly mean SST anomalies onto their first EOF vectors in the North Pacific (north of 20ºN). The EOF vectors are derived for the period from 1901 to 2000, and climatology is defined as monthly mean for the same period. Globally averaged monthly mean SST anomalies are subtracted from each monthly mean SST anomaly before calculation of the first EOF vector in order to eliminate the effects of global warming.

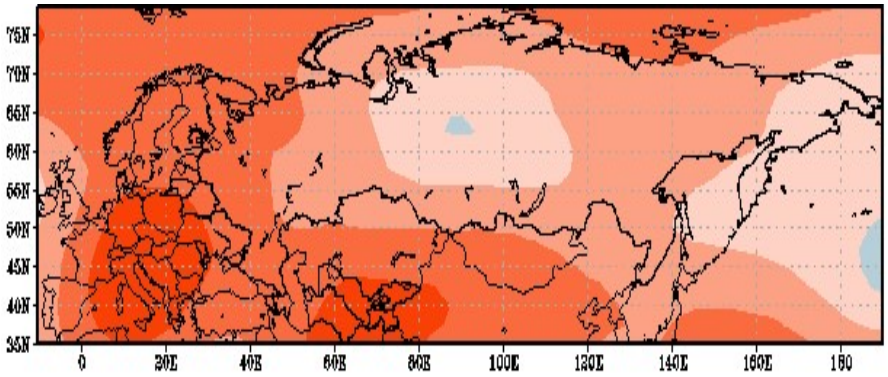
When the PDO index is positive (negative), SSTs in the central part of the North Pacific are likely to be lower (higher) than their normals. In addition, when the index is positive (negative), sea level pressures (SLPs) values in the high latitudes of the North Pacific are likely to be lower (higher) than their normals. This indicates that the Aleutian Low is stronger (weaker) than its normal in winter and spring.

http://ds.data.jma.go.jp/tcc/tcc/products/elnino/decadal/pdo.html

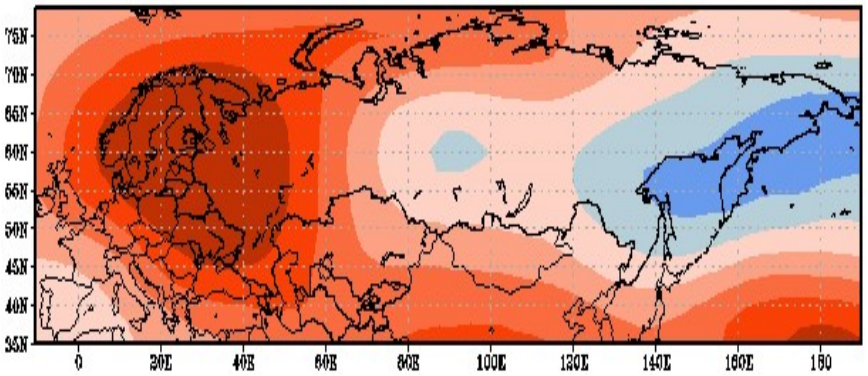
THE GENERAL CIRCULATION. 500 hPa height anomalies

HIDROMETEOROLOGICAL CENTRE OF RUSSIA(SL-AV) and MGO MODEL (ensemble average, dm)

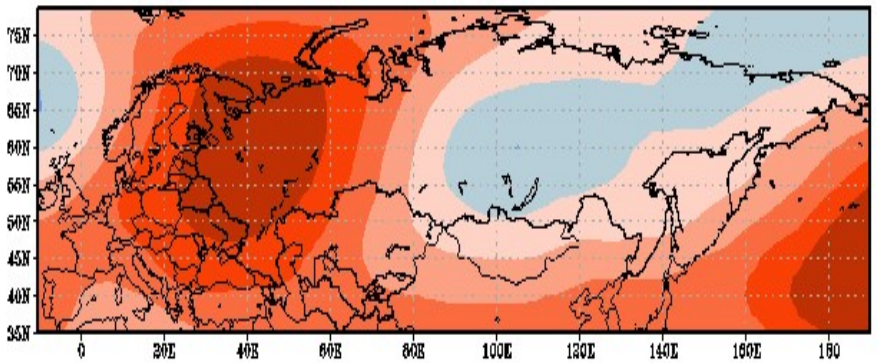
December 2016



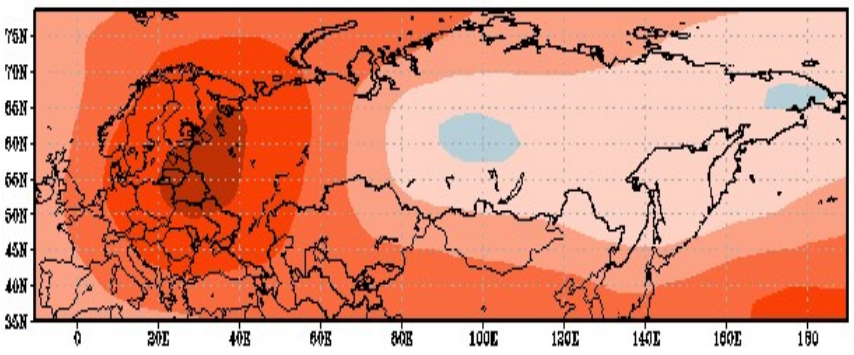
January 2017



February 2017



December 2016- February 2017



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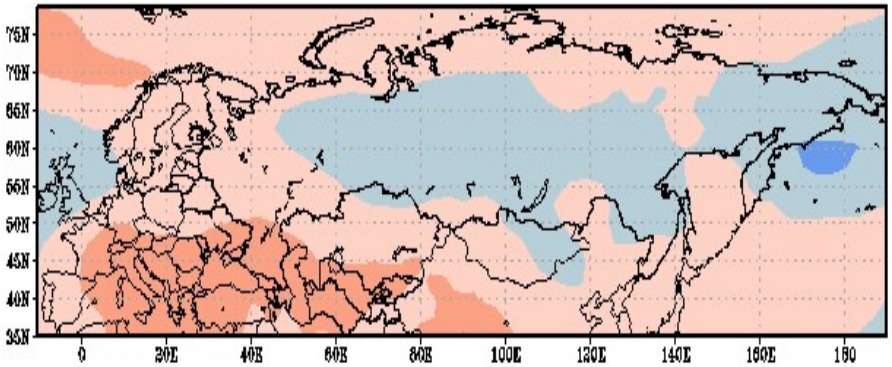
http://neacc.meteoinfo.ru

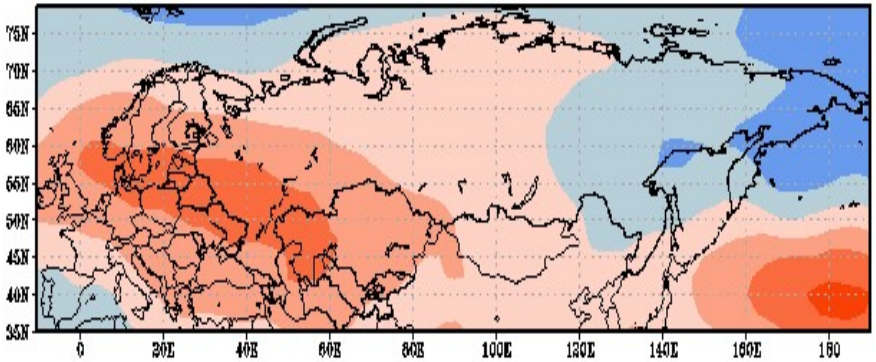
THE MEAN SEA LEVEL PRESSURE (gPa)

HIDROMETEOROLOGICAL CENTRE OF RUSSIA: SL-AV(HMC) and MGO MODEL (Ensemble Average)

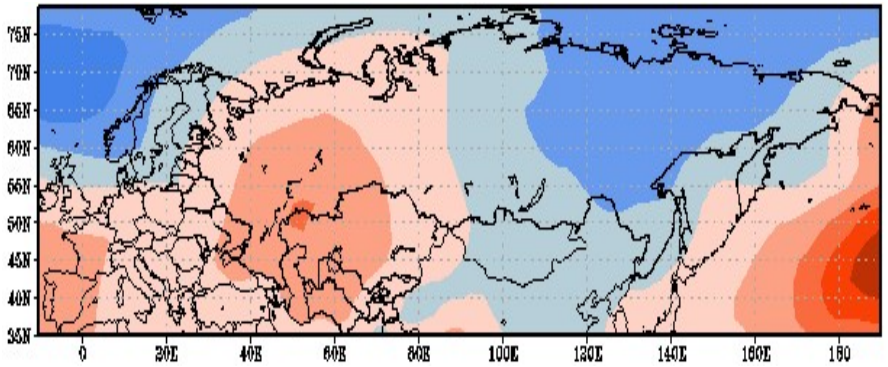
December 2016



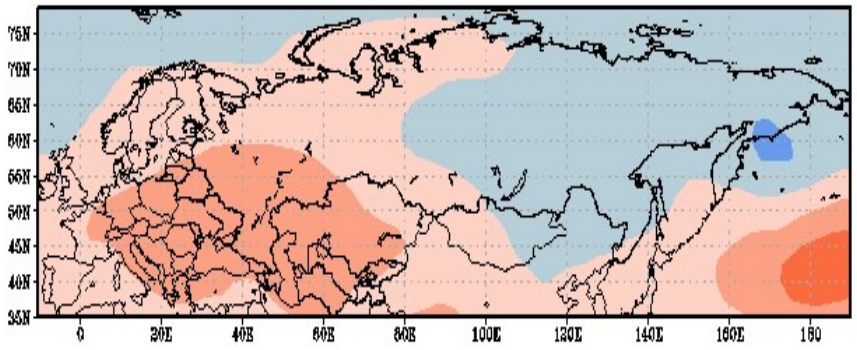
January 2017

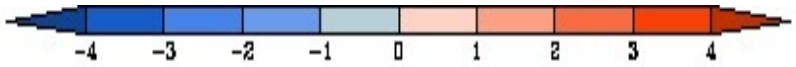


February 2017



December 2016- February 2017





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INDICES OCSILLATION FORECASTS

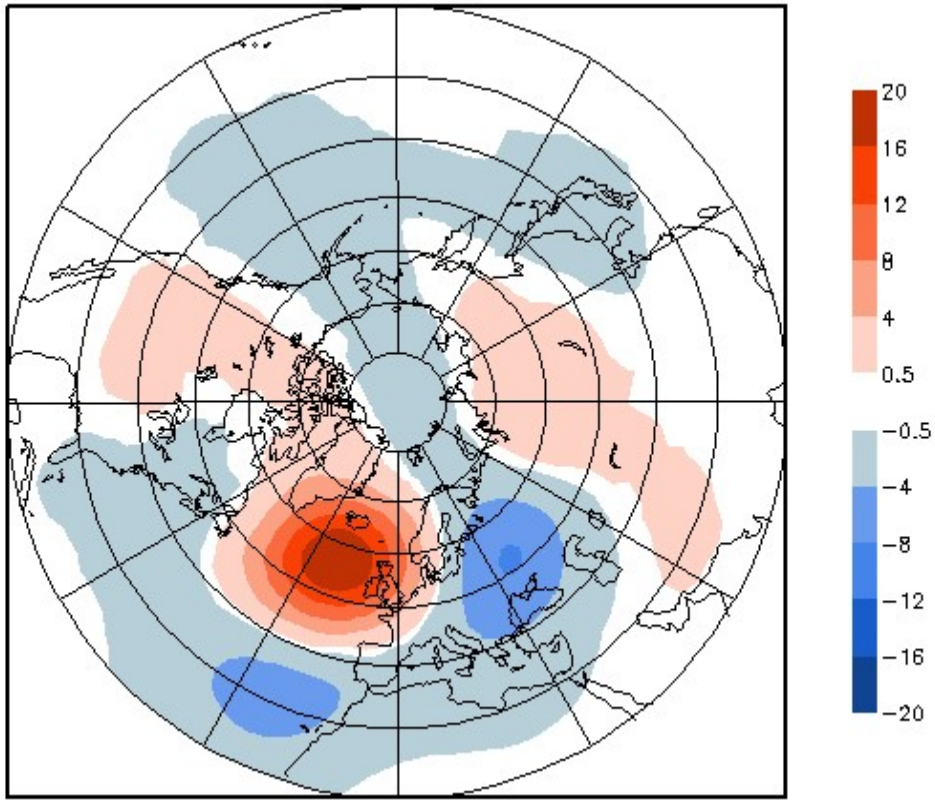
HIDROMETEOROLOGICAL CENTRE OF RUSSIA (SL-AV)

ИНДЕКС	DECEMBER 2016 – FEBRUARY 2017			
	DECEMBER	JANUARY	FEBRUARY	DECEMBER - FEBRUARY
EA	-1,18	-2,11	-0,95	-1,96
WA	0,45	0,76	1,44	0,96
EU	0,43	0,25	0,18	0,13
WP	0,14	- 0,51	-0,48	-0,22
PNA	0,60	0,06	-0,19	0,20
POL	-0.28	-0.90	-1.52	-0.95
NAO	0,70	0,66	0,44	0,71
AO	-0,07	0,07	0,44	0,15

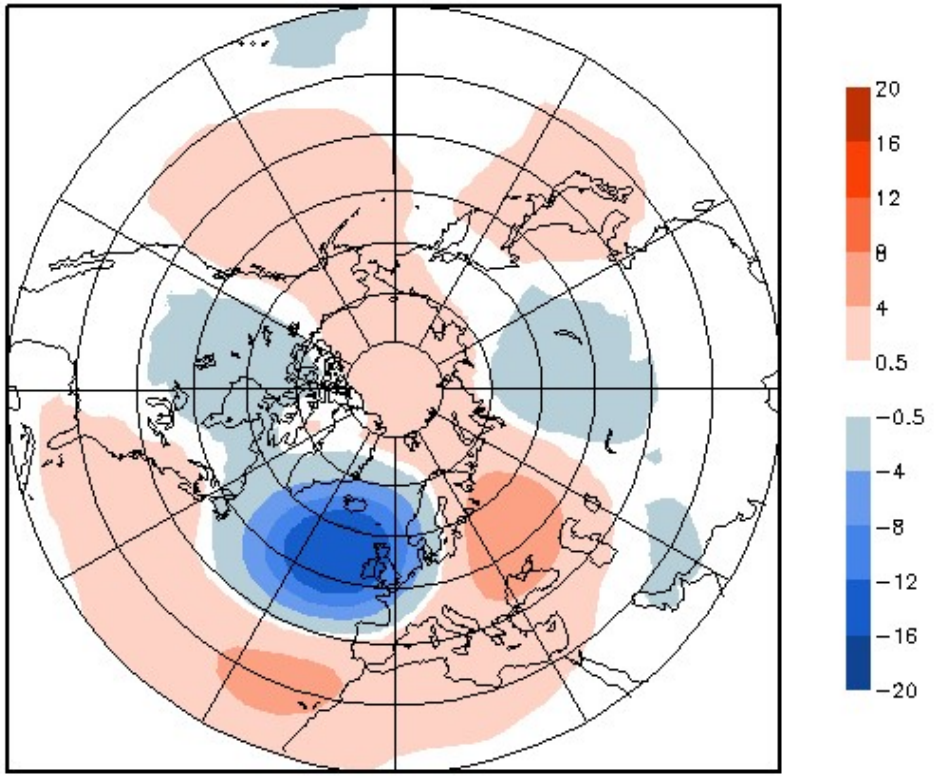
To identify the leading teleconnection patterns in the atmospheric circulation the teleconnection indices **EA**, **WA**, **EU**, **WP** and **PNA** by Wallace J. M., Gutzler D.S. (1981, Mon. Wea. Rev., 1981, 109, 784-812) and **NAO, POL** and **AO** (CPC) are used. The **AO** is the most important pattern in the winter. The **NAO**, **EA** and **EU** are three basic structures that define the modes of atmospheric circulation in the Northern Eurasia during all seasons. The negative phase of **EA** is predicted by HMC in December, January and February. The nearly neutral phase of **AO** is predicted by HMC in winter 2016-2017. HMC predict negative phase of POL index in January and February. Thus, POL index changes indicate a possible reorganization of the atmospheric circulation during the January in the Siberia and in the Far East. According to the forecasts of most centers and composite maps of **EA** and **POL** the positive anomalies of sea level pressure are expected over most of the North Eurasia.

EAST ATLANTIC OSCILLATION
COMPOSITE MAPS
ANOMALY OF H-500 (dm)

Positive phase
(EA>0.49)



Negative phase
(EA < -0.48)

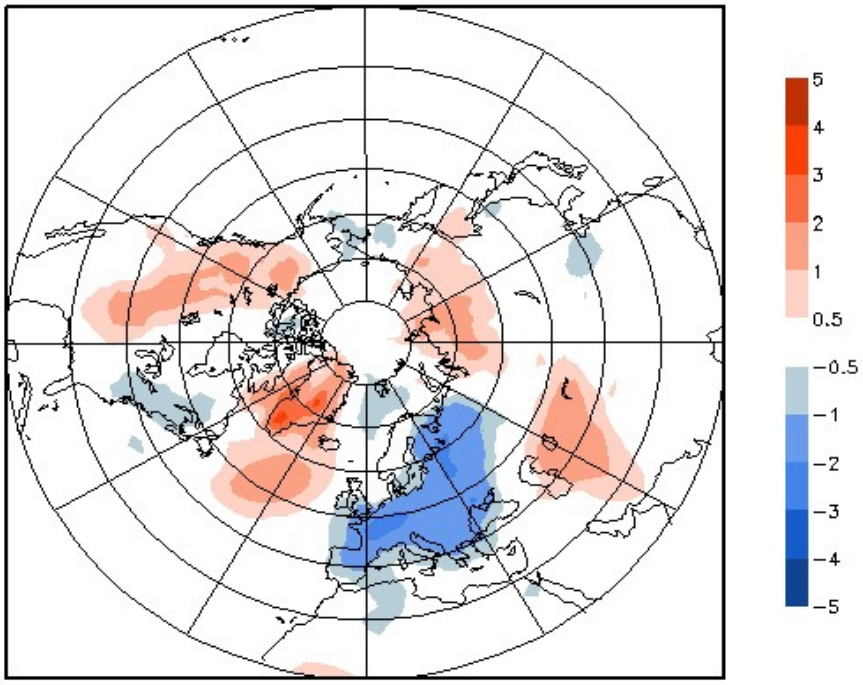


DJF

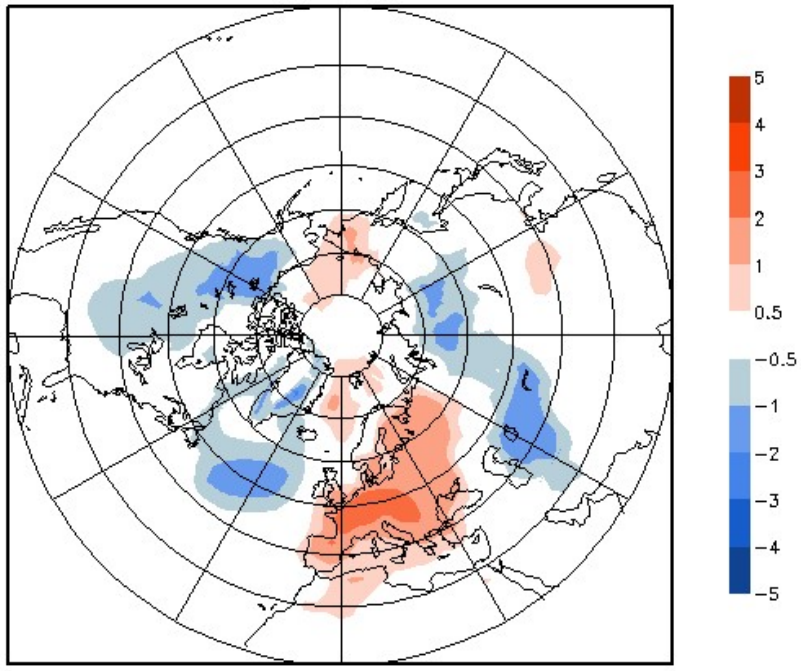
SL-AV EA=-1.96

EAST ATLANTIC OSCILLATION
COMPOSITE MAPS
ANOMALY OF AIR TEMPERATURE (°C)

Positive phase
(EA>0.49)



Negative phase
(EA< -0.48)



DJF

SL-AV EA=-1.96

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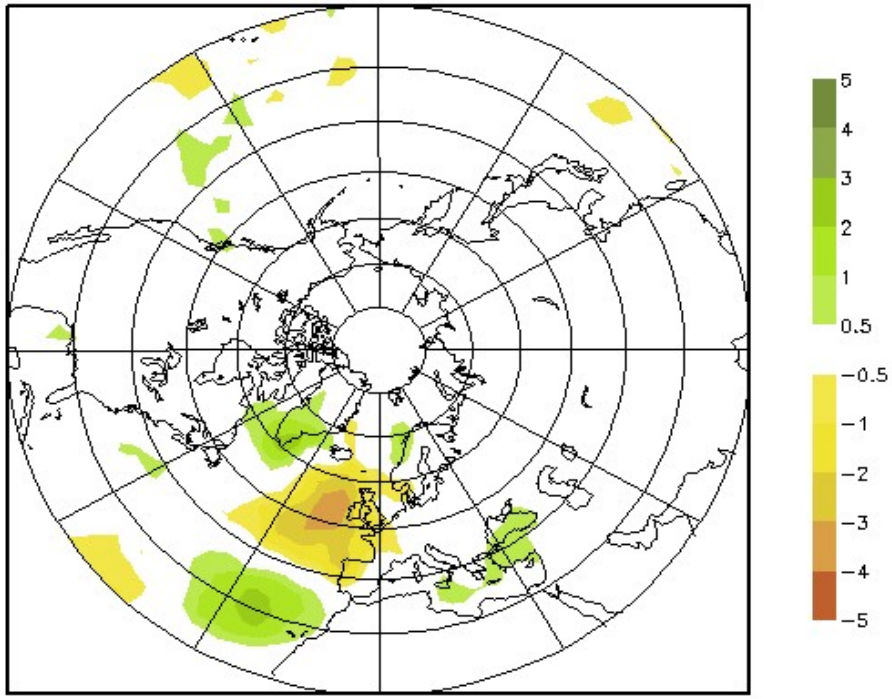
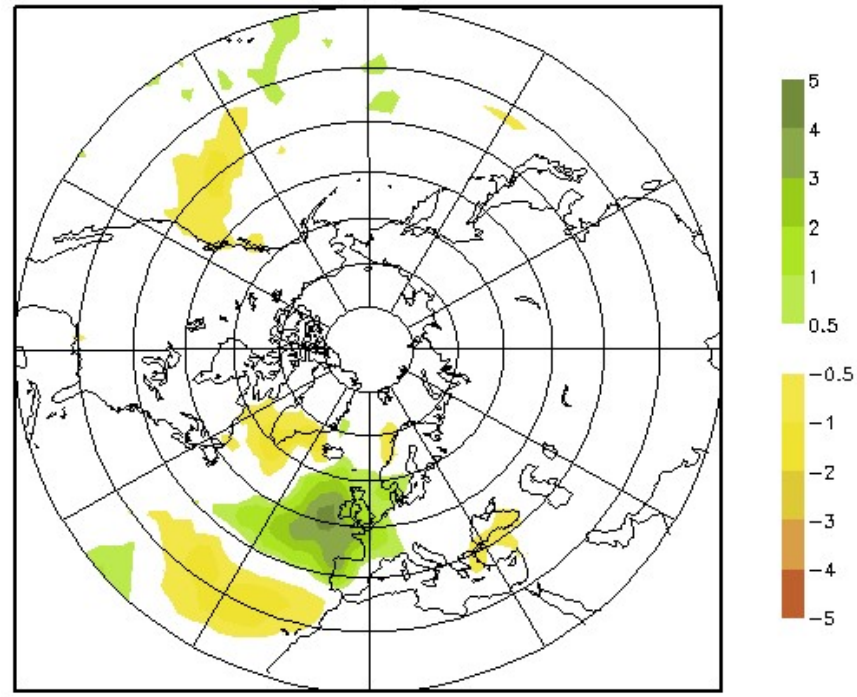
EAST ATLANTIC OSCILLATION
COMPOSITE MAPS
ANOMALY OF PRECIPITATION (mm/day)

Positive phase
(EA>0.49)



Negative phase
(EA< -0.48)

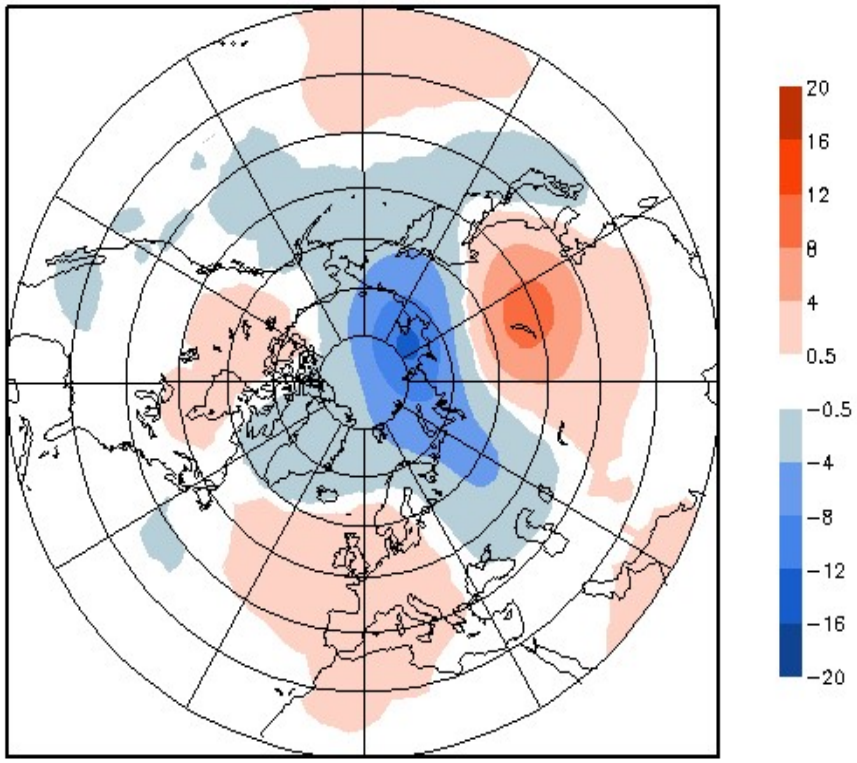


DJF

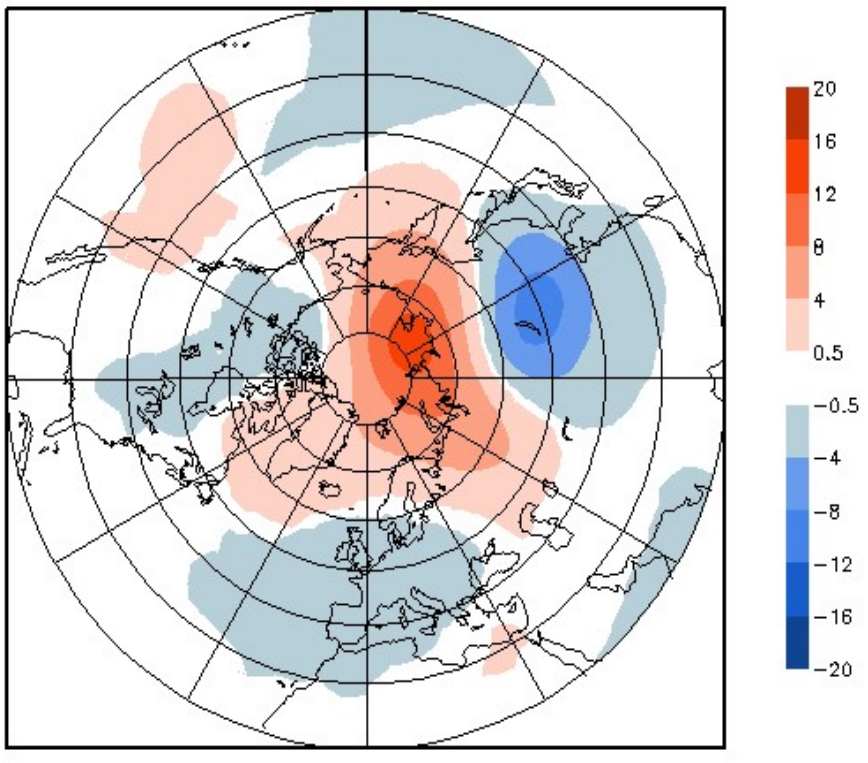
SL-AV EA=-1.96

POLAR OSCILLATION (POL)
COMPOSITE MAPS
ANOMALY OF H-500 (dm)

Positive phase
(POL>0.63)



Negative phase
(POL< -0.49)



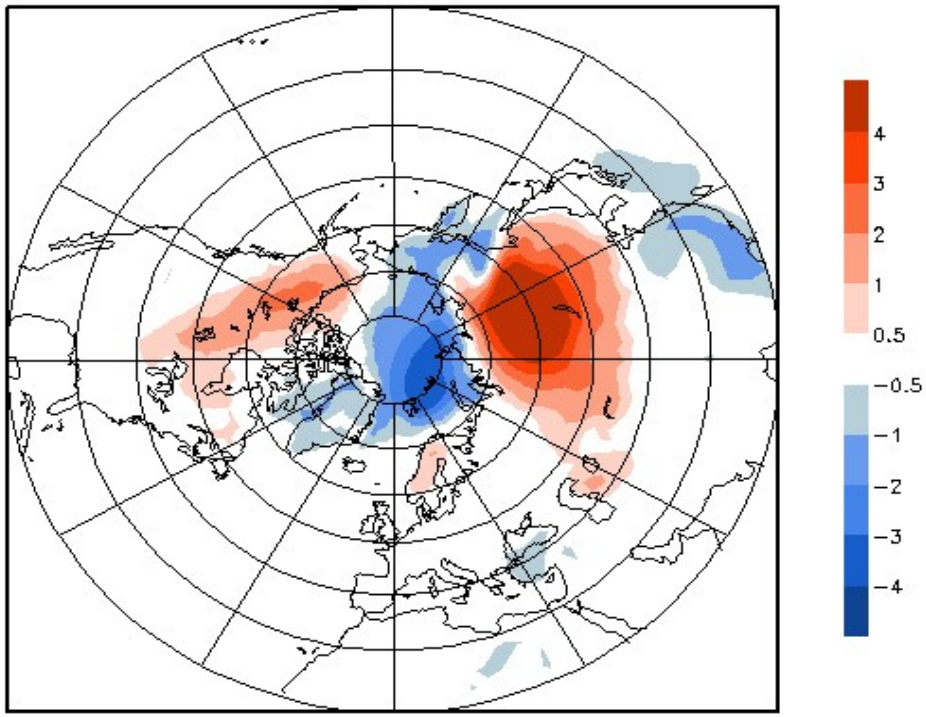
DJF

SL-AV POL=-0.95

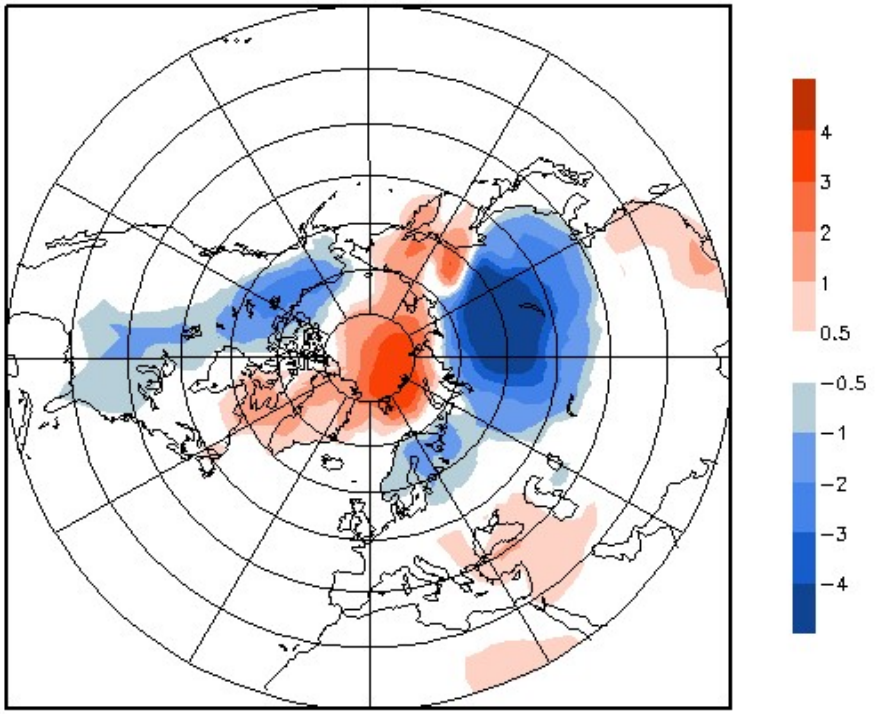
http://neacc.meteoinfo.ru

POLAR OSCILLATION (POL)
COMPOSITE MAPS
ANOMALY OF AIR TEMPERATURE (°C)

Positive phase
(POL>0.63)



Negative phase
(POL< -0.49)

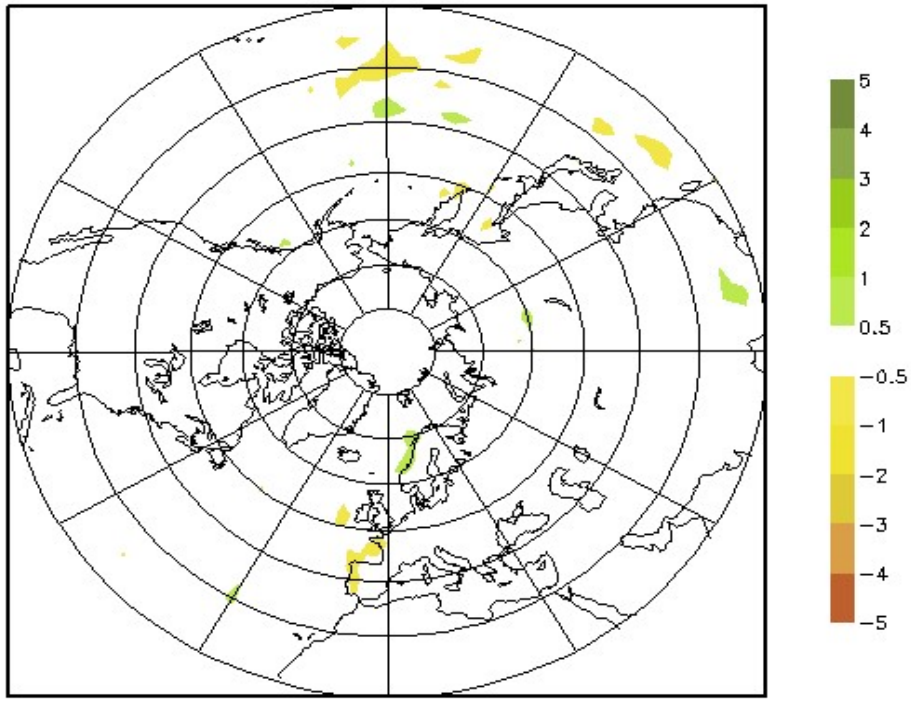


DJF

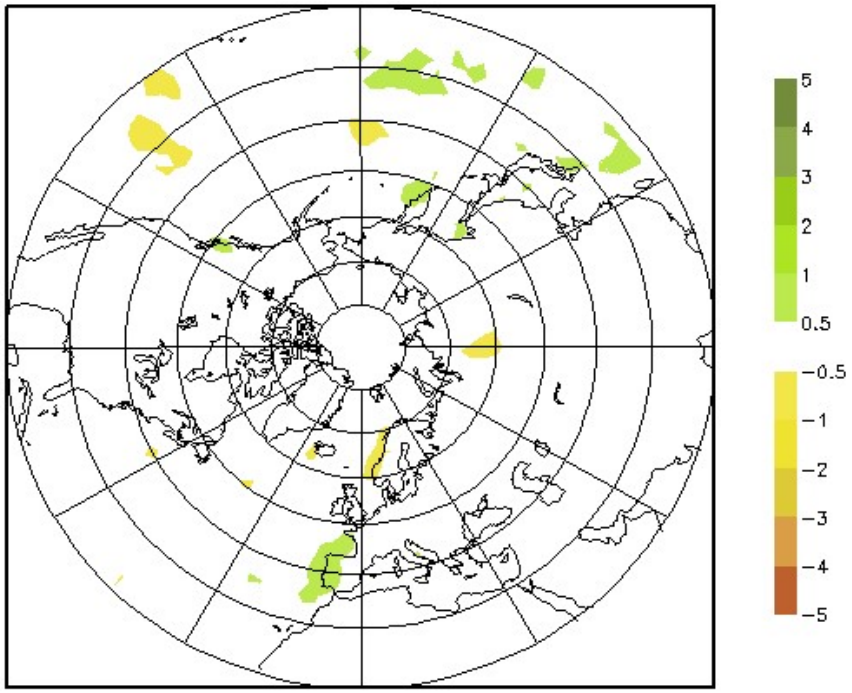
SL-AV POL=-0.95

POLAR OSCILLATION (POL)
COMPOSITE MAPS
ANOMALY OF PRECIPITATION (mm/day)

Positive phase
(POL>0.63)



Negative phase
(POL< -0.49)



DJF

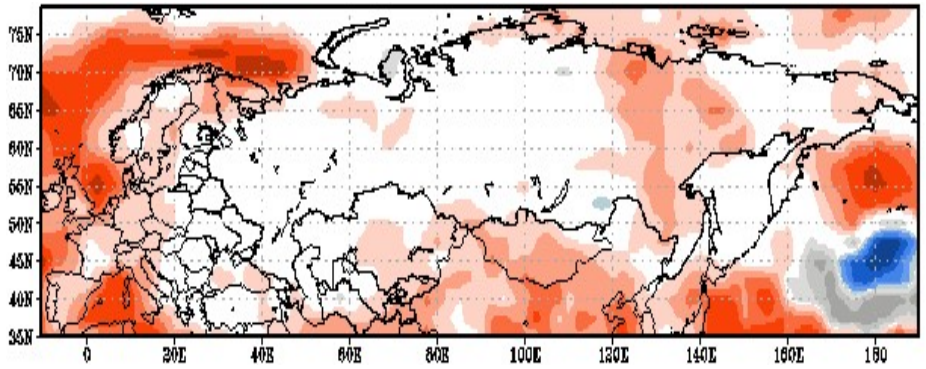
SL-AV POL=-0.95

http://neacc.meteoinfo.ru

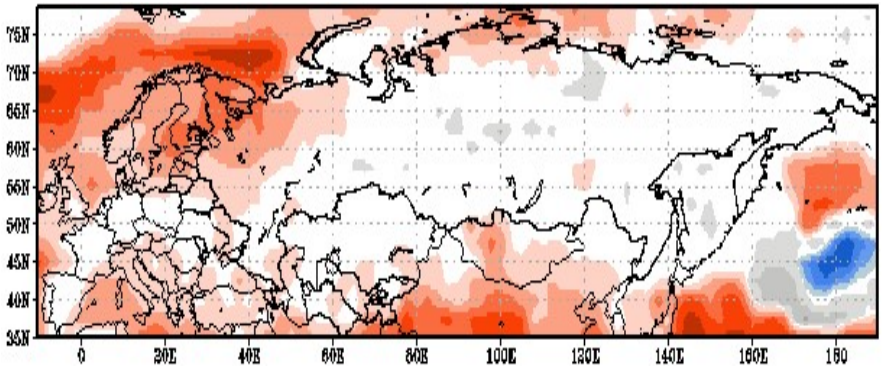
FORECASTS OF AIR TEMPERATURE
THE PROBABILISTIC FORECASTS

MODELS: HMC(SL-AV) and MGO

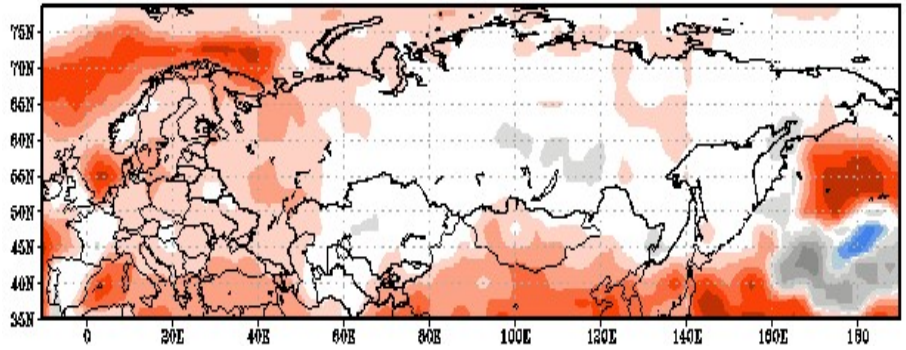
December 2016



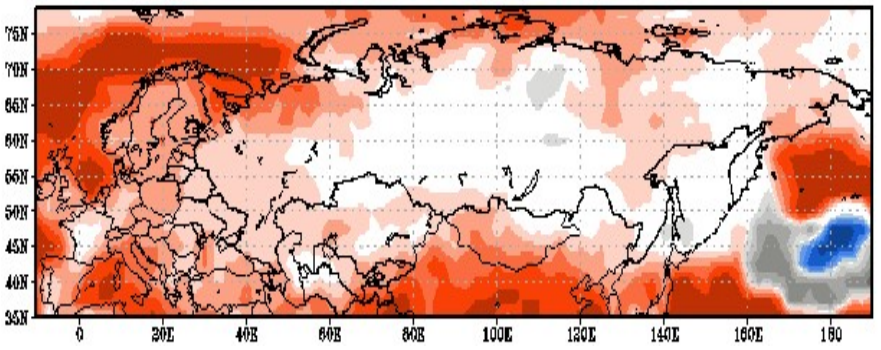
January 2017



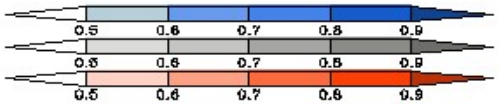
February 2017



December 2016 - January 2017



issued on October 2016



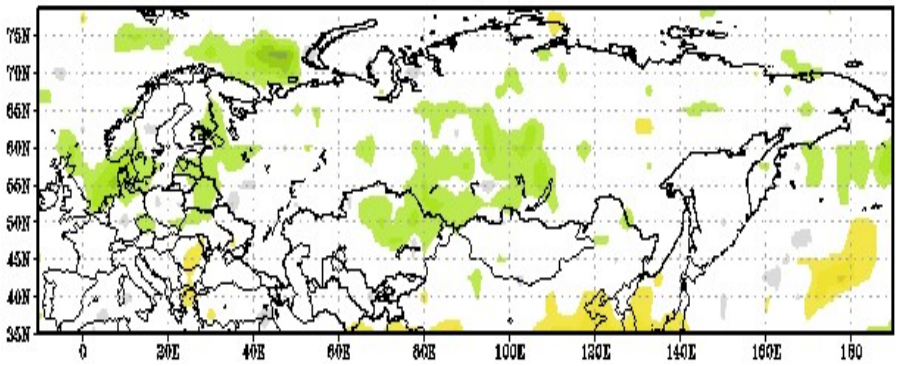
Below normal
Near normal
Above normal

http://neacc.meteoinfo.ru

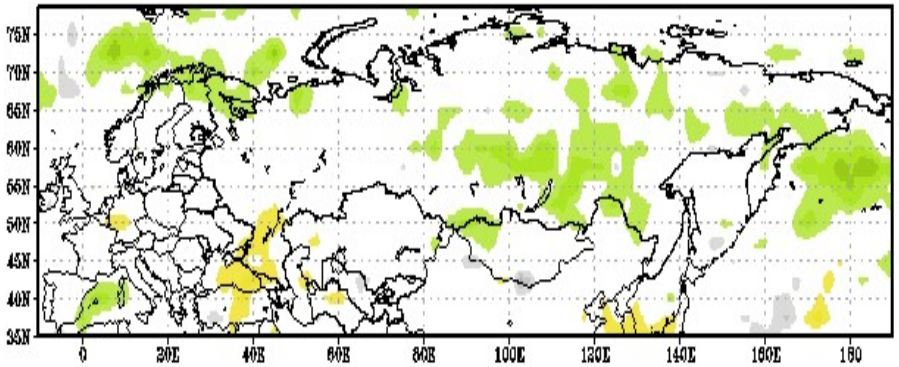
THE PROBABILISTIC FORECASTS OF PRECIPITATION

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

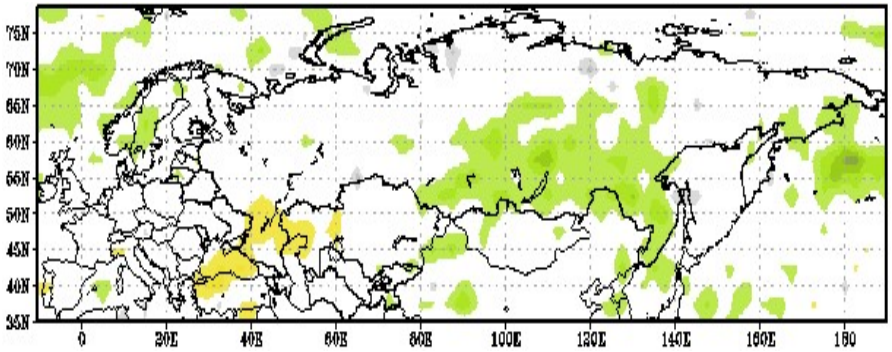
December 2016



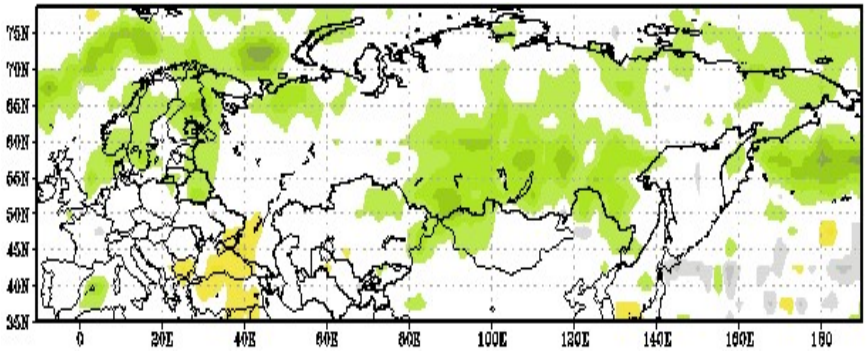
January 2017



February 2017



December 2016 - January 2017



Below normal
Near normal
Above normal

Issued on October 2016

http://neacc.meteoinfo.ru

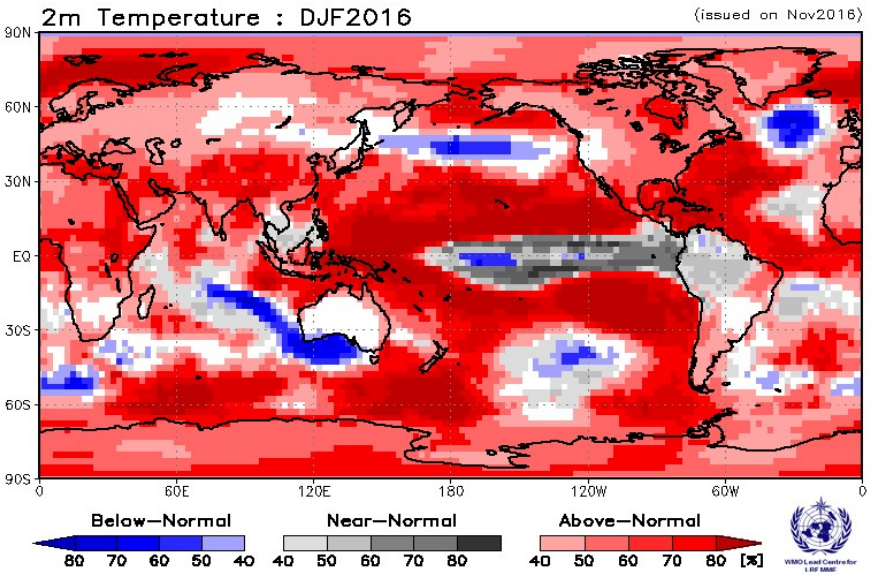
LC MMELRF-WMO Lead Centre for MME LRF

THE PROBABILISTIC FORECASTS

December 2016 – February 2017

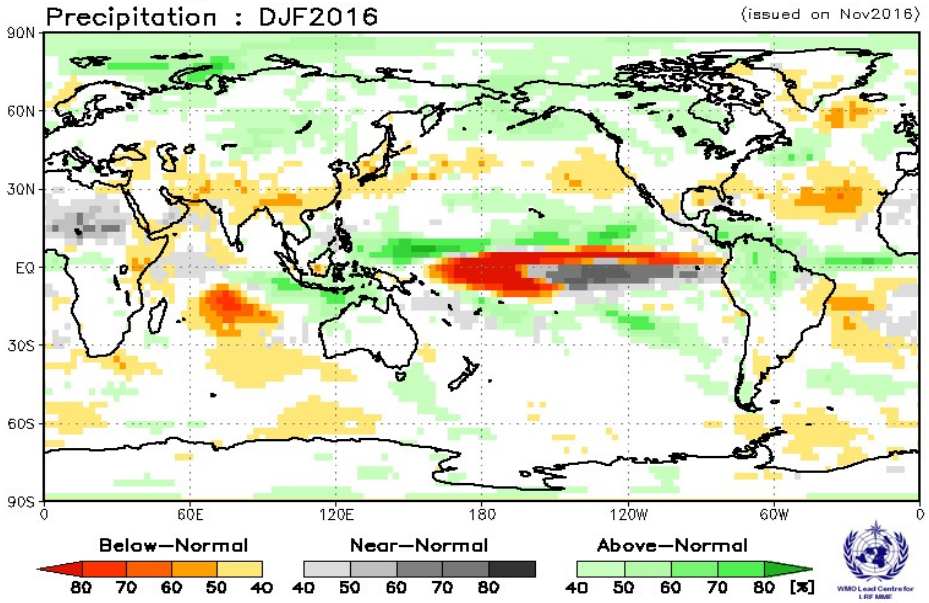
MODELS:

- GPC_Seoul
- ECMWF
- Melbourne
- Montreal
- Moscow
- Washington
- Tokyo
- Toulouse
- Exeter
- Pretoria
- CPTEC



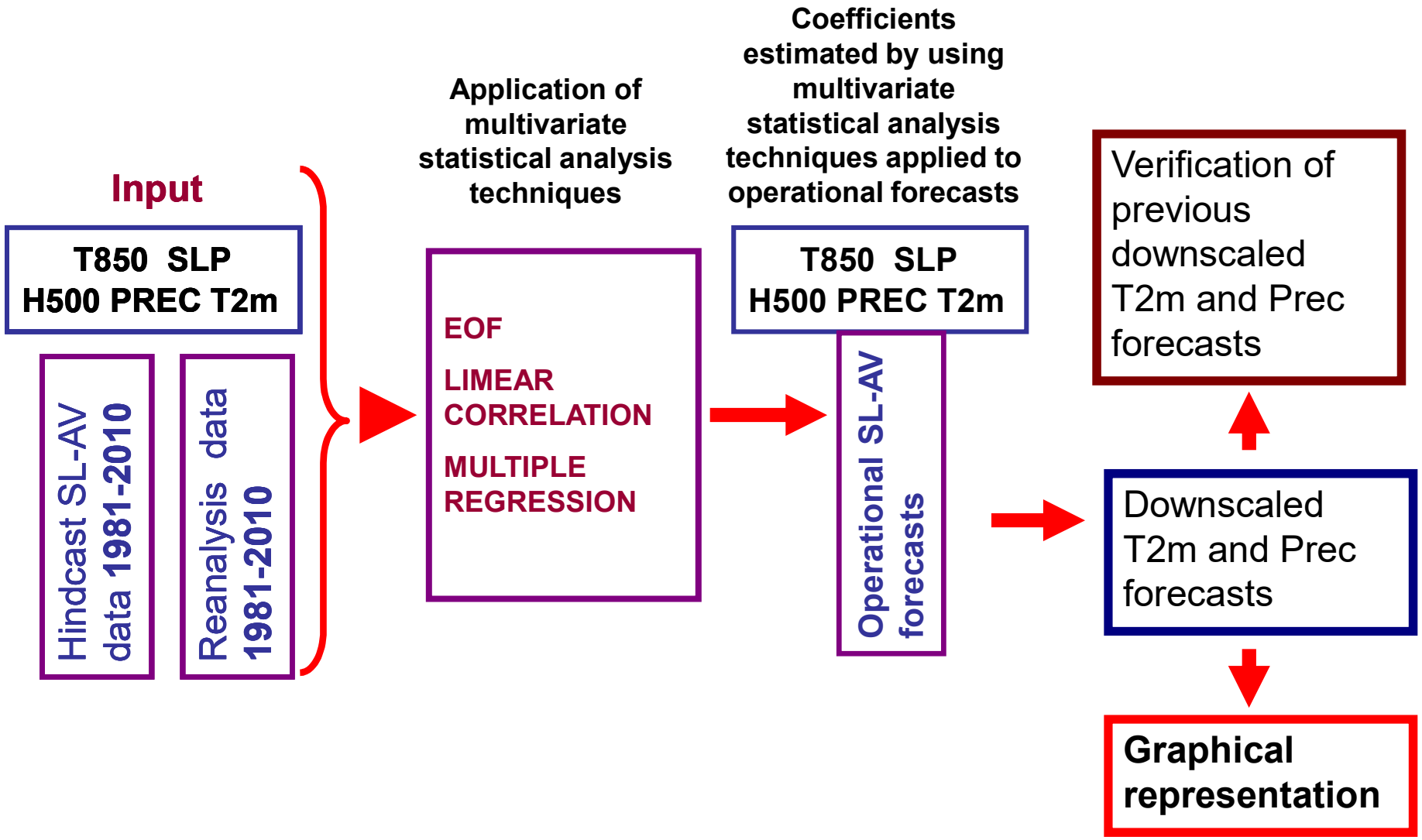
AIR TEMPERATURE

PRECIPITATION



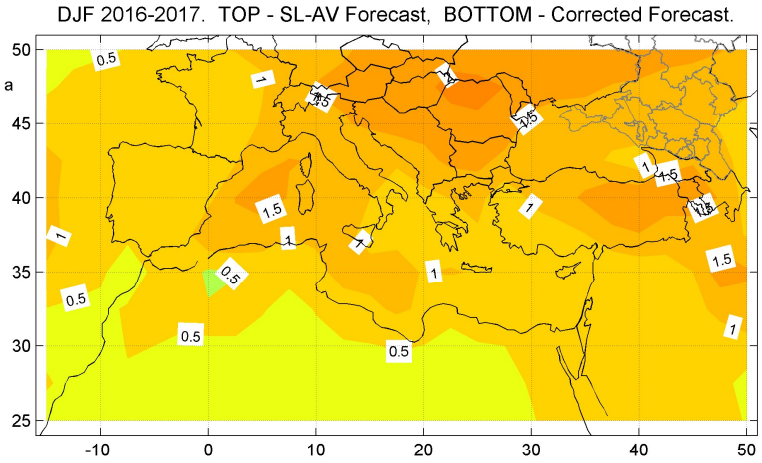
issued on November 2016

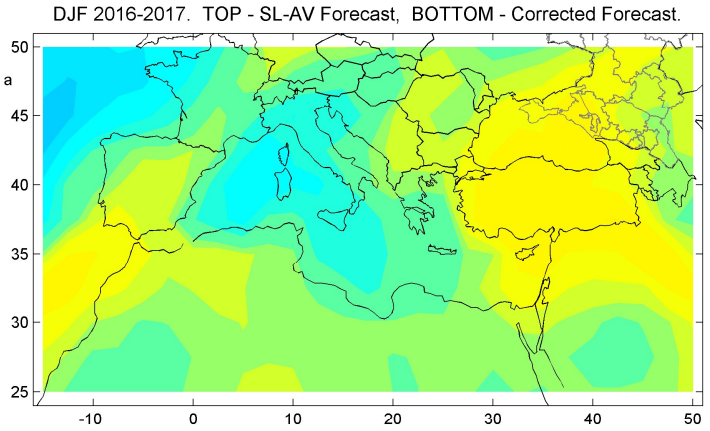
Downscaling block in operational technology for LRF issuance



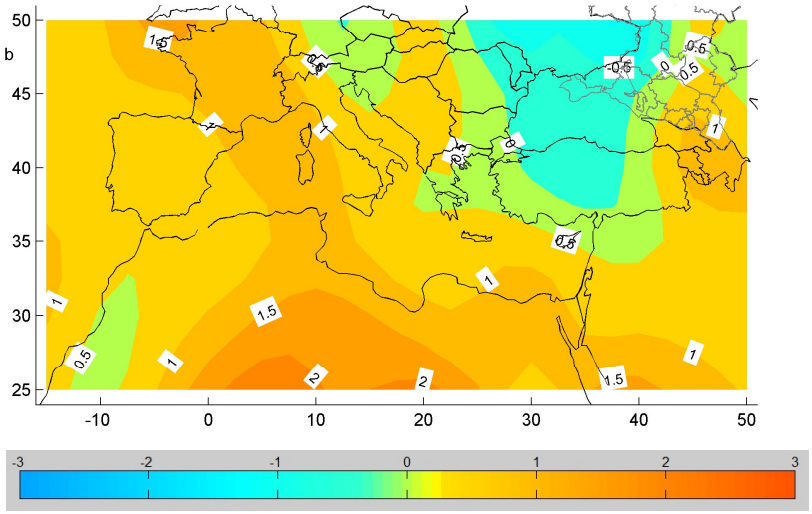
Downscaled forecasts from GPC-Moscow for DJF 2016-2017

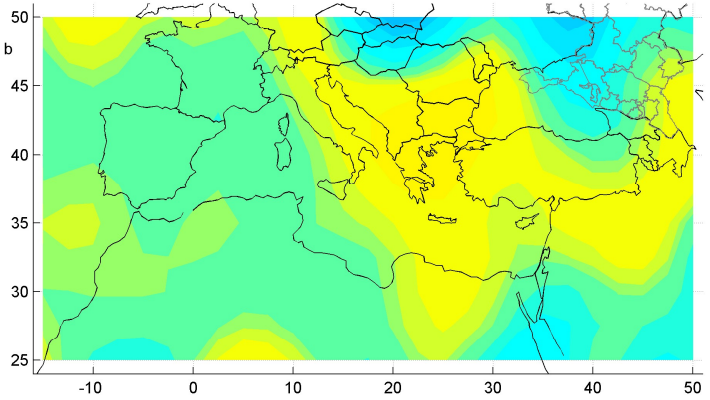
Raw forecasts





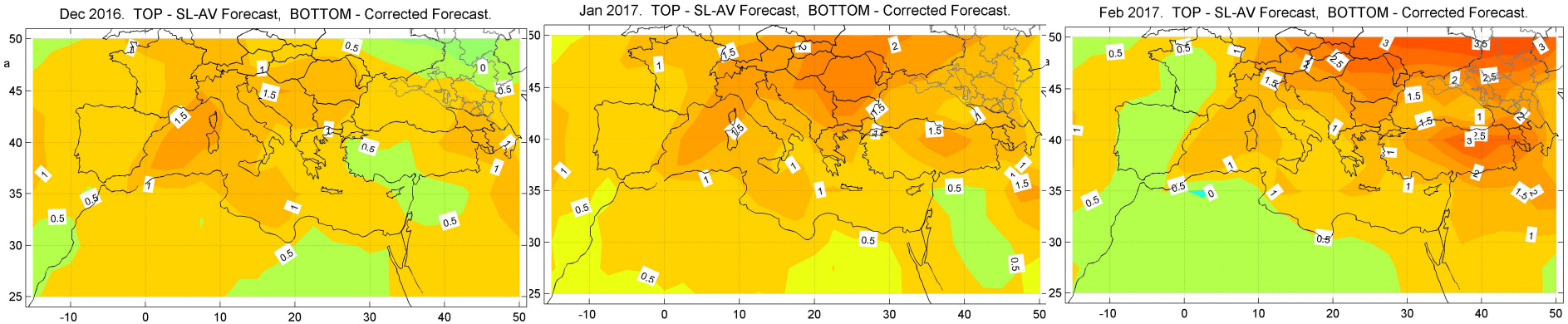
Downscaled forecasts



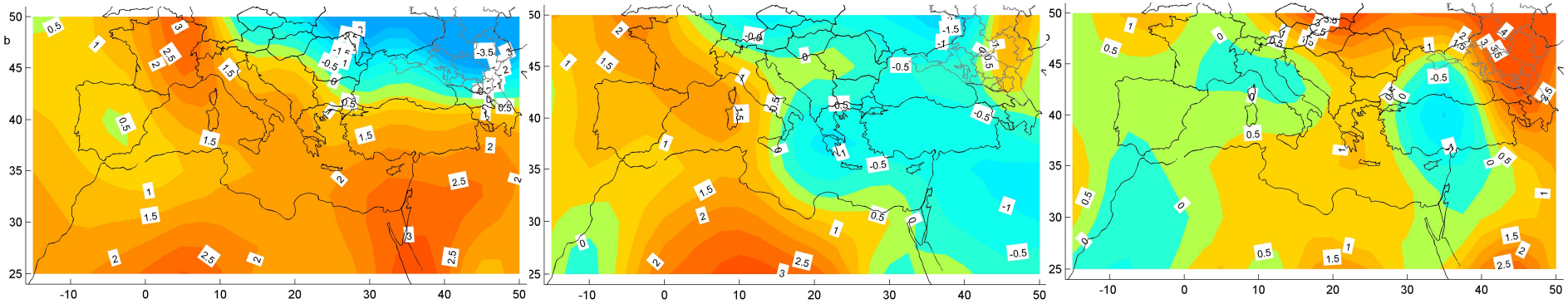


Downscaled forecasts of T2m from GPC-Moscow for DJF 2016-2017 at monthly scale

Raw forecasts

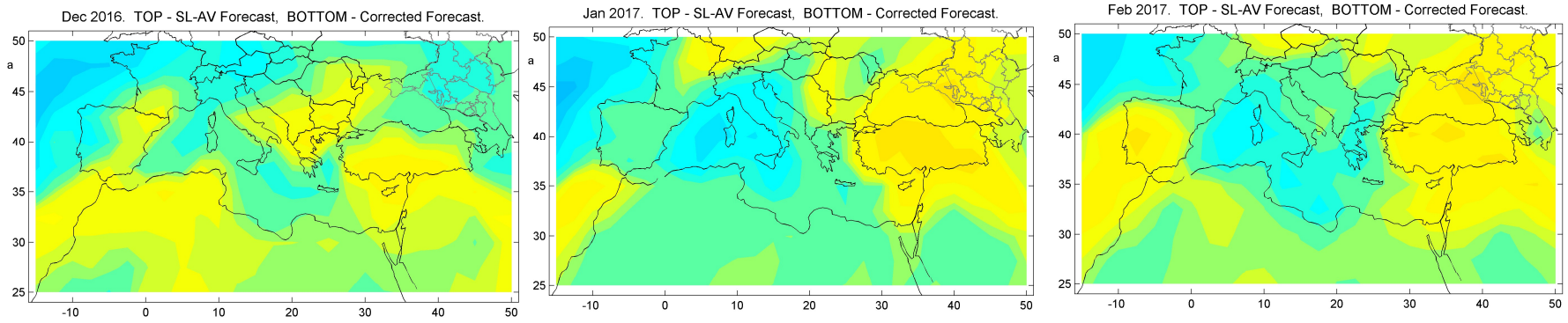


Downscaled forecasts

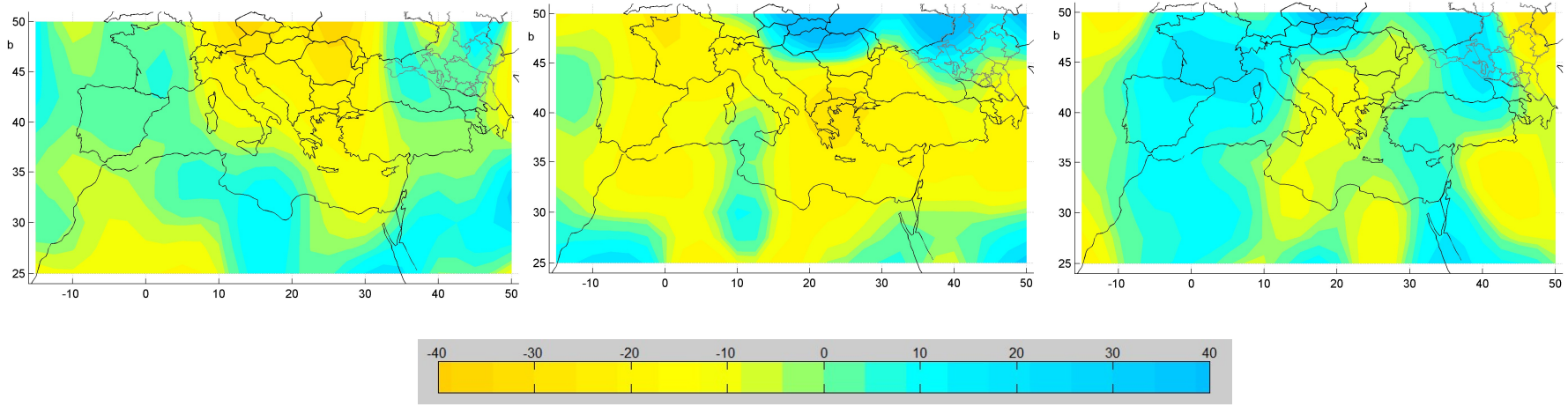


Downscaled forecasts of precipitation from GPC-Moscow for DJF 2016-2017 at monthly scale

Raw forecasts



Downscaled forecasts



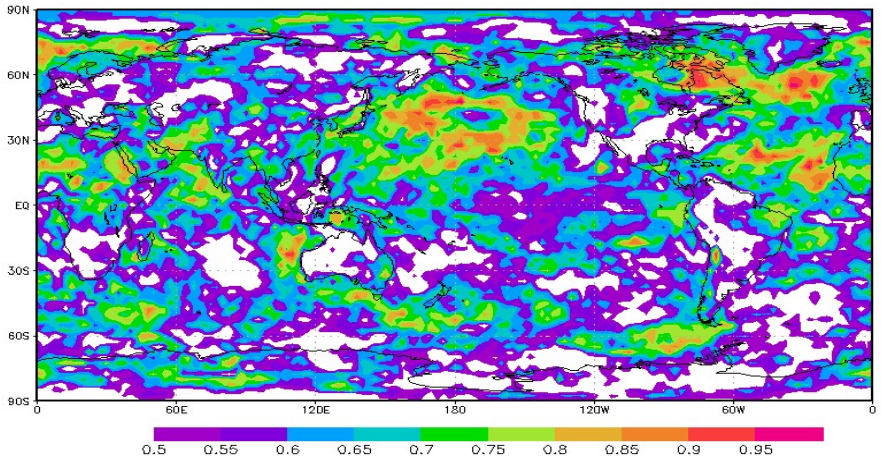
Skill scores of raw and downscaled forecasts

		May	June	July	August
Surface air temperature					
ACC	*raw forecast*	**0.37**	**0.16**	**0.11**	**0.12**
	downscaled forecast	**0.67**	**0.61**	**0.64**	**0.68**
ρ	*raw forecast*	**0.29**	**0.13**	**0.08**	**0.10**
	downscaled forecast	**0.49**	**0.43**	**0.47**	**0.49**
RMSE	*raw forecast*	**1.91**	**1.44**	**1.21**	**1.34**
	downscaled forecast	**1.39**	**1.13**	**0.91**	**0.96**
RMSSS	*raw forecast*	**0.01**	**0.02**	**0**	**0.03**
	downscaled forecast	**0.29**	**0.23**	**0.25**	**0.29**
KS_{scaled}	*raw forecast*	**0.60**	**0.54**	**0.53**	**0.55**
	downscaled forecast	**0.74**	**0.72**	**0.73**	**0.75**
Precipitation					
ACC	*raw forecast*	**0.16**	**0.09**	**-0.01**	**-0.02**
	downscaled forecast	**0.59**	**0.62**	**0.64**	**0.60**
ρ	*raw forecast*	**0.13**	**0.07**	**-0.02**	**-0.03**
	downscaled forecast	**0.44**	**0.44**	**0.47**	**0.43**
RMSSS	*raw forecast*	**-0.08**	**-0.09**	**-0.10**	**-0.12**
	downscaled forecast	**0.22**	**0.24**	**0.26**	**0.23**
KS_{scaled}	*raw forecast*	**0.54**	**0.51**	**0.49**	**0.48**
	downscaled forecast	**0.71**	**0.72**	**0.73**	**0.71**

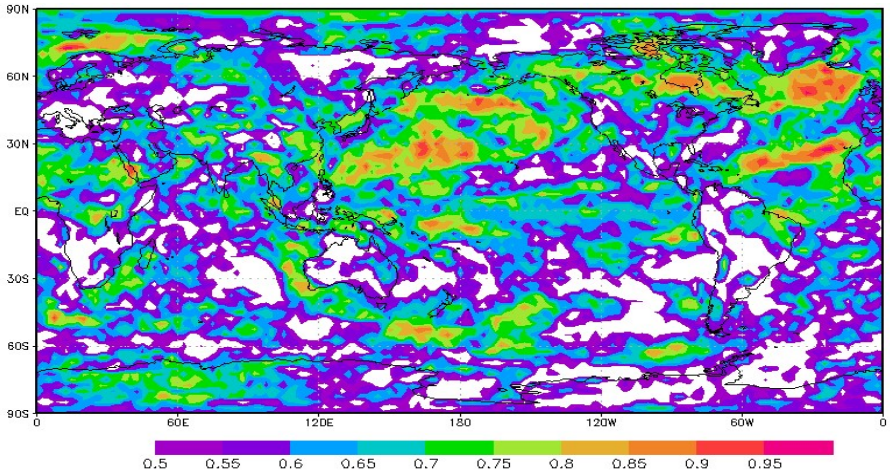
FORECAST VERIFICATION: TEMPERATURE

SL-AV, HMC

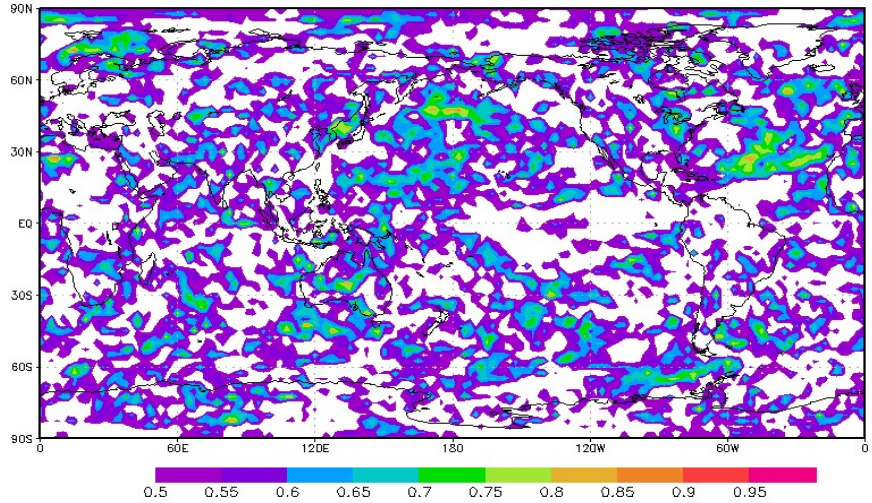
ROC_B



ROC_A



ROC_N



Scores:

ROC_A - ROC Score Above Normal

ROC_N - ROC Score Near Normal

ROC_B - ROC Score Below Normal

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

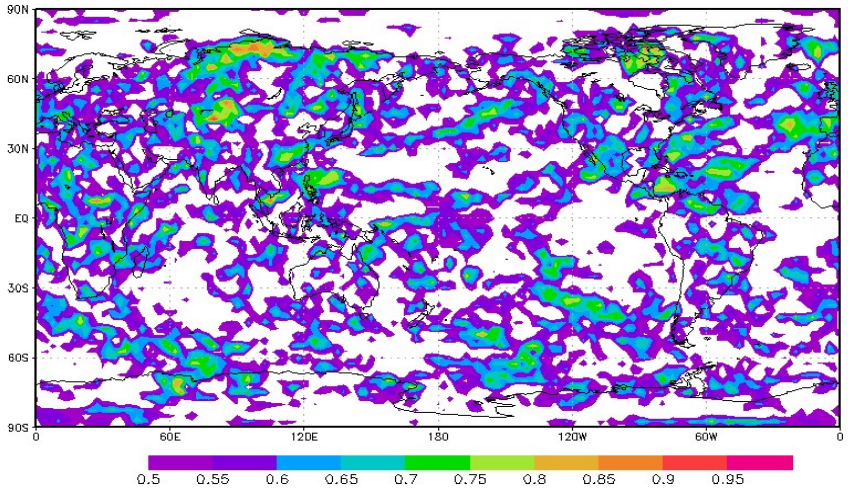
Guidance: Standardised Verification System for Long-Range Forecasts, SVSLRF, 2002. New Attachment II-8 to the *Manual on the GDPFS* (WMO-No. 485), Volume I.

Verification characteristics are operationally presented on the NEACC web-site: *http://seakc.meteoinfo.ru*.

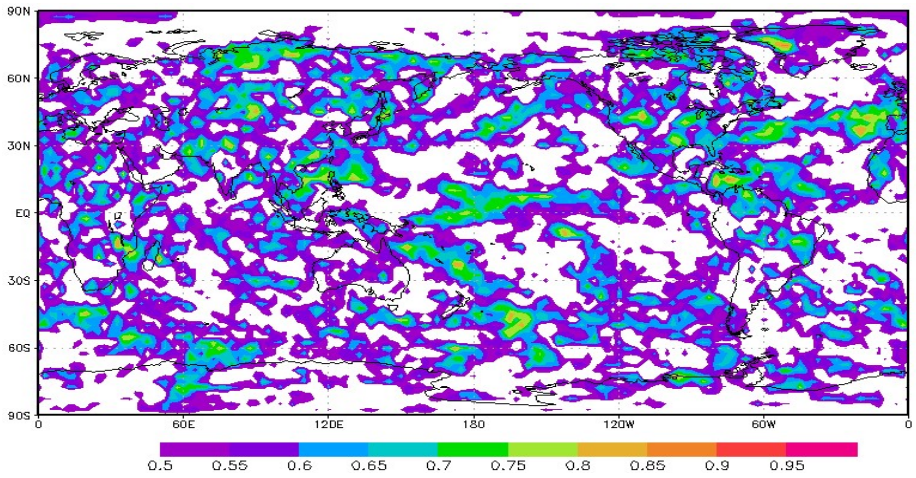
FORECAST VERIFICATION: PRECIPITATION

SL-AV, HMC

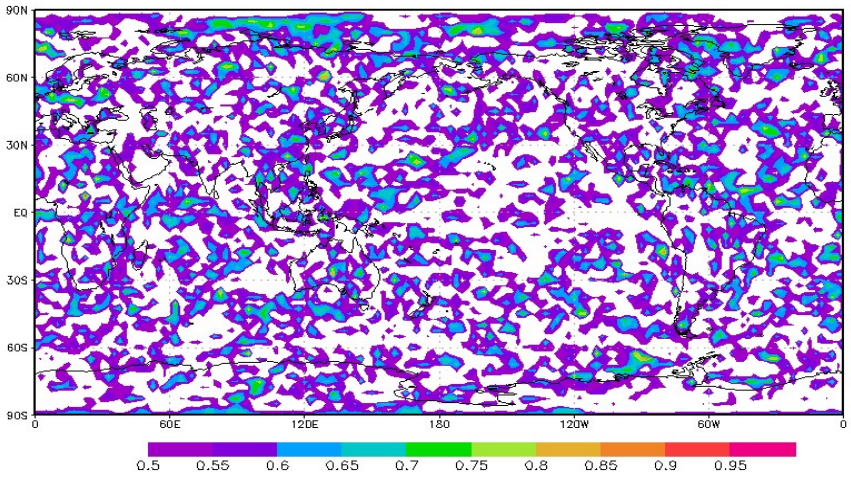
ROC_B



ROC_A



ROC_N



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SUMMARY

- According to the forecasts of the most of the models the negative anomalies of SST are expected in the central part of the Pacific Ocean through the winter 2016-2017. The probabilities for La Nina, neutral and El Nino conditions (using -0.5C and 0.5C thresholds) over the coming DJF season are: 47%, 51% и 2 %.
- Most of the centers predict significant SST anomalies in the North Pacific Ocean connected with the positive phase of PDO. It can drive the variations of the geographical position and intensity of the Pacific maximum and the Aleutian minimum. The significant temperature and precipitation anomalies are possible in the Far East as a result.
- In the North Atlantic significant positive SST anomalies are expected near the Gulf Stream and NEZ. The negative anomalies are expected from Labrador to Europe. The forecasts of most centers indicate the signal associated with the appearance of positive SST anomalies in the Norwegian and Barents Seas.
- GPC-Moscow predicts the negative phases of EA in winter 2016-2017. The negative phase of EA is associated with the positive temperature anomalies in Europe. The positive anomalies of precipitation are possible in the west of Europe.
- The winter season of 2016-2017 is expected warmer than normal over most of Mediteraanean region according to the forecasts of the most of models.
- There are a lot of contradictions and uncertainties in the forecasts of precipitation. The precise signal is marked only in the south-east of Europe where below normal precipitation is expected.

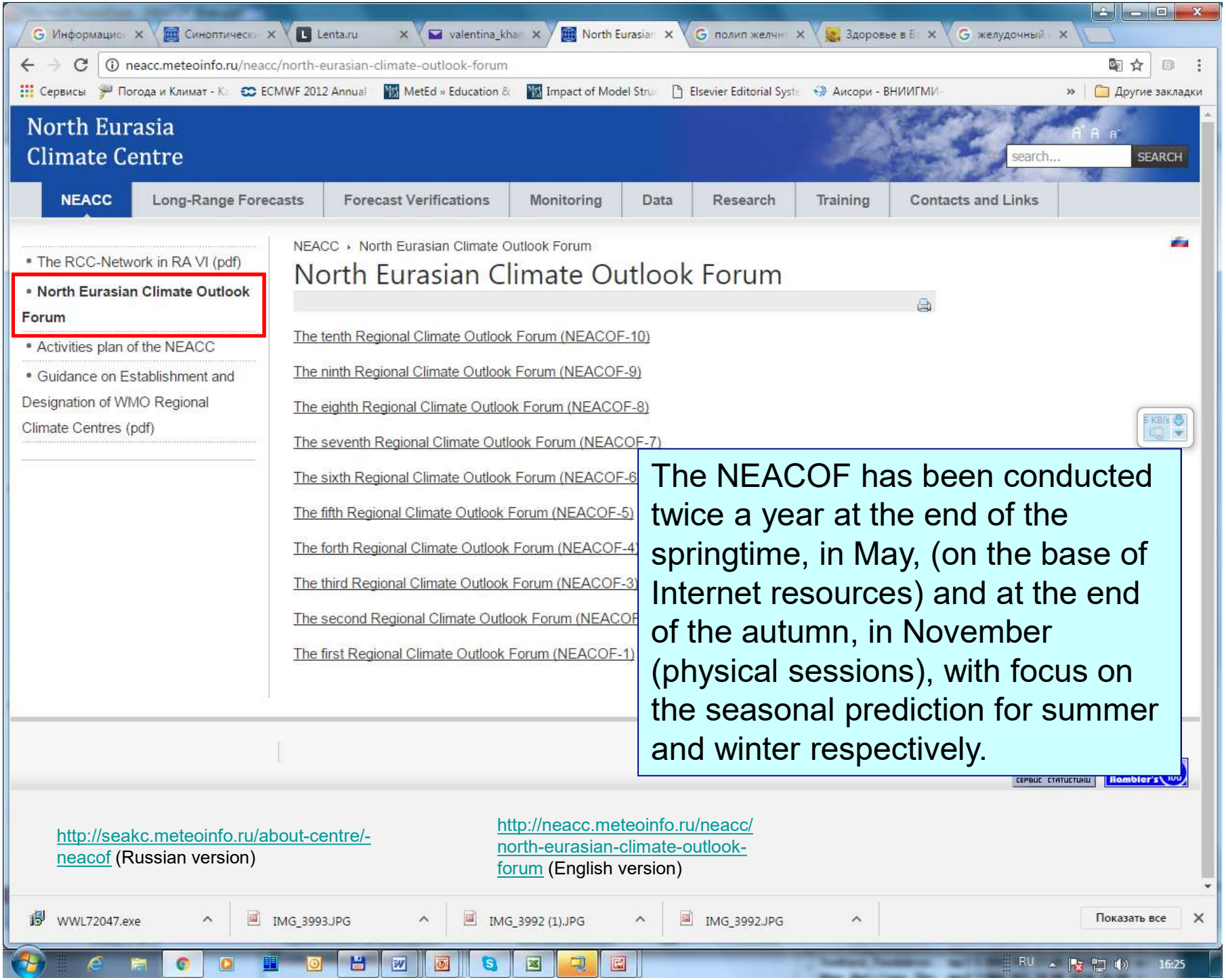
North Eurasian Climate Outlook Forums (NEACOF)

Activity of NEACOF

- NEACOF was initiated by the North Eurasia Climate Centre (NEACC); the first session took place from 17 to 19 May 2011, hosted by Hydrometcenter of Russia.
- Participating countries: Azerbaijan, Armenia, Belorussia, Kazakhstan, Kirgizstan, Moldova, Russian Federation, Tajikistan, Uzbekistan, Ukraine.
- The last physical session of NEACOF - NEACOF-9 was held in November 10-12, 2015 in Moscow.

Preparation of consensus winter 2015/2016 forecast.

November 11, 2015


North Eurasia Climate Centre
search...
SEARCH
NEACC
Long-Range Forecasts
Forecast Verifications
Monitoring
Data
Research
Training
Contacts and Links
• The RCC-Network in RA VI (pdf)
• North Eurasian Climate Outlook Forum
• Activities plan of the NEACC
• Guidance on Establishment and Designation of WMO Regional Climate Centres (pdf)
NEACC › North Eurasian Climate Outlook Forum
North Eurasian Climate Outlook Forum
The tenth Regional Climate Outlook Forum (NEACOF-10)
The ninth Regional Climate Outlook Forum (NEACOF-9)
The eighth Regional Climate Outlook Forum (NEACOF-8)
The seventh Regional Climate Outlook Forum (NEACOF-7)
The sixth Regional Climate Outlook Forum (NEACOF-6)
The fifth Regional Climate Outlook Forum (NEACOF-5)
The forth Regional Climate Outlook Forum (NEACOF-4)
The third Regional Climate Outlook Forum (NEACOF-3)
The second Regional Climate Outlook Forum (NEACOF
The first Regional Climate Outlook Forum (NEACOF-1)
The NEACOF has been conducted twice a year at the end of the springtime, in May, (on the base of Internet resources) and at the end of the autumn, in November (physical sessions), with focus on the seasonal prediction for summer and winter respectively.
http://seakc.meteoinfo.ru/about-centre/-neacof (Russian version)
http://neacc.meteoinfo.ru/neacc/north-eurasian-climate-outlook-forum (English version)

Objectives of NEACOF

- **Integration on a professional basis of national, regional and international experts on climate monitoring and prediction and assistance in capacity building of NMHS CIS to meet national (and regional) requirements for climate services**

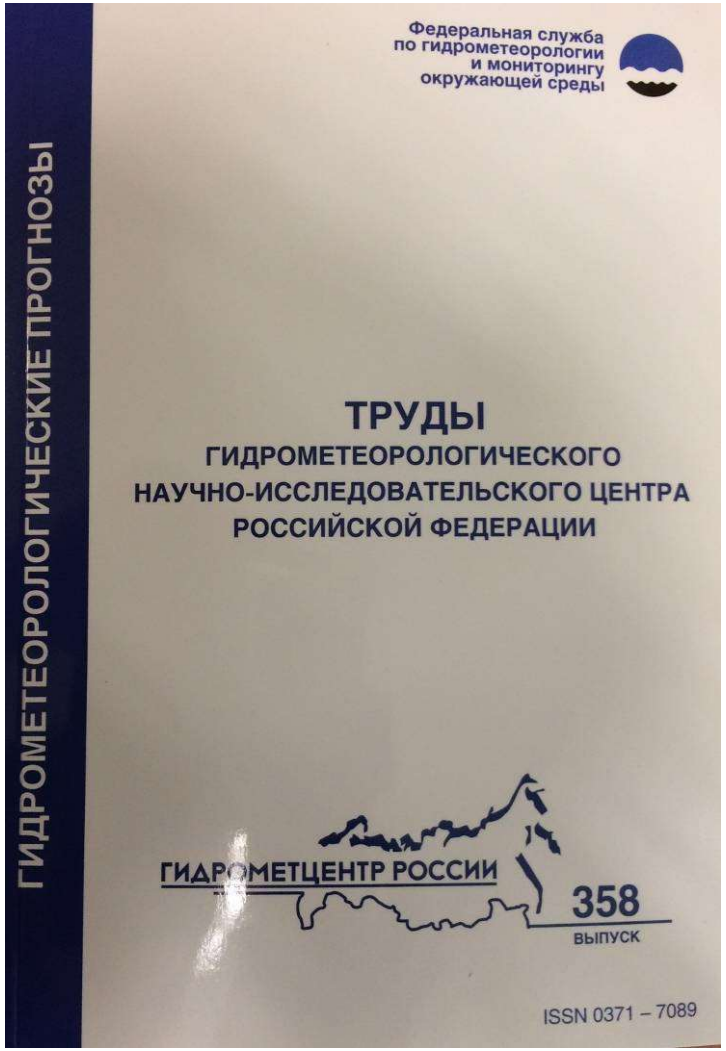
The scope of NHMS climate services in the area of NEACC differ from country to country. Some of NHMS monitor and assess regional climate variability, while some deal with operational climate forecasting. In some cases, climate services are not enough transparent. So, the use of information from consensus NEACOF outlook is in importance for the NHMS needs.

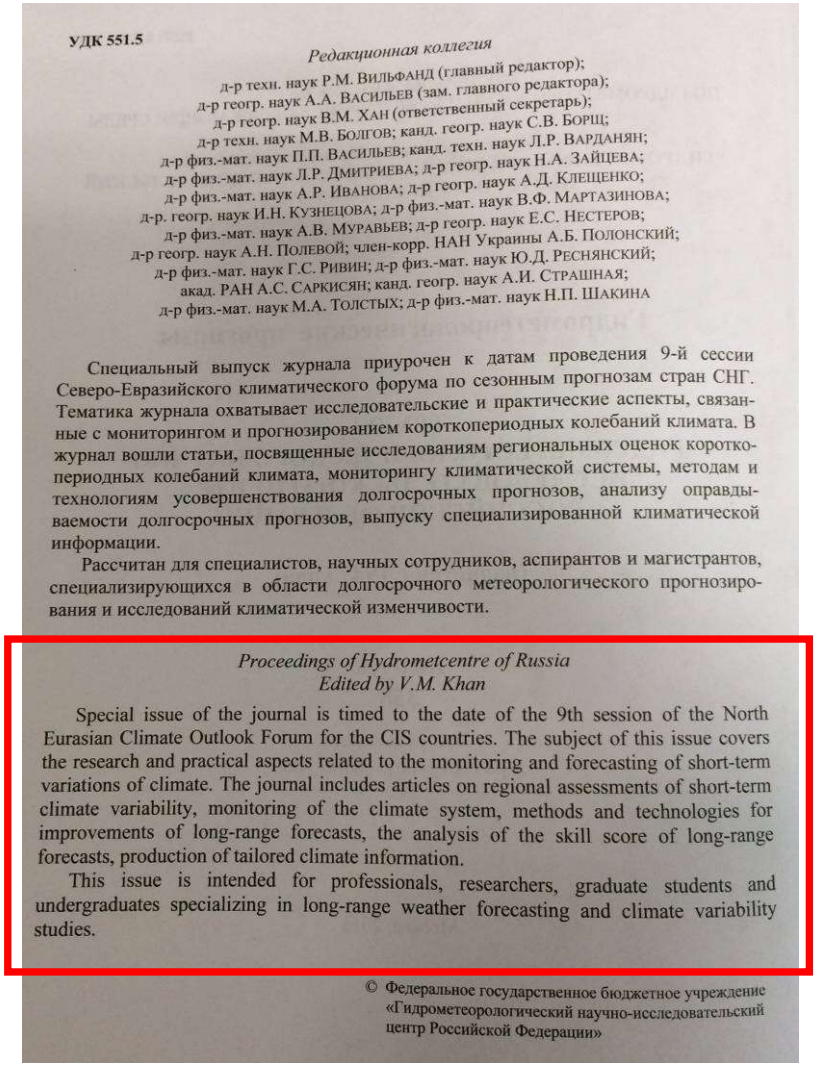
How are sessions of NEACOF organized?

The NEACOF agenda includes a number of different issues in the following main areas:

- ❖ A review of recent advances in the field of climate research and the development of long-range forecasting methods;
- ❖ Overview of climate monitoring over territory of the CIS;
- ❖ Overview of state of large-scale circulation patterns which are influencing on climate conditions in CIS territory;
- ❖ Presentation of forecasts for upcoming season issued by NHMSs of CIS;
- ❖ Issue of a seasonal forecast for the upcoming season over the CIS territory;
- ❖Training activity with focus on practical exercises to visualize and interpret the forecasts developed by empirical and hydrodynamic methods;
- ❖ Discussion on the practical use of climate information in various socio-economic sectors.

Special issue of scientific-technical journal “Trudy Gidrometcentra Rossii” focused on a NEACOF-9 topic was published at the end of 2015. NEACOF-9 participants submitted various papers





УДК 551.5

Специальный выпуск журнала приурочен к датам проведения 9-й сессии Северо-Евразийского климатического форума по сезонным прогнозам стран СНГ. Тематика журнала охватывает исследовательские и практические аспекты, связанные с мониторингом и прогнозированием короткопериодных колебаний климата. В журнал вошли статьи, посвященные исследованиям региональных оценок короткопериодных колебаний климата, мониторингу климатической системы, методам и технологиям усовершенствования долгосрочных прогнозов, анализу оправдываемости долгосрочных прогнозов, выпуску специализированной климатической информации.

Рассчитан для специалистов, научных сотрудников, аспирантов и магистрантов, специализирующихся в области долгосрочного метеорологического прогнозирования и исследований климатической изменчивости.

Proceedings of Hydrometcentre of Russia
Edited by V.M. Khan

Special issue of the journal is timed to the date of the 9th session of the North Eurasian Climate Outlook Forum for the CIS countries. The subject of this issue covers the research and practical aspects related to the monitoring and forecasting of short-term variations of climate. The journal includes articles on regional assessments of short-term climate variability, monitoring of the climate system, methods and technologies for improvements of long-range forecasts, the analysis of the skill score of long-range forecasts, production of tailored climate information.

This issue is intended for professionals, researchers, graduate students and undergraduates specializing in long-range weather forecasting and climate variability studies.

Products of NEACOF

NORTH EURASIA CLIMATE CENTRE

WMO RA VI
WMO RA II
RCC-Network

SESONAL FORECAST OUTLOOK

SUMMER 2016

http://neacc.meteoinfo.ru

NORTH EURASIA CLIMATE CENTRE

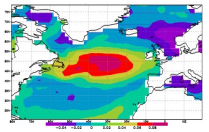
TABLE OF CONTENTS

NORTH EURASIA CLIMATE CENTRE

OCEANIC FORECASTS
SEA SURFACE TEMPERATURE (SST)

OUTLOOK

In the Indian Ocean: the most significant SST anomalies (mostly positive) are found in the southern hemisphere. Several centers predict positive SST anomalies in the vicinity of the South East Asia. It can cause the summer monsoon circulation weaking. **In the Pacific Ocean:** Most of models predict warmer than normal conditions in the equatorial latitudes. Accoding to the IRI/CPC probabilistic forecast the probabilities for La Nina, neutral and El Nino conditions (using -0.5C and 0.5C thresholds) over the coming JJA season are: 52%, 42% and 6 %. Negative anomalies in the Central Tropics and Subtropics and positive anomalies in the Eastern are in the forecasts of most of models. Colder than normal conditions are expected in the high latitudes. It can result in an activation of cyclones in the north of Russian Far East. **North Atlantic:** The tripole is the principal mode of SST variability in the North Atlantic (see picture). According to the most of centers, it is characterized by negative anomalies in the central part of the area. There are significant positive SST anomalies in the Gulf Stream and the NEO. Increasing temperature contrasts can lead to an exacerbation of atmospheric fronts and increased cyclonic activity. This means that the zonal transport of air mass is more intensive than it is necessary under the climate.



SST: Summer. First Empirical Orthogonal Function (1983-2002).

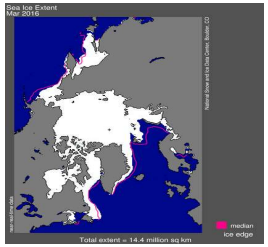
According to the forecasts of most centers the significant positive SST anomalies are expected in the Norwegian and Barents Seas at higher latitudes of the North Atlantic. These anomalies are characterized by high stability. Significant positive SST anomalies that persist for a long time may result in a further reduction in the area of ice cover in the Arctic (see below).

http://neacc.meteoinfo.ru

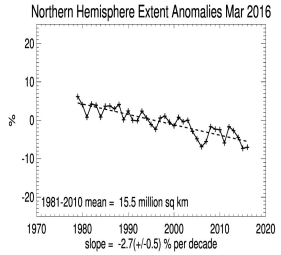
NORTH EURASIA CLIMATE CENTRE

ARCTIC SEA ICE EXTENT

National Snow and Ice Data Centre, Boulder, CO



Sea-Ice extension in Arctic in March 2016. The pillow line indicates the averaged extension (for the 1981-2010 period).



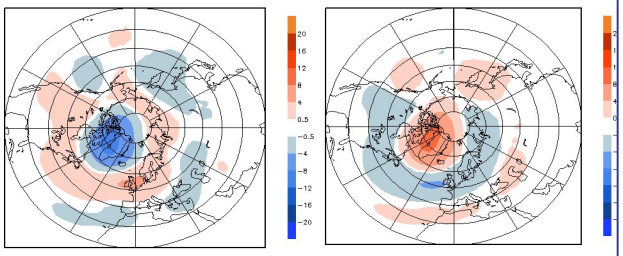
Arctic Sea Ice Extent (% from 1981-2010 mean).

http://nsidc.org/data/seaice_index/

NORTH EURASIA CLIMATE CENTRE

NORTH ATLANTIC OSCILLATION
COMPOSITE MAPS
ANOMALY OF H-500 (dm)

Positive phase (NAO>0.63) **SUMMER** **Negative phase (NAO< -0.49)**



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NORTH EURASIA CLIMATE CENTRE

INDICES OCSILLATION FORECASTS

HYDROMETEOROLOGICAL CENTRE OF RUSSIA (SL-AV)

	JUNE – AUGUST 2016			
INDEX	JUNE	JULY	AUGUST	JUNE-AUGUST
EA	-0,46	-1,12	-0,21	-0,65
WA	1,27	0,83	0,83	1,12
EU	0,70	0,63	0,80	0,68
WP	-1,14	-0,89	-0,31	-1,09
PNA	0,60	1,03	0,69	1,02
NAO	-0,07	-0,02	0,92	0,48
POL	-1,20	-0,76	-1,47	-1,36

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**) oscillations (Climate Prediction Centre of USA).

http://neacc.meteoinfo.ru

Consensus statements

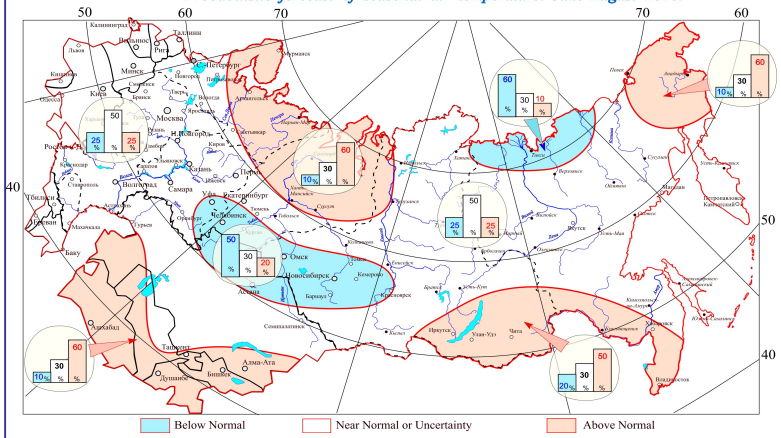
The Tenth Session of the North-Eurasian Climate Outlook Forum for CIS Countries (NEACOF-10)

Consensus Statement for Summer Season (2016)

- Most of the models predict occurrence of negative SST anomalies in equatorial latitudes of Pacific ocean. According to the forecast of CPC/IRI, the probabilities for La Nina, neutral and El Nino conditions (using -0.5C and 0.5C thresholds) over the coming JJA season are: 52%, 42% and 6 %.
- Most of the centers predict significant SST anomalies in the North Pacific Ocean connected with the positive phase of PDO. It can lead to variations of the geographical position and intensity of the Pacific maximum and the Aleutian minimum. The significant temperature and precipitation anomalies are possible in the Far East as a result.
- The principal mode of SST variability in the North Atlantic is characterized by negative anomalies in the central part of the area and the significant positive SST anomalies in the Gulf Stream and NEZ . This can cause the west-east wind intensification and advection of heat by the North Atlantic current. It can result in a change of a sign of circulation indexes and intensification of west-east air shift in Europe.
- HMC predicts the positive phases of NAO fluctuations in August. The season is expected non uniform according to forecasts of index NAO. We expect the intensification of zonal flow and activation of cyclones in North Atlantic and Western Europe in August.
- The most significant perturbations of atmospheric circulation are expected in the Far East. HMC predicts the negative phases of POL fluctuations in Summer. That means occurrence of positive values of a geopotential height in the Arctic latitudes of Northern Eurasia and weakening the whirlwind.
- The blocking, probably, will be the main mode of circulation in the European Russia in June. Anticyclonic (cyclonic) forms of atmospheric circulation are expected in the north (south) of the Europe.
- The summer season of 2016 is expected normal and warmer than normal over most of Northern Eurasia according to the most of models. Negative anomalies of temperature of air are most probable in the south of Ural and Western Siberia, also in the north of Yakutia.
- There are a lot of contradictions and uncertainties in the forecasts of precipitation. The precise signal is marked only in the south of Ural and Western Siberia, also in the north-east of Chukotka. The negative precipitation anomalies are expected in the north- west of European Russia.

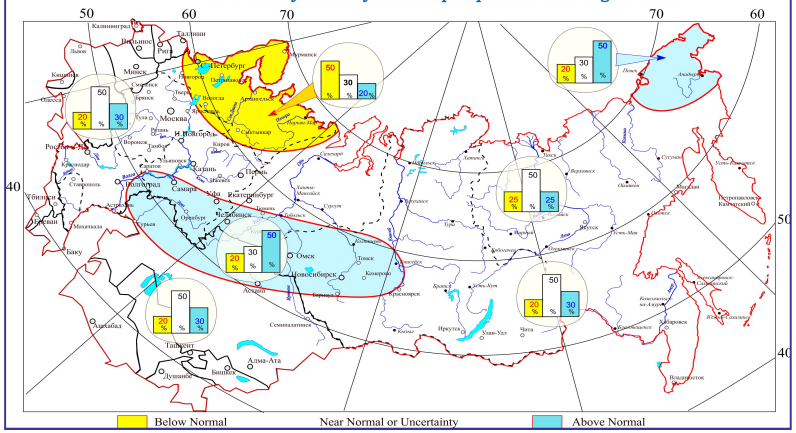
TEMPERATURE CONSENSUS OUTLOOK, SUMMER 2016

Probabilistic forecast of seasonal air temperature. June-August 2016.



PRECIPITATION CONSENSUS OUTLOOK, SUMMER 2016

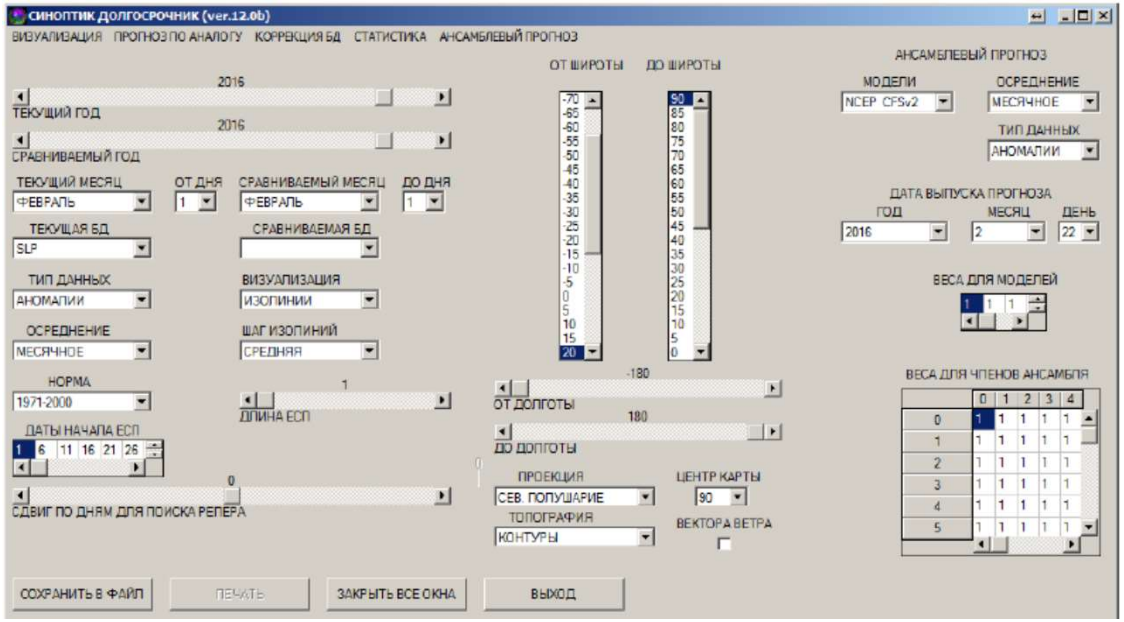
Probabilistic forecast of seasonal precipitation. June-August 2016.



Training and Capacity Building Activities during NEACOF sessions

Assistance in professional capacity of climate experts. Special software was developed for analysis and interpretation of climatological and forecast data.

"Long-range forecaster" software is interactive tool developed by V. Tscepelev from Roshydromet using IDL programming language.
The main objective of this software to assist long-range forecasters from NHMSs in the process of long-range forecast issue and to perform express statistical analysis of climatological and forecast data. As an example, the main page of this software is demonstrated bellow.



There are three main modules in the software

- Developing long-range forecasts using synoptical statistical methods
- Visualization and analysis of ensemble seasonal forecasts from hydrodynamical models
- Statistical analysis of climatological and forecast data

Capacity Building Activities

Specialists from NHMSs of CIS countries have expressed extremely high interest to learn how to work with this software to facilitate the process of long-range forecasting.