WMO RA VI RCC-Network

SEASONAL FORECAST OUTLOOK WINTER 2017-2018 FROM GPC-MOSCOW/NEACC

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Zagreb, Croatia

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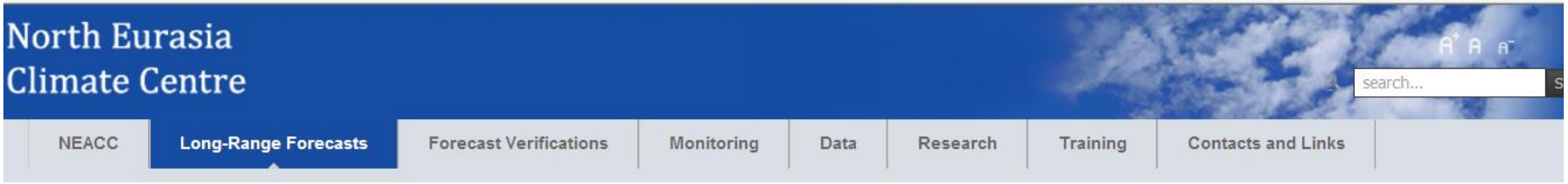
1. THE GENERAL INFORMATION

• **Seasonal predictions** are based on a **NEACC's Seasonal Ensemble Prediction System (EPS)**, which is based on the atmosphere general circulation models (GCM) of Hydrometcenter of Russia (PL-AV) and of MGO.

• **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; d**eterministic forecasts** of three seasonal and monthly mean values of meteorological variables (ensemble averages and anomalies) with zero and 1 month lead time; f**orecasts** of indices of the atmospheric circulation.

• **NEACC** provides month and three-month prediction products around the 30th of every month with warm-season (Jun. – Aug.) prediction products at the end of spring , and withcold-season (Dec. – Feb.) prediction products at the end of autumn. Main products and textual summary outlook regularly allocated on the web-site.

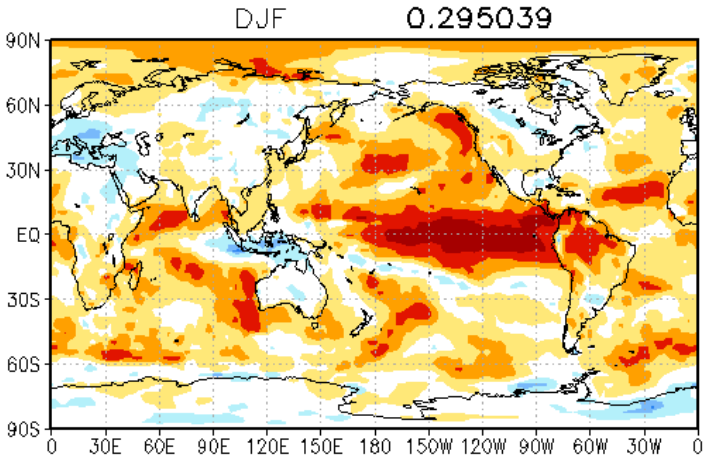
• **Prediction products** of Multi Model Forecasts Meteorological Services: **the APEC Climate Center – APCC**, the **EUROSIP** forecasting system, **the International Research Institute for Climate and Society (The IRI's), LC MMELRF (WMO Lead Centre for MME LRF) are used. The products of Tokyo Climate Center (TCC) and Climate Prediction Centre (CPC) are used too.**

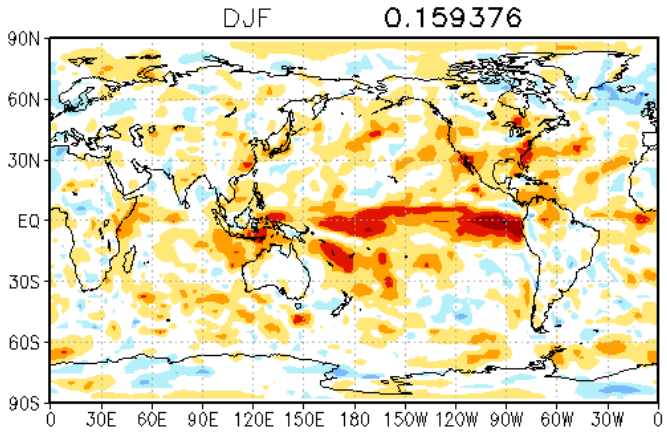


http://neacc.meteoinfo.ru

Skill of the model SL-AV

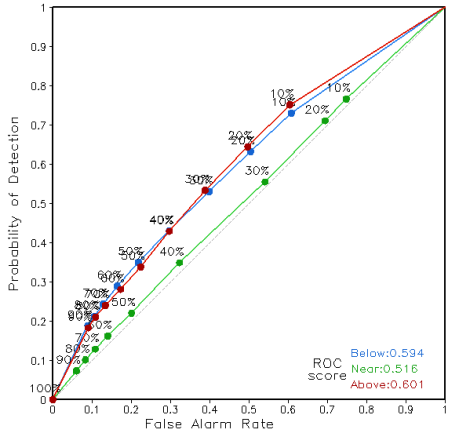
CALCULATION TIME : 1993 – 2009
FORECAST MODEL : moscow
FORECAST VARIABLE : TMP2m
Domain : 0000 0360 –090 0090





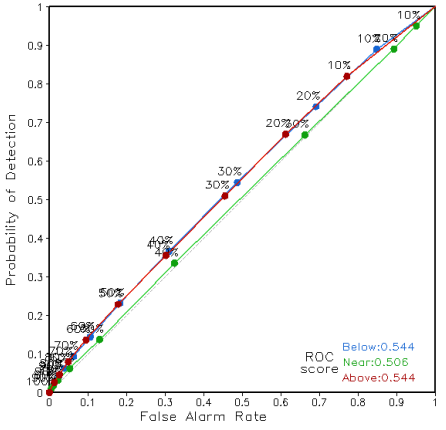
CALCULATION TIME : 1993 – 2009
FORECAST MODEL : moscow
FORECAST VARIABLE : TMP2m
Domain : 0000 0360 –90. 0090

ROC Curve and Score



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

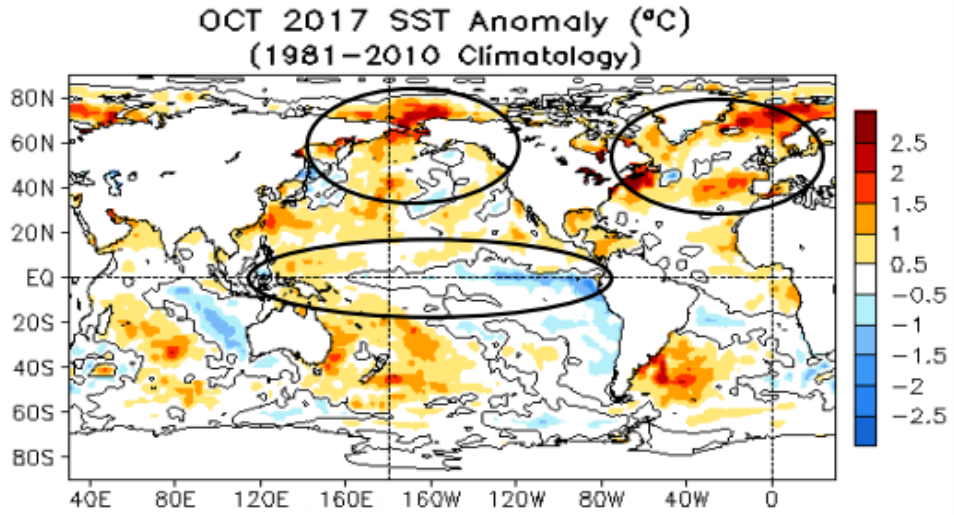
ROC Curve and Score

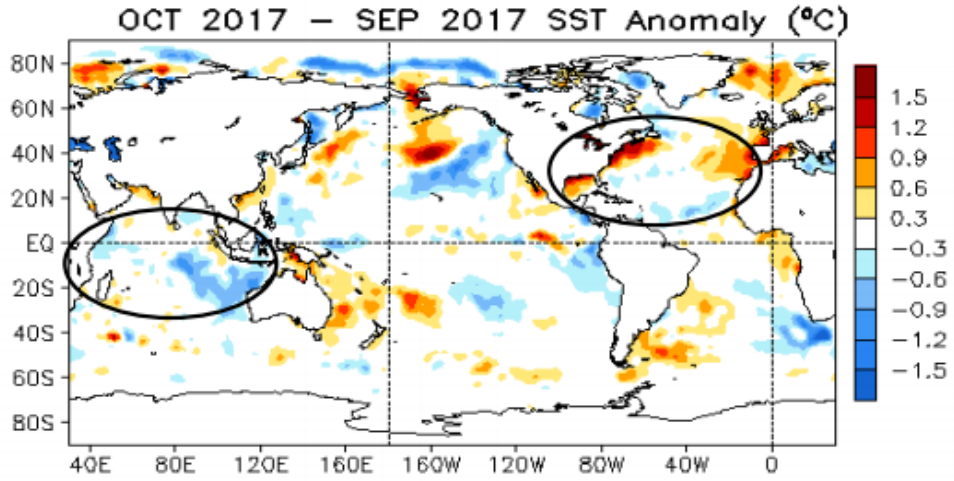


2. CLIMATE DIAGNOSTICS

October 2017

Sea Surface Temperature (SST)





- **SST** were below-normal (above normal) in the central-eastern (western) equatorial Pacific - Positive SSTA dominated in N. Pacific and N. Atlantic Oceans.

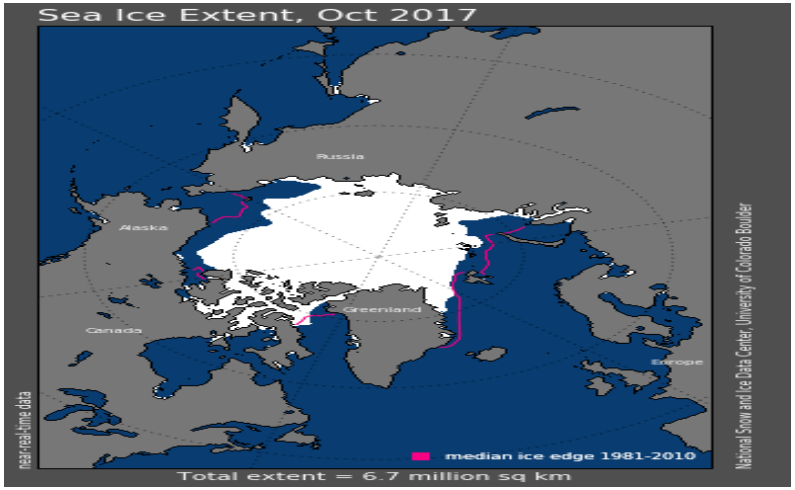
- **SSTA tendency** were mostly negative in the tropical **Indian Ocean**. Indian dipole index was near average in Oct 2017.
- **Strong SSTA tendencies** presented in the **N. Pacific Ocean**. ENSO cycle: developing from neutral into **cold** condition during Oct 2017. PDO switched to weakly **negative** phase with PDO = -0.2.
- **Positive SSTA** tendencies were observed in Gulf of Mexico and along the eastern coast of N. America.

CLIMATE PREDICTION CENTRE

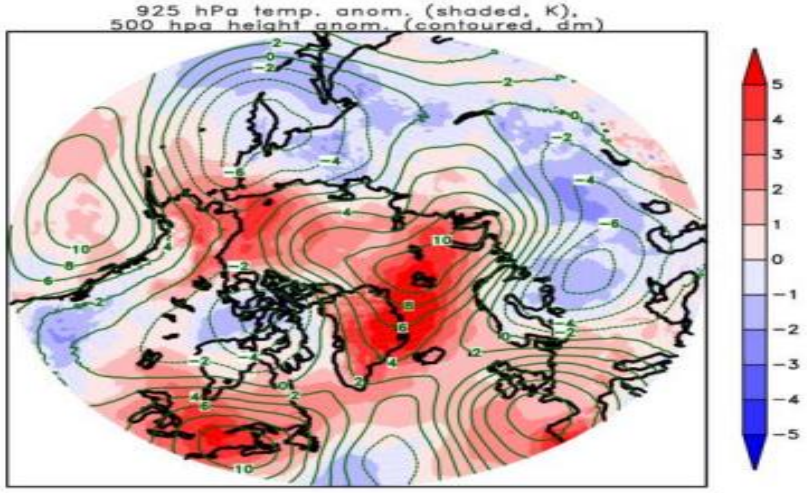
http://www.cpc.ncep.noaa.gov/products/GODAS/ocean_briefing_gif/global_ocean_monitoring_current.pdf

ARCTIC SEA ICE EXTENT

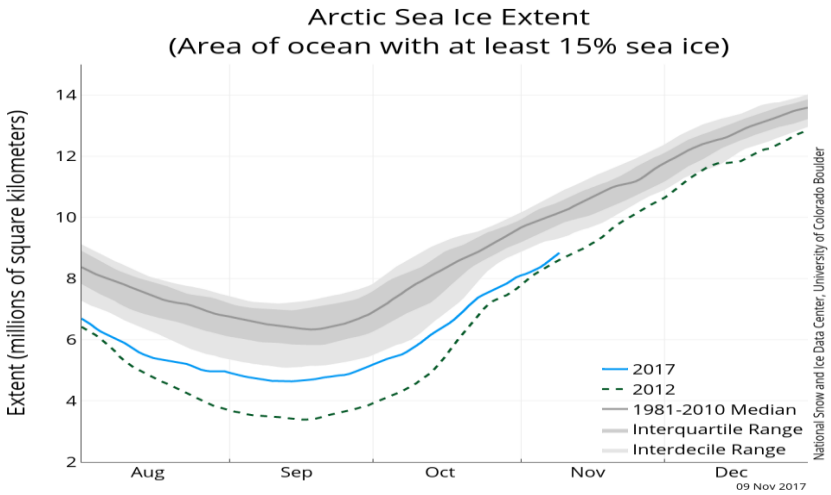
Sea-Ice extension in Arctic. October 2017. The pink line indicates the median ice edge 1981-2010 period.



October 2017 temperature and height anomalies



Arctic Sea Ice Extent (millions of square kilometers) 9 November

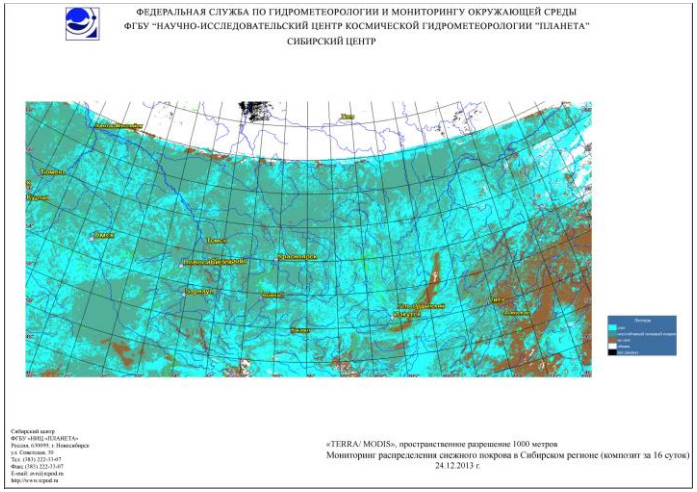


- **Arctic sea ice extent** for October was 6.71 million km^2 making it 5th lowest October in the satellite record extending back to 1979.
- **Currently** a slightly more expansive coverage exists compared to last year at this time. It is worth noting that the freeze-up rate has slowed in the last 2 weeks. The Arctic Ocean region generally had **above average** near surface temperatures in October 2017.

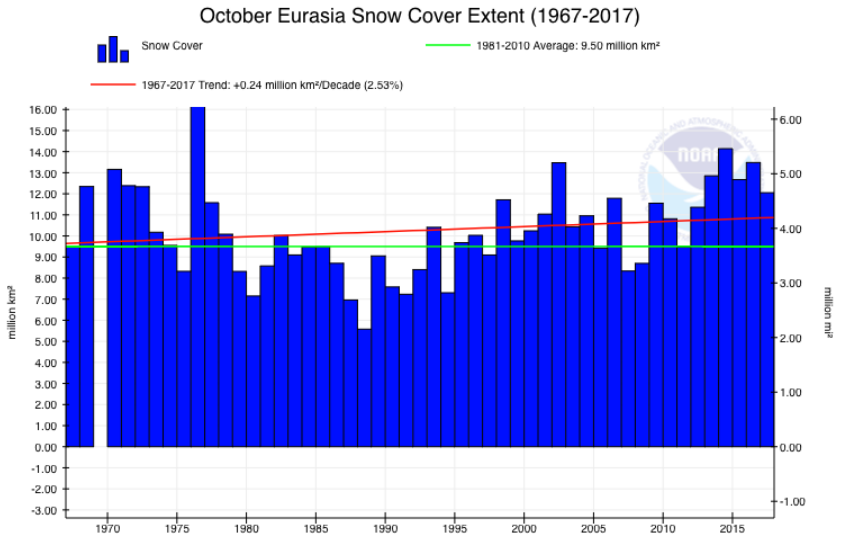
National Snow and Ice Data Centre, Boulder, CO

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

SNOW COVER CONDITIONS



Source -State Research Center "Planeta" (Roshydromet)



The Eurasian snow cover impacts on the atmospheric circulation, particularly the intensity of the Arctic Oscillation, Siberian high (Cohen and Entekhabi 1999, Saito and Cohen 2003, Allen and Zender 2011, Peings et al. 2013)

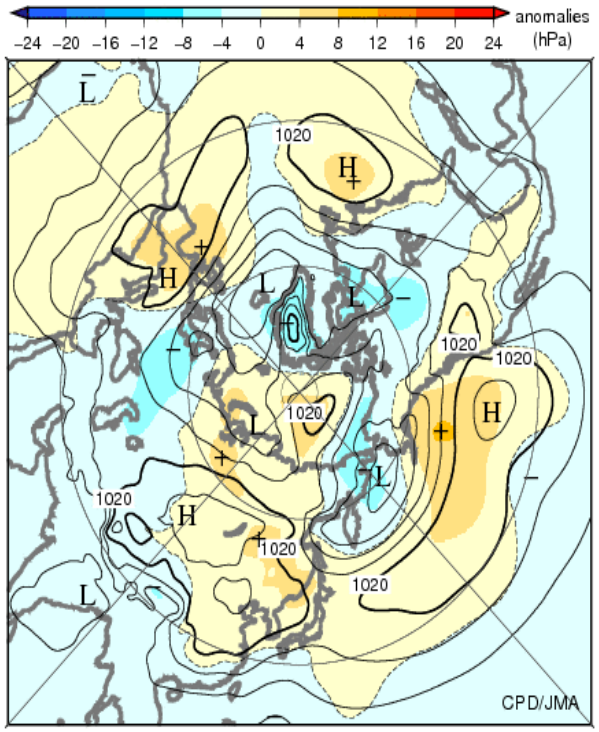
Cohen et al 2012 qualitatively linked sea-ice loss to additional surface evaporation and earlier snowfall over high-latitude lands.

The SH forms generally in October mainly in response to strong and continuous radiative cooling in the lower troposphere above the snow-covered surface of Asia.

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

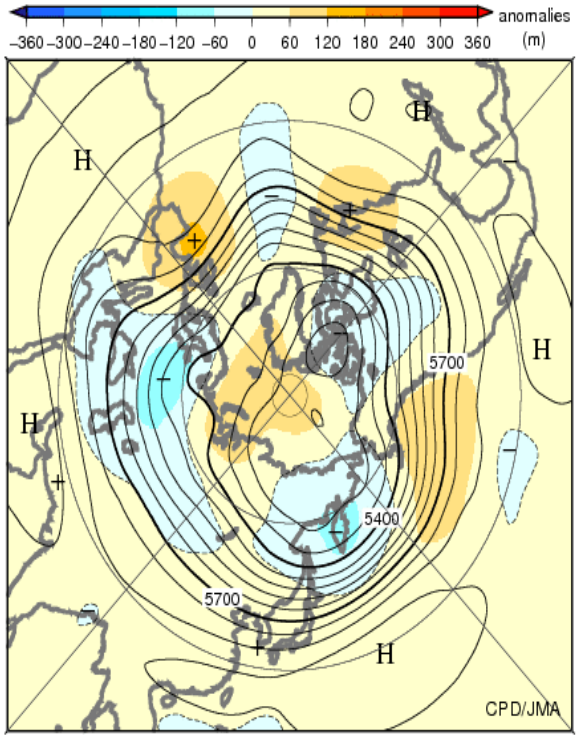
October 2017

Northern Hemisphere Circulation

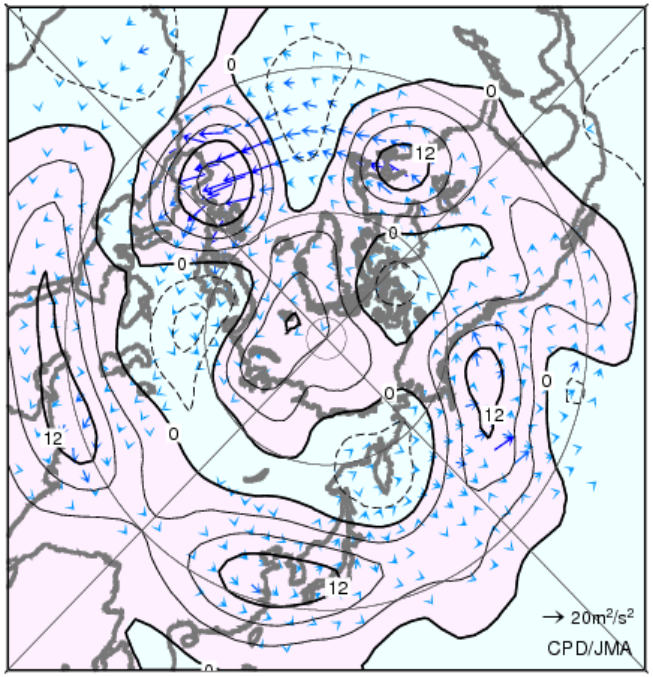


Monthly mean sea level pressure and anomaly in the Northern Hemisphere (Oct.2017)

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



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



Monthly mean 300 hPa function anomaly and wave activity flux. The contours indicate stream function anomalies of 4×10^5 m^2/s,and the vectors show wave activity flux (unit: m^2/s^2). The vectors are not shown where wave activity flux is less than 2 m^2/s^2.

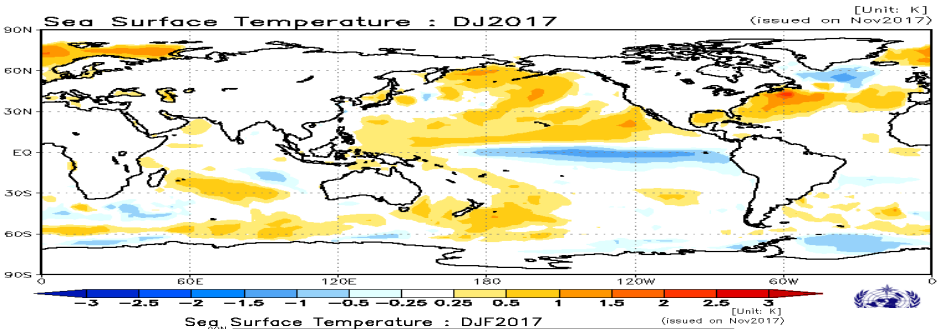
<Tokyo Climate Centre> http://ds.data.jma.go.jp/tcc/tcc/products/clisys/figures/db_hist_mon_tcc.html

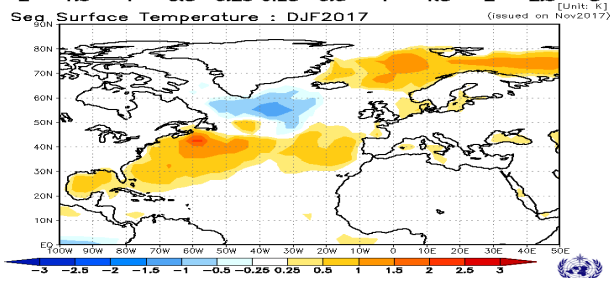
3. THREE-MONTH PREDICTIONS
(Dec. 2017–Feb. 2018)

SST and IMPACTS OF TROPICAL SST

December – February

Three month mean SST anomalies (°K)

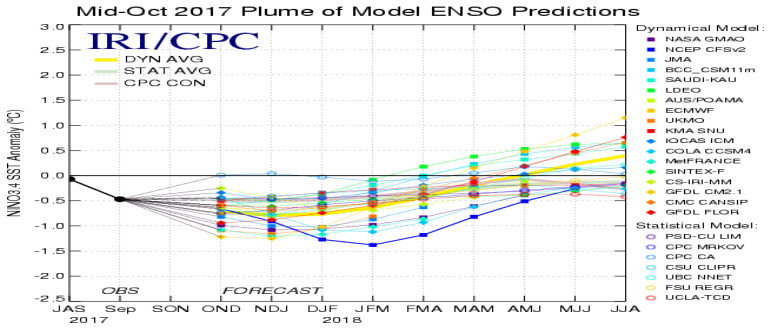




The tripole structure of SST variability will be in the North Atlantic). The distribution of predicted anomalies is consistent with the positive phase of NAO.

The different models are in good agreement this season.

- **Indian Ocean:** the most significant SST anomalies are expected in the southern hemisphere (positive in the west and negative in the east). In the northern hemisphere, the IOD returned to neutral values.
- **Pacific Ocean:** Most models predict warmer (colder) than normal conditions in the west (centre and east) of the equatorial latitudes. It is likely that above normal SST in the latitudinal band 5-15N in the North Pacific Ocean will persist during the winter.. Colder than normal conditions are expected near the north-west cost of Nothern America to north of 30˚N. This can lead to a strengthening Pacific High and shift it to the north-west from the climate position.



Predicted ENSO DJF 2017/2018

NINO.3 SST is predicted to be **below normal**.

CPC/IRI Consensus ENSO Forecast Probabilities winter 2017-2018 La Niña, Neutral and El Niño are 67%, 33% and 0 %. The ENSO prediction models indicates La Niña as a likely scenario during Northern Hemisphere fall and winter.

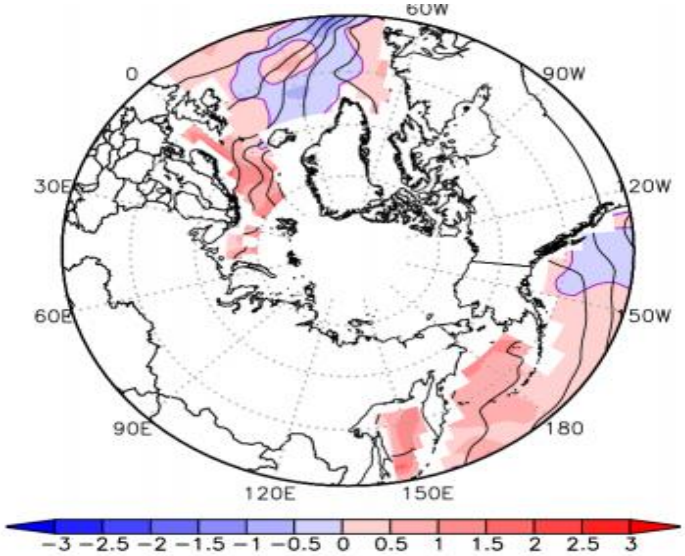
LC MMELRF-WMO Lead Centre for MME LRF

https://www.wmolc.org/

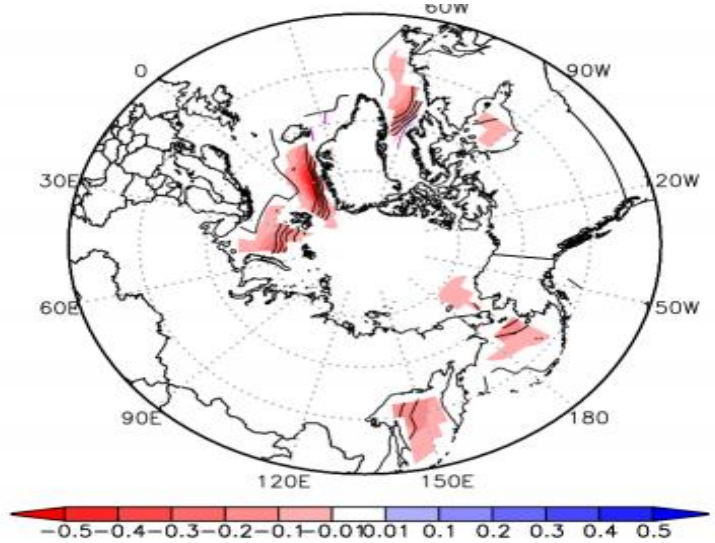
PREDICTED ARCTIC SEA ICE EXTENT

December 2017 – February 2018

SSTs anomalies



Sea ice Extent Anomalies



- **SSTs** are predicted to be above normal around the Arctic Sea
- **Sea Ice extents** are predicted to be below normal in the Sea of Okhotsk, the Barents Sea and the Bering Sea.
- **Experimental CFSv2 forecast** shows sea ice extent remaining below the 1981-2010 average but above last year's record lows (http://www.cpc.ncep.noaa.gov/products/GODAS/ocean_briefing_gif/global_ocean_monitoring_current.pdf.

TOKYO CLIMATE CENTRE

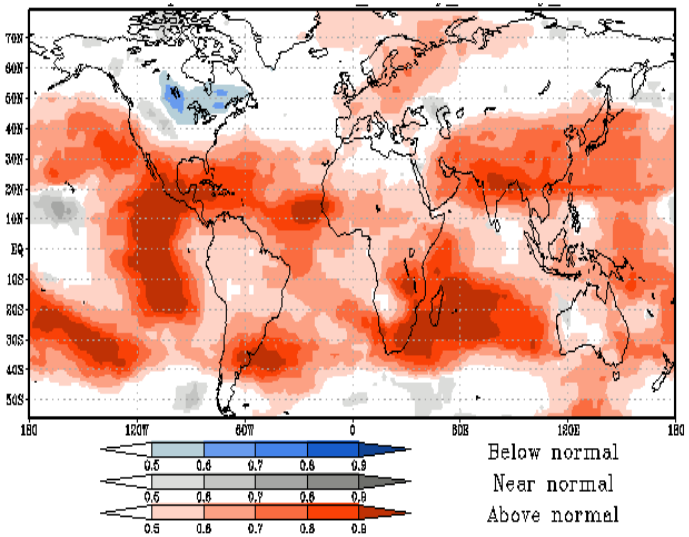
http://ds.data.jma.go.jp/tcc/tcc/library/temporary/JMA_Prediction_NEACOF-13.pdf

ATMOSPHERIC CIRCULATION

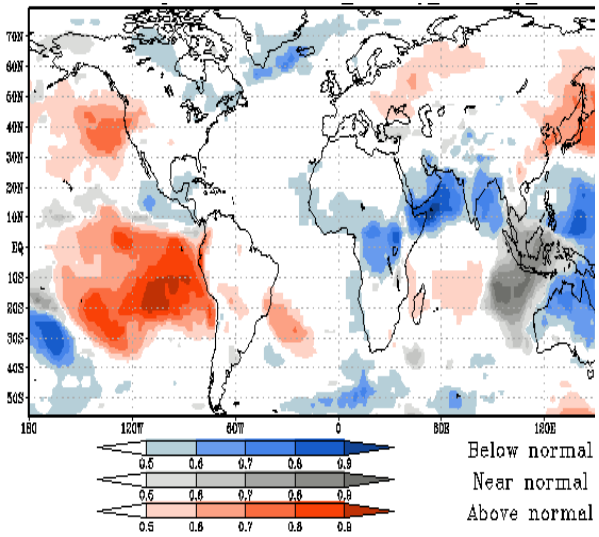
December 2017 - February 2018

Probability of most likely category

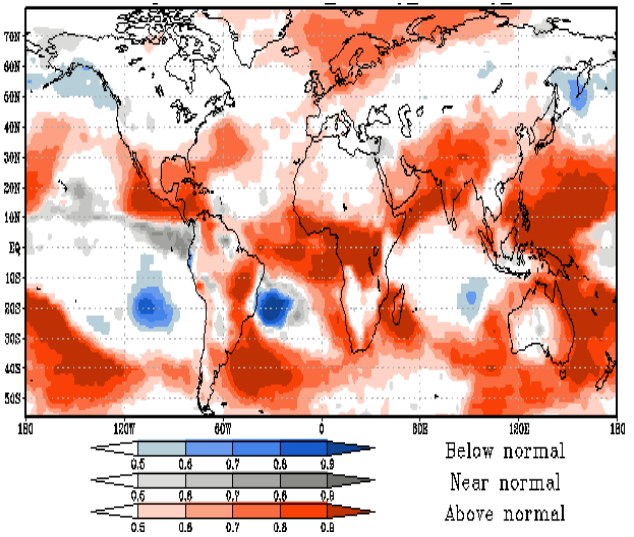
500-hPa Height



Sea level pressure



850 hPa Temperature



- **In the 500-hPa height field**, **positive** anomalies are predicted in the north east and in the south of Eurasia continent.
- **In the sea level pressure field**, **positive** anomalies are predicted from European Russia to the north of Western Siberia.
- **In the 850-hPa temperature field**, **positive** anomalies are predicted around Arctic seas and in the south of Northern Asia.

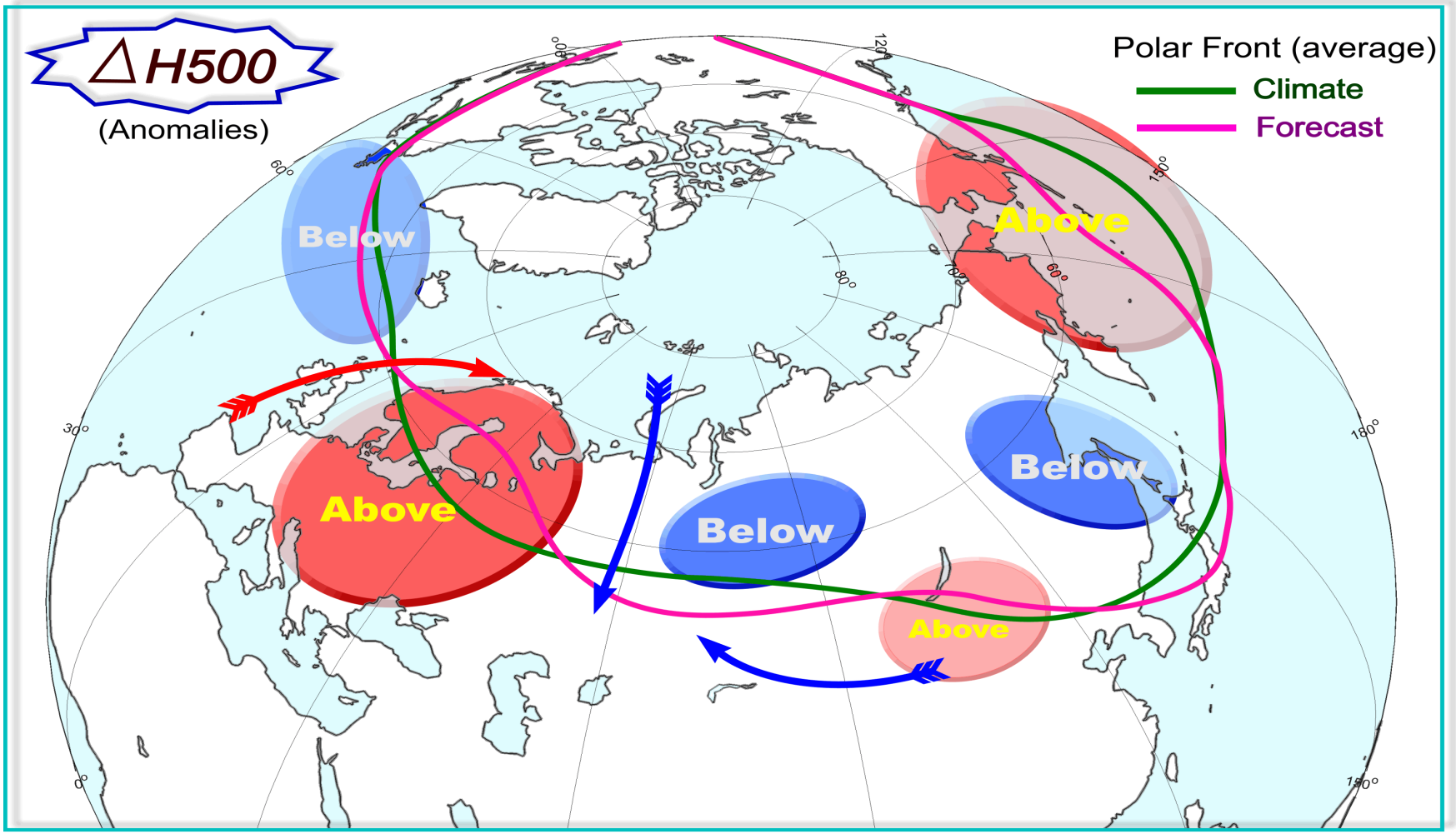
HIDROMETEOROLOGICAL CENTRE OF RUSSIA(SL-AV) and MGO MODEL

http://neacc.meteoinfo.ru

OUTLOOK OF ATMOSPPHERIC CIRCULATION

December 2017 – February 2018

SCHEMATIC FIGURE



PREDICTED ATMOSPHERIC CIRCULATION INDICES

GPC-MOSCOW (SL-AV)

INDEX	DECEMBER 2017 – FEBRUARY 2018			
	DECEMBER	JANUARY	FEBRUARY	DECEMBER-FEBRUARY
EA	-0,6	-1,6	-1,26	-1,48
WA	-2,45	-1,35	-0,46	-1,66
EU	-1,34	-0,49	-1,3	-1,45
WP	-1,2	- 0,31	-0,83	-0,97
PNA	-0,39	-0,13	-0,67	-0,45
POL	0.26	0.02	-0.1	0.05
NAO	0,97	0,43	-0,13	0,44
AO	0,08	0,35	0,09	0,29

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).

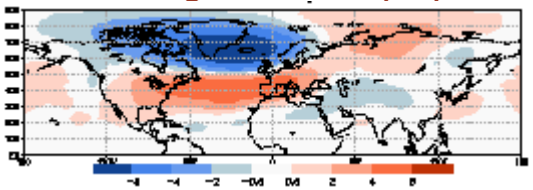
North Atlantic (**NAO**), Polar (POL), Arctic (**AO**) oscillations (Climate Prediction Centre of USA).

ATMOSPHERIC CIRCULATION INDICES

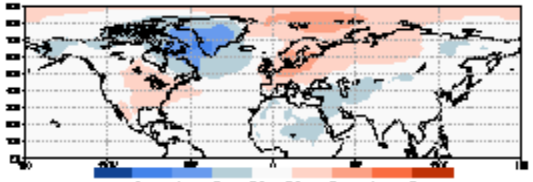
COMPOSITE MAPS

Positive phase of NAO

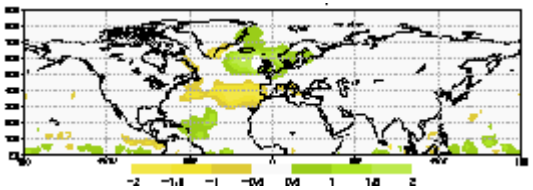
500 hPa Height anomalies (dm)



2m Temperature anomalies (˚C)

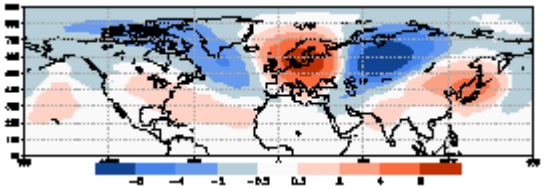


Precipitation anomalies (mm/day)

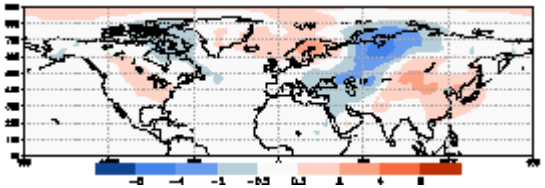


Negative phase of EU

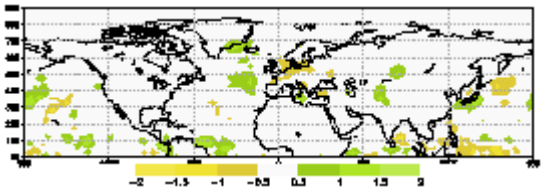
500 hPa Height anomalies (dm)



2m Temperature anomalies (˚C)

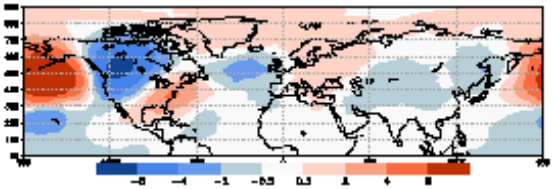


Precipitation anomalies (mm/day)

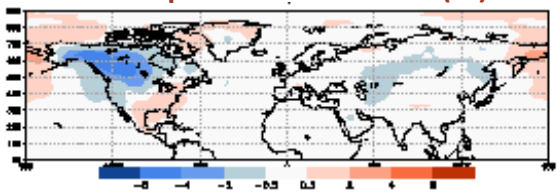


Negative phase of PNA

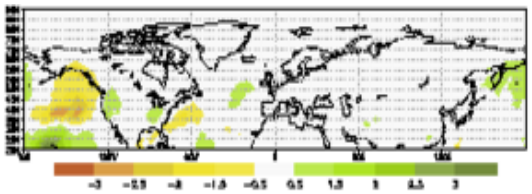
500 hPa Height anomalies (dm)



2m Temperature anomalies (˚C)



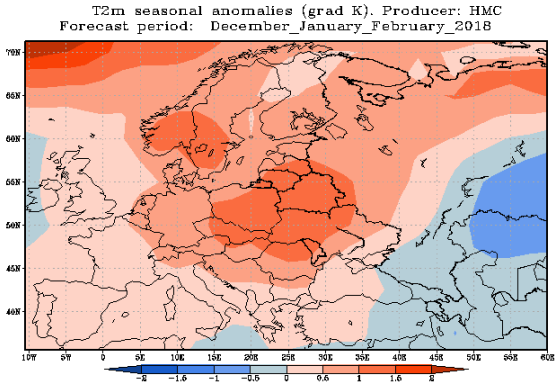
Precipitation anomalies (mm/day)

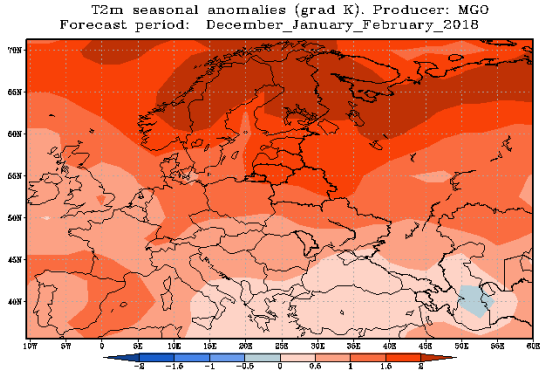


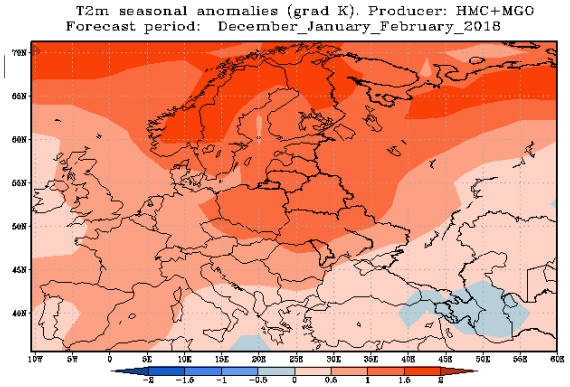
According to the forecasts of the GPC-Moscow, the winter is expected with **positive** values of index NAO and **negative** values of index EU. **Positive** values of index NAO are indicative of an **above normal** temperature in the north of Europe and below normal temperature in the south of Europe. **Positive values** of the index are indicative of an **above** (**below**) normal precipitation in the north (south) of Europe too. Most of models predict the **negative** PNA pattern, which is consistent with a La Niña event. Besides that, la Niña events combined with a positive PDO is known to favor **positive** NAO circulations over Western Europe.

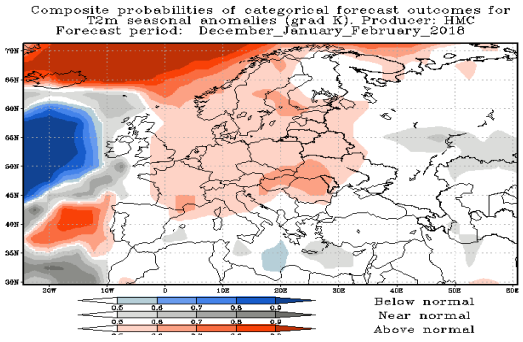
http://neacc.meteoinfo.ru

NEACC FORECASTS OF AIR TEMPERATURE

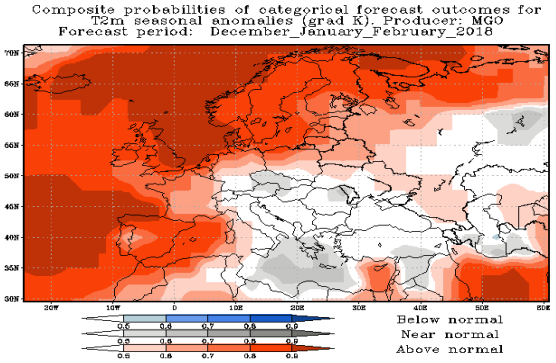




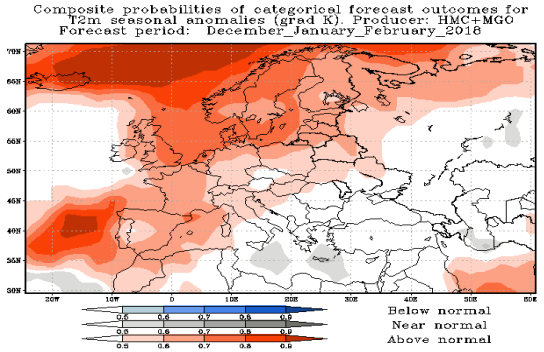




HMC



MGO



HMC and MGO

- **According to the forecasts of the HMC**, **positive** temperature anomalies are expected to be over most of Europe. **Light negative** anomalies can be in the Caucasus and Caspian regions .
- **MGO** predicts **positive** anomalies over all Europe.
- **HMC+MGO** predicts **positive** anomalies over most of Europe (40%-50%), the south eastern part of Europe tends to be normal.

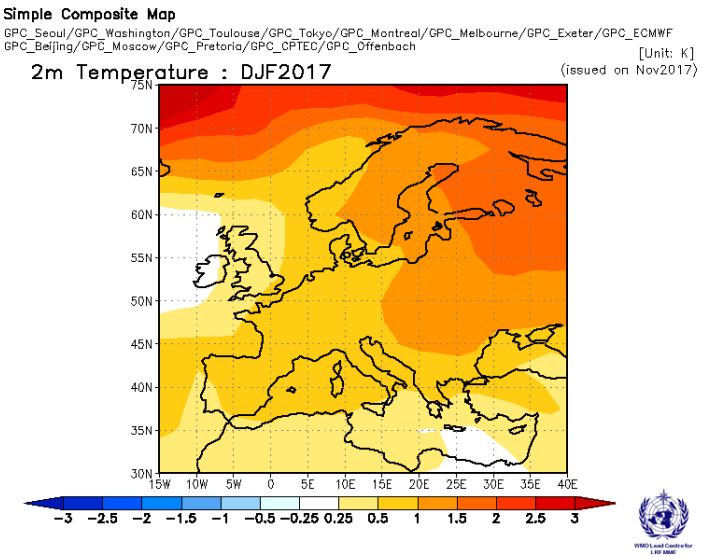
FORECASTS OF AIR TEMPERATURE FROM LC MMELRF WMO

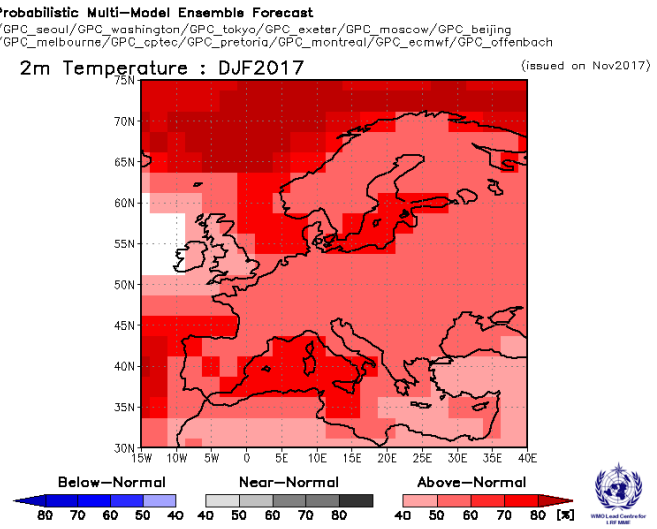
December 2017 – February 2018

MODELS:

- Beijing
- Seul
- Washington
- Toulouse
- Exeter
- CPTEC
- ECMWF
- Melbourne
- Montreal
- Moscow
- Offenbax

Simple composite map: 2m Temperature anomalies (°K).





- **In the 2m temperature field** according to the forecasts of the most of centers positive anomalies are predicted over Europe.

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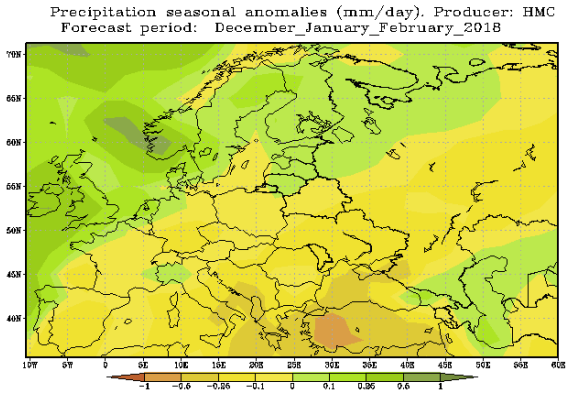
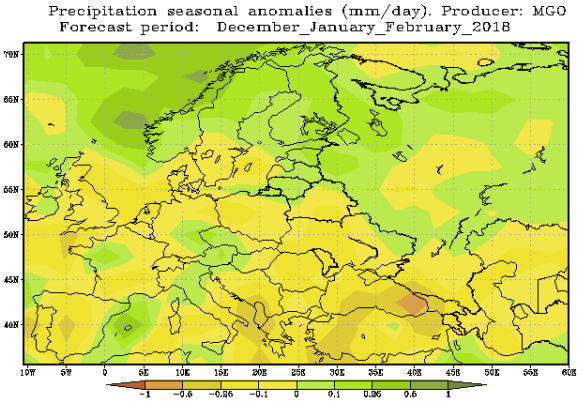
FORECASTS OF PRECIPITATION FROM NEACC

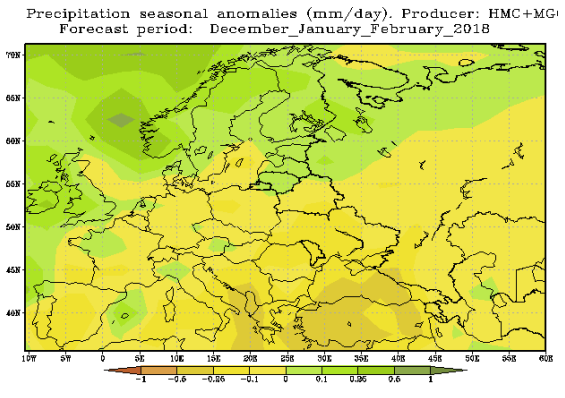
December 2017 - February 2018

Seasonal anomalies (mm/day)

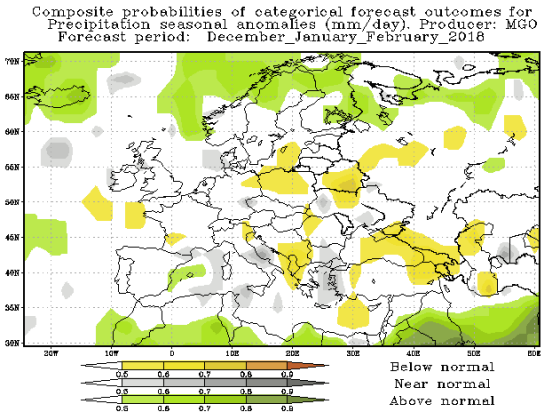


HMC

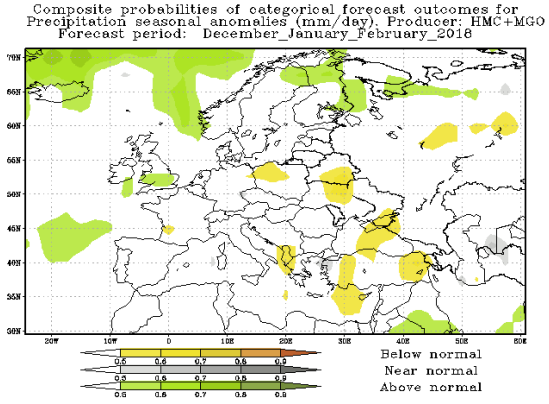




- **NEACC** (SI-AV + MGO) predicts **positive** anomalies in the north of Europe. **Negative anomalies** are possible in east regions of Mediterranean area**,**
- **MGO** predicts **positive** (**negative**) anomalies in the north (in the central and south-west) of Europe.



MGO



HMC and MGO

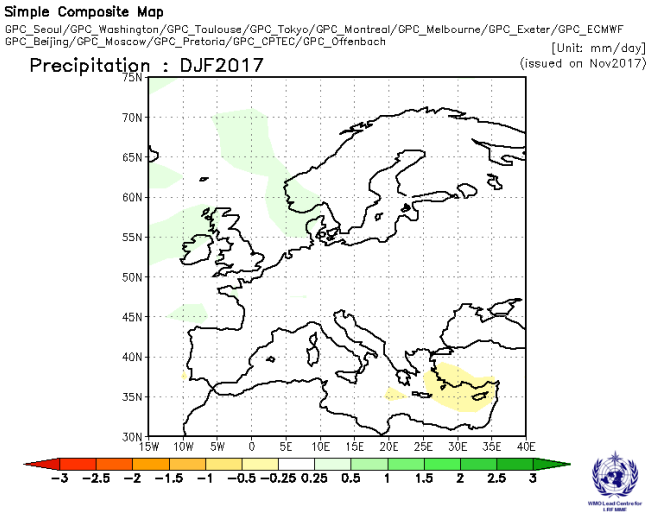
FORECASTS OF PRECIPITATION

December 2017 – February 2018

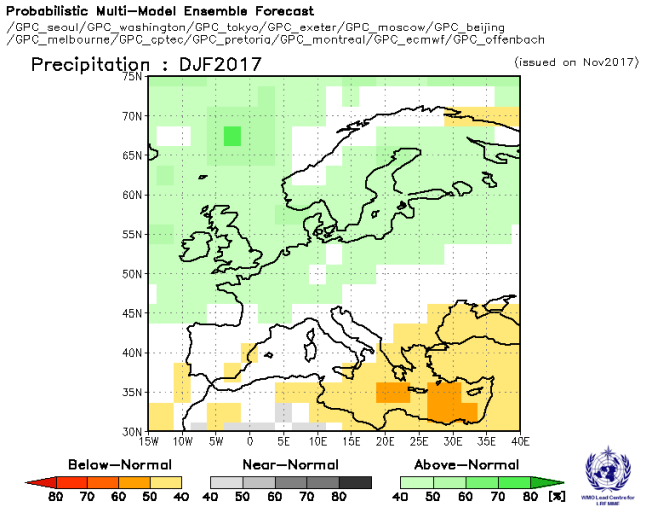
MODELS:

- Beijing
- Seul
- Washington
- Toulouse
- Exeter
- CPTEC
- ECMWF
- Melbourne
- Montreal
- Moscow
- Offenbax

Deterministic forecast of Precipitation anomalies (mm/day)



Probabilistic forecast of Precipitation



- It is likely the **positive** anomalies in the Northern Europe and **negative** in the south eastern part.

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OUTCOMES OF NEACOF-13

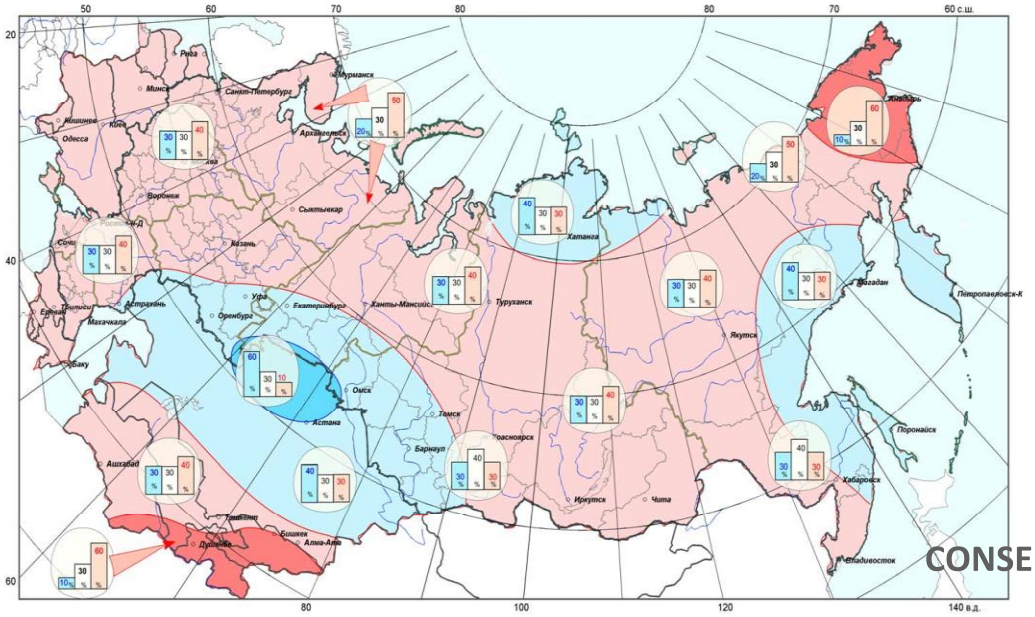
North EurAsia Climate Centre

CLIMATE ADAPTATION & MITIGATION PROGRAM IN THE ARAL SEA BASIN CAMP4ASB

Thirteenth Session of the North EurAsia Climate Outlook Forum

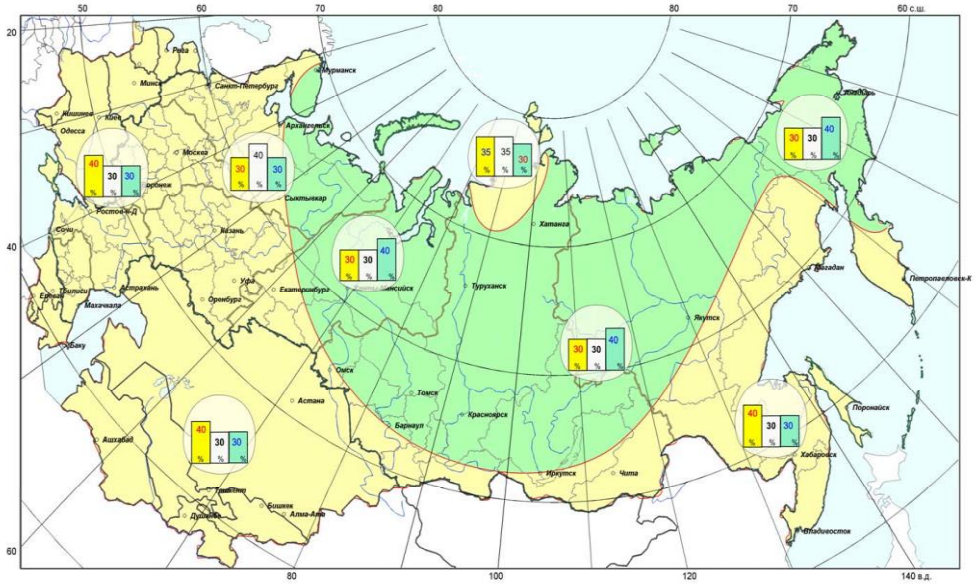
November 15, 2017 (Large conference hall of the Hydrometeorological Center of Russia)	
-10.00	Registration of participants
Opening. Greeting. Chair: AA Vasiliev Co-Chair: A. Umirbekov	
-10.10	R.M. Vilfand - Director of Hydrometeorological Center of Russia T. Azizova - The Regional Environmental Center for Central Asia V.M. Khan - Executive Director of NEACC
-10.30	Contribution of the NEACC and NEACOF to the improvement of the climate services in the CIS region V.M. Khan (NEACC)
-10.45	The project of the Regional Environmental Center for Central Asia "Adaptation to climate change and mitigation in CA" T. Azizova (RECCA)
-11.15	Group photo. Coffee break.
Development of methods and technologies for climate monitoring and forecasting Chair: R. Vilfand Co-Chair: N. Mustaeva	
- 11.45	A new version of the technology of long-range forecasting based on global atmosphere model SL-AV M. Tolstykh, D.Kiktev (Institute of Numerical Mathematics, Hydrometeorological Center of Russia)
-12.15	Long-range forecasting at Climate Prediction Center NOAA Arun Kumar (CPC NOAA)
- 12.45	The Met Office GloSea5 long-range forecasting system: Description and Results Richard Graham (Metoffice)
- 13.00	Long-term forecasting technology at the Beijing Climate Center Peiqun Zchang (BCC CMA)
- 13.30	Development of forecasting system on an interannual scale based on coupled model of the INM RAS E. Volodin, A. Gritsun (INM RAS)
-14.30	Lunch
Chair: D.Baydulloeva Co-chair: V.Mamedova	
-14.45	Session 2. Specialized climate services V.M. Khan (Hydrometeorological Center of Russia) Introduction
-17.50	Round table 1. (Small Conference hall) Approaches to the collaboration of the Roshydromet, the Ministry of Health and Rospotrebnadzor for implementing the Global Framework for Climate Services in the Health sector. Moderators: S.M. Semenov (IGCE), B.A. Revich (IEDF RAS) Brief reports: - B.A. Revich (IEDF RAS) The main strategies in climate risks mitigation for health of different

CONSENSUS FORECAST: TEMPERATURE



Consensus forecasts from NEACOF-13

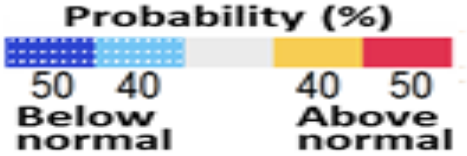
CONSENSUS FORECAST: PRECIPITATION



SEASONAL FORECAST OUTLOOK FROM GPC-MOSCOW/NEACC

December 2017 – February 2018

Region	Air temperature			Region	Precipitation		
	-	normal	+		-	normal	+
Europe (except south-east)	20	30	50	North of Europe	25	35	40
Europe (south-east)	30	40	30	South-east of Europe	40	35	25



SUMMARY

- **Most of the centers** predict significant SST anomalies in the Northern Pacific. **Above-average** (**below-average**) temperatures are expected in the west (centre and east) of the equatorial latitudes. It is likely that **above-average** SST conditions in the latitudinal band 5-15˚N in the North Pacific Ocean will persist during the winter. According 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: 67%, 33% и 0 %. **Colder than normal** conditions are expected near the north-west cost of Northern America to north of 30˚N. It can lead to a strengthening Pacific High and shift it to the north-west from the climate position.
- **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 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 south of Europe. **Positive values** of the index are indicative of an **above** (**below**) normal precipitation in the north (south) of Europe too.
- **NEACC** (Sl-AV + MGO) predicts **positive** anomalies over most of Europe (40%-50%), the south eastern part of Europe is under normal climatological air temperature. **Positive** precipitation anomalies are predicted in the north of Europe and **negative** precipitation anomalies are possible in east regions of Mediterranean area
- **The winter season of 2017-2018** is expected **warmer** than normal over most of Europe according to the most of models.
- **The most of models predict** in precipitation field the **positive** anomalies over north of Europe. It is likely the **negative** anomalies in the south east.
- *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.*

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THANK YOU FOR ATTENTION!

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