



North EurAsia
Climate Centre



North Eurasia Climate Center North Eurasia Climate Outlook Forum

Valentina Khan

Hydrometcenter of Russia/NEACC

Chair of CCI/CBS IPET-RCA WMO

WGSIP meeting, 30 May 2019, Moscow

North Eurasia Climate Center (NEACC) as a part of RCCs worldwide



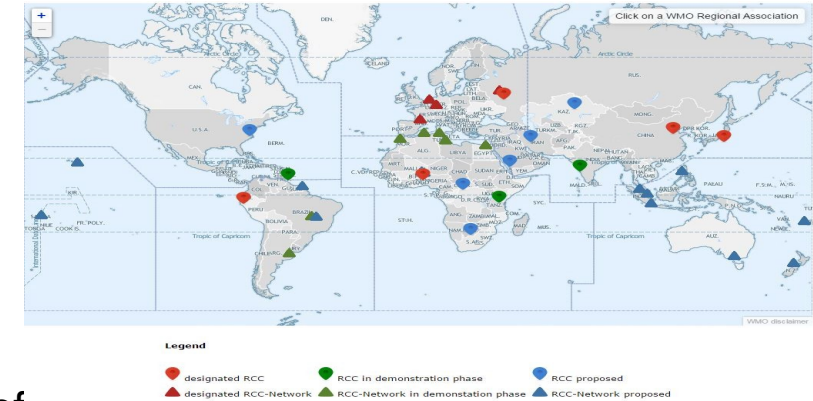
The structure of NEACC:

NHMSs of CIS

+

Consortium of the 7 Roshydromet organizations:

Hydrometeorological Research Centre of the Russian Federation is coordinator and host institution



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

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

NEACC contributes to ArcRCCs operations

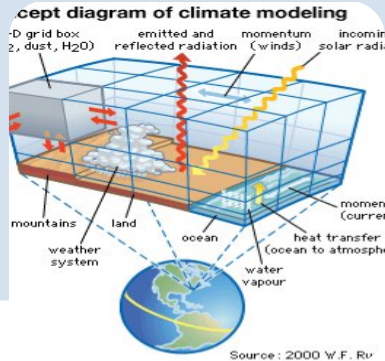
The North Eurasia Climate Centre (NEACC) coordinated by the Russian Federation under the auspices of the Commonwealth of Independent States (CIS). NEACC was formally designated as a WMO RCC NEACC by WMO Executive Council in May 2013.

Mission of NEACC

The priority of the NEACC as a regional climate center of WMO is to support the CIS NMHSs in climate services provision at the regional and national levels .

According to WMO requirements, the NEACC performs a number of mandatory and recommended RCC functions. (Criteria for the mandatory functions of the RCC OF THE RCC are formulated in the Manual of the WMO GDPFS)

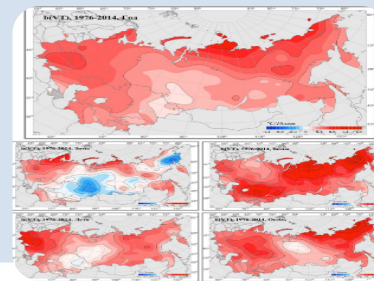
Mandatory functions of NEACC



Operational LRF activity



Operational climate data provision

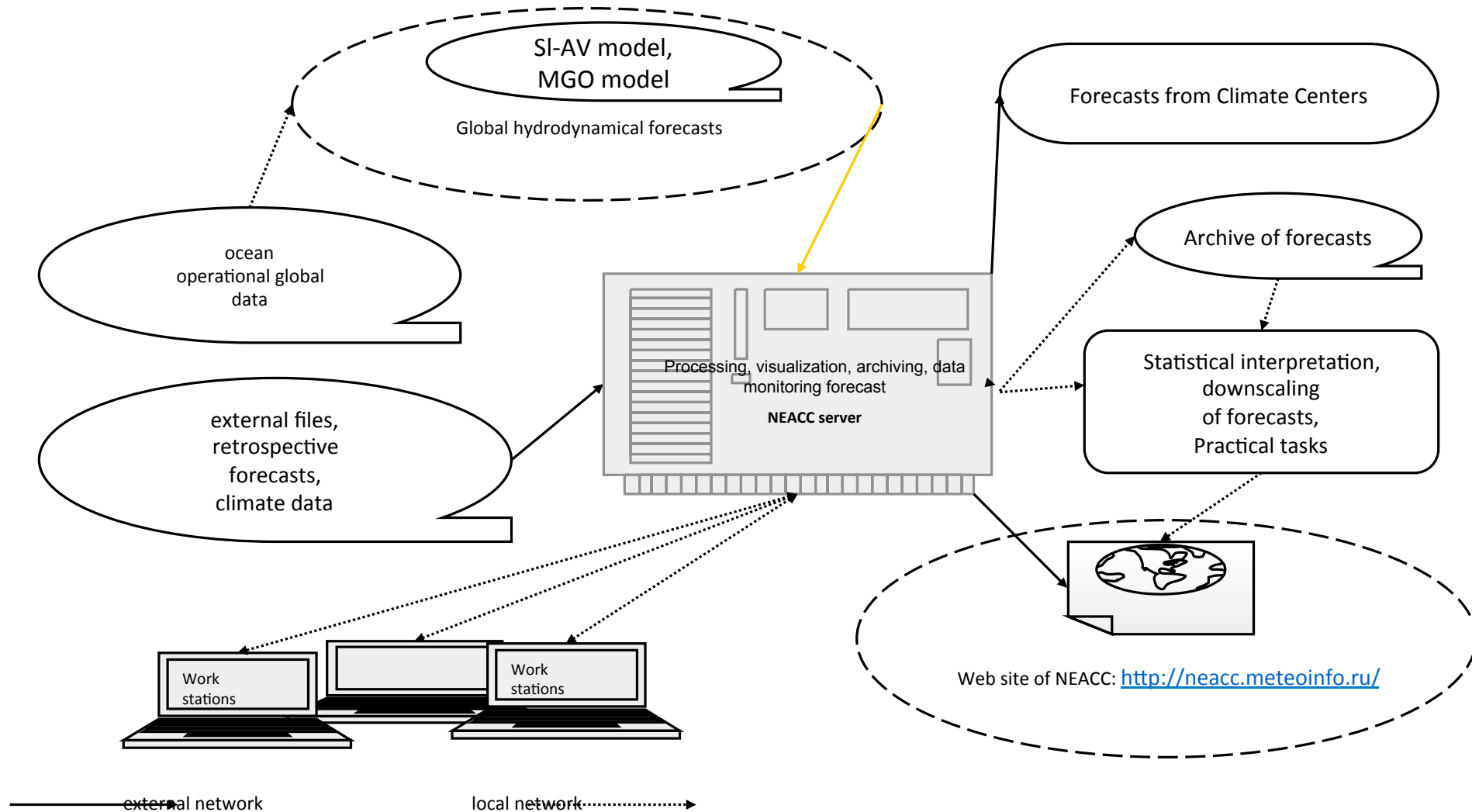


Operational climate monitoring



Capacity building activities

LRF technology at NEACC



NEACC since 2015 has started to deliver climate forecast products over Arctic region in operational regime

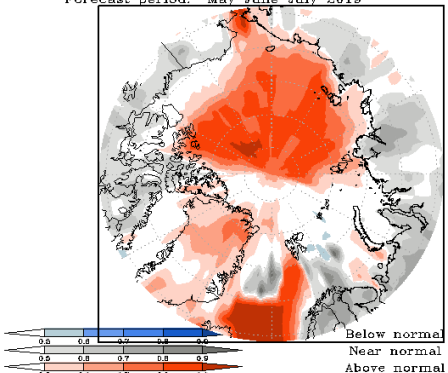
LRF products for Arctic region provided by NEACC

Monthly to seasonal multimodel forecasts (SL-AV + MGO models) of basic meteorological parameters with monthly update

Forecasts of climate indices (including Arctic Oscillation Index, Polar Oscillation Index) with monthly update

Subseasonal forecasts of basic meteorological parameters with weekly update

Composite probabilities of categorical forecast outcomes for T2m seasonal anomalies. Producer: HMC+MGO
Forecast period: May-June-July 2019

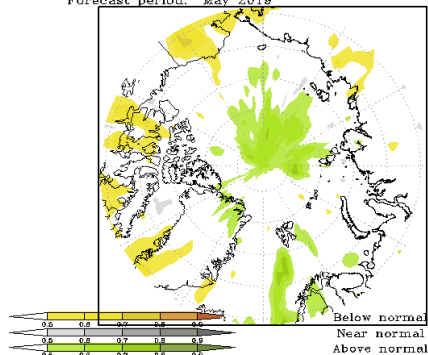


Probabilistic forecast of air temperature for MJJ 2019

index	MAY, JUNE, JULY, AUGUST 2019					
	1 month	2 month	3 month	4 month	1 season	2 season
EA	-1,61	-1,45	-0,83	-0,44	-1,99	-1,03
WA	-1,29	-1,2	-2,32	-1,84	-1,63	-1,9
EU	-0,1	-0,06	0,08	-0,6	-0,07	-0,28
WP	0,49	-1,65	-0,66	0,36	-0,49	-0,79
PNA	0,38	0,84	-0,56	-0,06	0,63	0,11
NAO	-0,14	1,48	0,69	1,03	0,5	1,44
POL	0,14	-0,69	0,09	-0,52	-0,26	-0,33
AOS	0,36	0,1	0,1	-0,01	0,18	0,06

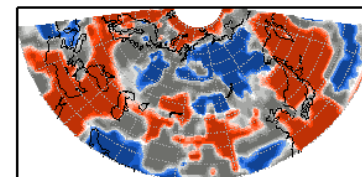
EA - East Atlantic Oscillation
WA - West Atlantic Oscillation
EU - Eurasia Pattern
WP - West Pacific Oscillation
PNA - Pacific – North American Pattern
NAO - North Atlantic Oscillation
POL - Polar Oscillation
AOS - Arctic Oscillation

Composite probabilities of categorical forecast outcomes for Precipitation seasonal anomalies (mm/day). Producer: HMC+MGO
Forecast period: May 2019

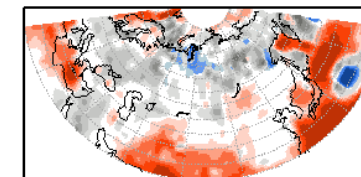


Probabilistic forecast of precipitation for June 2019

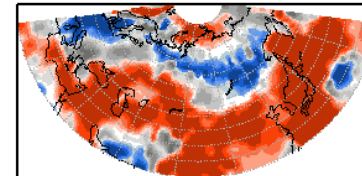
HMC (TRSF) Week 1 (17.05–23.05.2019)



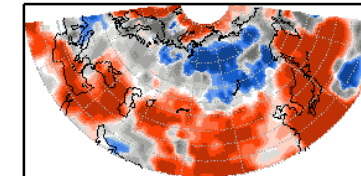
HMC (TRSF) Week 4 (07.06–13.06.2019)



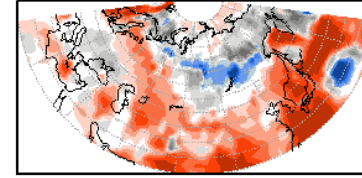
HMC (TRSF) Week 2 (24.05–30.05.2019)



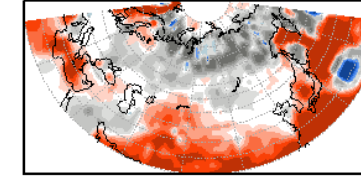
HMC (TRSF) Month 1 (17.05–15.06.2019)



HMC (TRSF) Week 3 (31.05–06.06.2019)



HMC (TRSF) Month 2 (31.05–29.06.2019)



Climate Watch Advisories have been issued based on monitoring and subseasonal forecast information



Climate Watch Advisory

CLIMATE WATCH ADVISORY



WMO RA VI
WMO RA II
RCC-Network

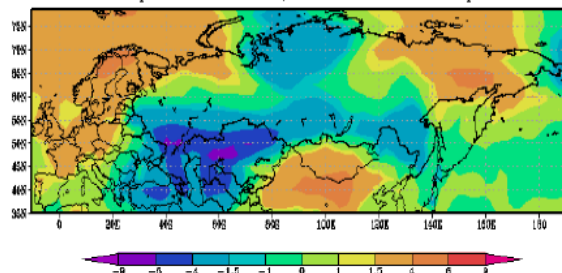


TEMPERATURE WILL BE SIGNIFICANTLY BELOW NORMAL

The forecasts (from 18.04.2019) for the next week (till 26.04.19) show anomalously cold weather for the territory of Central Asia, except south-eastern regions, and for Caucasus region. The most significant temperature anomalies (down to 6-8°C) are expected in Armenia and the southern regions of Kazakhstan.

WEEKLY DETERMINISTIC FORECASTS OF TEMPERATURE ANOMALIES (HYDROMETEOROLOGICAL CENTRE OF RUSSIA (SL-AV) and MGO MODEL)

T2m anomalies. Producer: HMC+MGO
Forecast period – WEEK 1, initial data: 18 april 2019



Abnormal cold weather

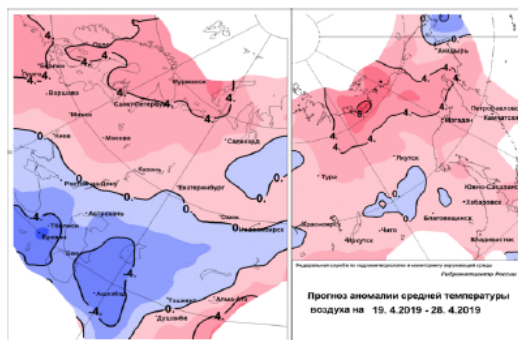
At a period (from October to March) when the mean daily temperature anomalies are less than 7 °C during the 5 or more days.

The dangerous phenomena are the phenomena of weather which intensity, duration and time of occurrence represent threat of a security of people, as well as they can cause significant damage to branches of economy. The list of the typical dangerous phenomena which are used and specified by the local territorial hydrometeorological services of Russia Federation is located on the web site of the Hydrometeorological centre of Russia: <http://meteinfo.ru/hazards-definitions>

<http://neacc.meteinfo.ru>

WEEKLY DETERMINISTIC FORECASTS OF TEMPERATURE ANOMALIES

<https://meteinfo.ru/prognoz-na-dekadu>



Abnormal hot weather

At a period (from April to September) when the mean daily temperature anomalies are more than 7 °C during the 5 or more days.

Guidance on heavy precipitation

ID: 201808-t

Area concerned:

Heavy precipitation: Eastern Mediterranean and Middle East (Greece, western and southern Turkey, Cyprus, Syria, Lebanon, Israel, western Jordan)

Initial statement issued on 6 July 2018
First update issued on 20 July 2018
Second update issued on 3 August 2018
Third update issued on 17 August 2018
Fourth update issued on 24 August 2018
Fifth update issued on 07 September 2018
Sixth update issued on 19 September 2018
Seventh update issued on 2 October 2018
Eighth update issued on 16 October 2018
Ninth update issued on 24 October 2018
Tenth update issued on 2 November 2018
Eleventh update issued on 14 November 2018
Twelfth update issued on 26 November 2018
Thirteenth update issued on 11 December 2018
Fourteenth update issued on 19 December 2018
Fifteenth update issued on 8 January 2019
Sixteenth update issued on 15 January 2019
Seventeenth update issued on 29 January 2019
Eighteenth update issued on 12 February 2019
Termination issued on 19 February 2019



End: 19 February 2019

To: Climate Watch focal points of NMHSs: Iceland, Norway, Denmark, Sweden, Ireland, United Kingdom, Netherlands, Belgium, Luxembourg, France, Germany, Switzerland, Slovenia, Croatia, Bosnia-Herzegovina, Montenegro, Serbia, Albania, FYR of Macedonia, Greece, Bulgaria, Turkey, Portugal, Spain, Monaco, Italy, Malta, Cyprus, Syria, Lebanon, Israel, Jordan

The RA VI RCC Network Offenbach Node on Climate Monitoring (RCC Node-CM) is responsible for providing Climate Watch guidance information for NMHSs' own consideration for issuing climate advisories for their territory.

After having consulted the consortium partners of the RCC Node-CM and RCC Node-LRF (RA VI RCC Network Toulouse and Moscow Node on Long-Range Forecasting), RCC Node-CM issues the following guidance information:

Due to the results from monthly forecasts we announce:

The end of above-normal precipitation in the eastern Mediterranean subregion."

Skill scores of monthly-seasonal forecasts

Operational forecasts

forecast verifications

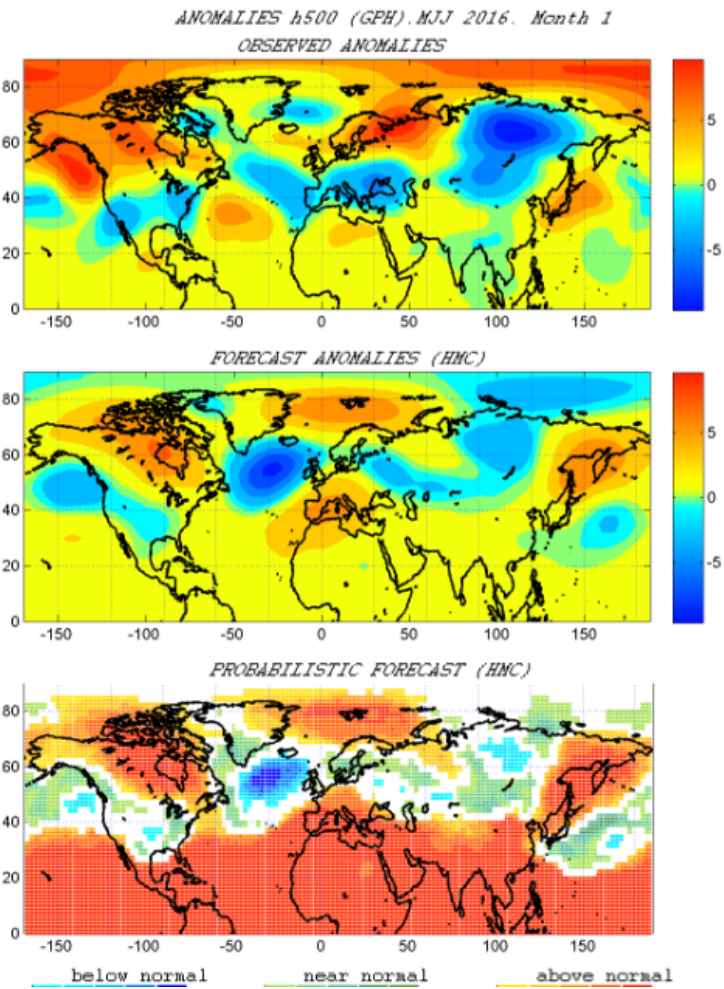
Skill scores of seasonal forecast

Date: 2016-05-01 Region: GLOBUS Parameter: H500 Upload

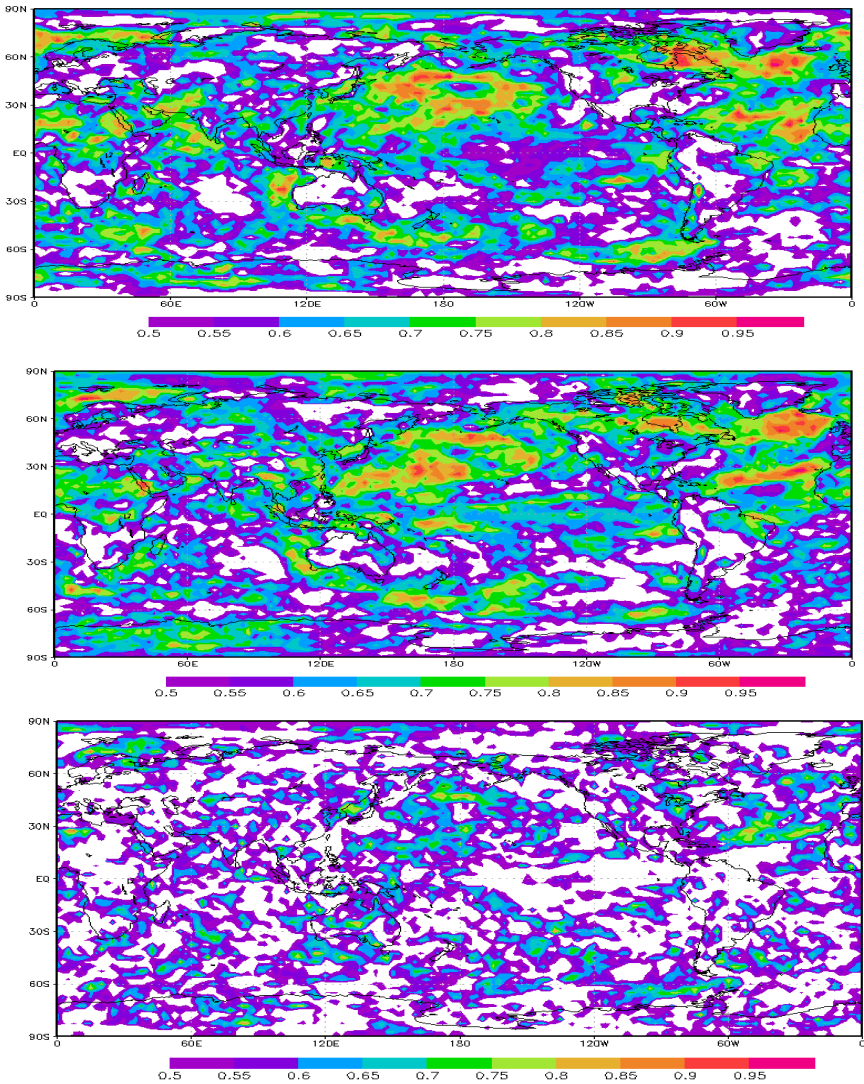
Parameter: H500
Region: GLOBUS (90S - 90N; 0 - 360)
Date: 2016-05-01

Model	Verifications						Maps
	ROC_A	ROC_N	ROC_B	RO	ACC	RMSE	
May 2016							
PLAV	0.8	0.7	0.79	0.63	0.63	32.5	Open
MGO	0.88	0.72	0.84	0.65	0.73	29.25	Open
PLAV+MGO	0.88	0.74	0.85	0.66	0.72	29.19	Open
June 2016							
PLAV	0.77	0.64	0.86	0.74	0.53	38.33	Open
MGO	0.78	0.65	0.83	0.65	0.68	35.47	Open
PLAV+MGO	0.79	0.67	0.88	0.74	0.66	35.81	Open
July 2016							
PLAV	0.69	0.63	0.76	0.63	0.46	28.61	Open
MGO	0.67	0.61	0.71	0.55	0.28	31.94	Open
PLAV+MGO	0.69	0.64	0.77	0.64	0.41	29.22	Open
Season							
PLAV	0.83	0.75	0.89	0.84	0.8	17.52	Open
MGO	0.84	0.74	0.83	0.71	0.71	20.6	Open
PLAV+MGO	0.87	0.77	0.88	0.8	0.8	18.04	Open

Skill scores:
ROC_A ROC_N ROC_B RO ACC RMSE



Hindcasts



Updating of computational facilities at Roshydromet

New supercomputer complex (2018) has been facilitating operational LRF work at GPC-Moscow and NEACC

- increased storage for forecast and monitoring information
- increase of resolution of dynamical model forecasts
- optimization of LRF technology

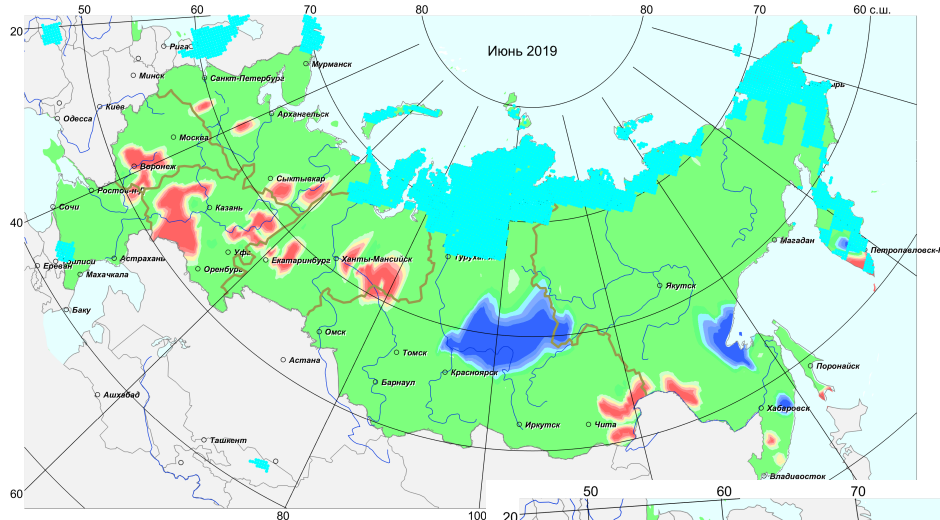


Center	Peak Performance TFlops (10 ¹² Flops)	System	Cores	RAM TB/GB per core	Manufacturer	Storage
GPC-Moscow	1200	Cray XC40-LC	33696/36	120/3,55	Cray (USA)	2,8 PB Cray Sonexion 3000 + 360 TB EMC
	13	Bull S6 130	384/384	4/10	Bull SAS (France)	

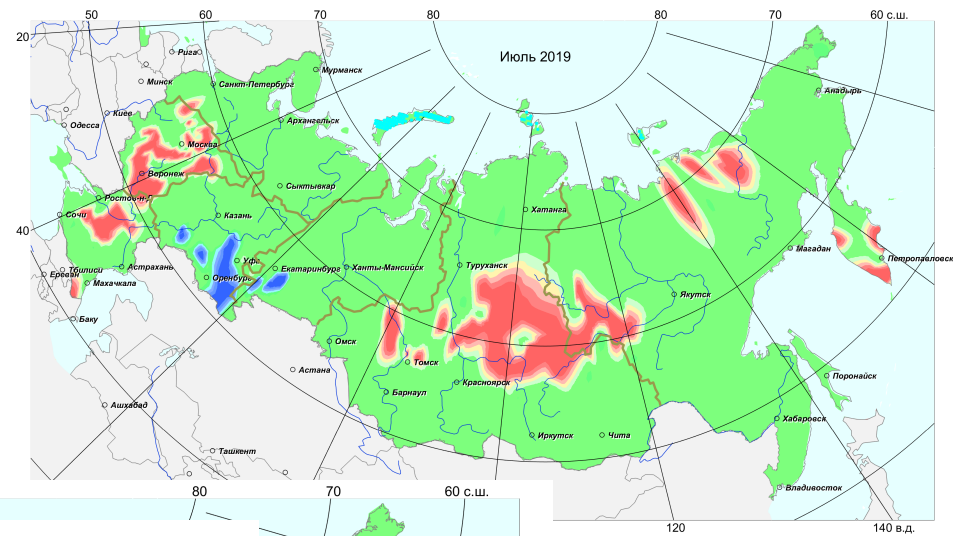
Specialized seasonal forecasts to respond sectoral user needs

FOREST FIRE DANGER OUTLOOK FOR UPCOMING SUMMER

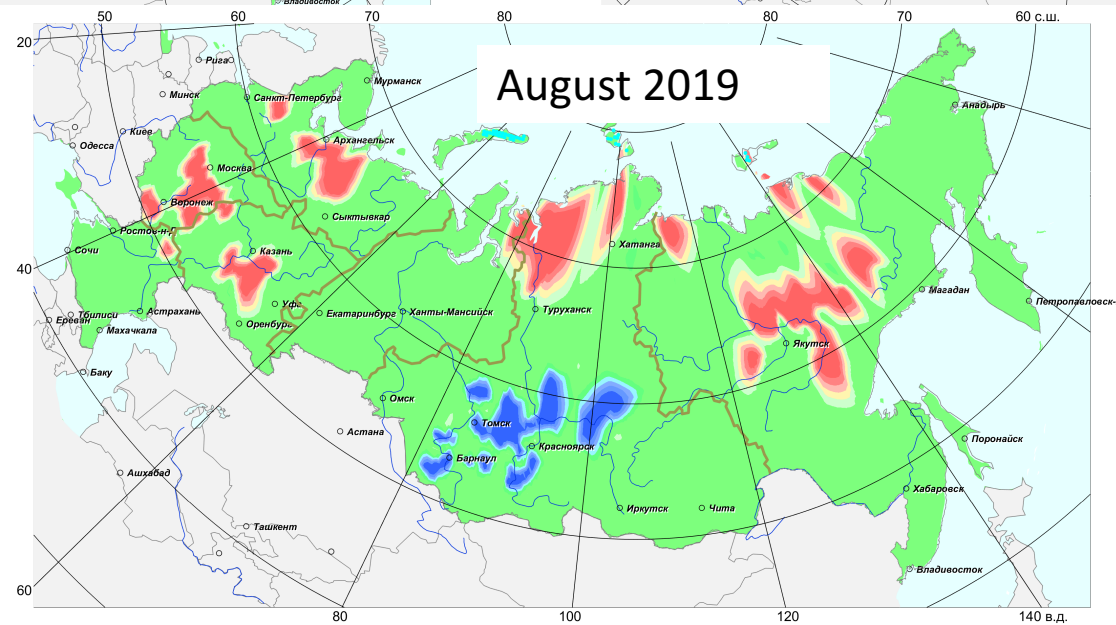
June 2019



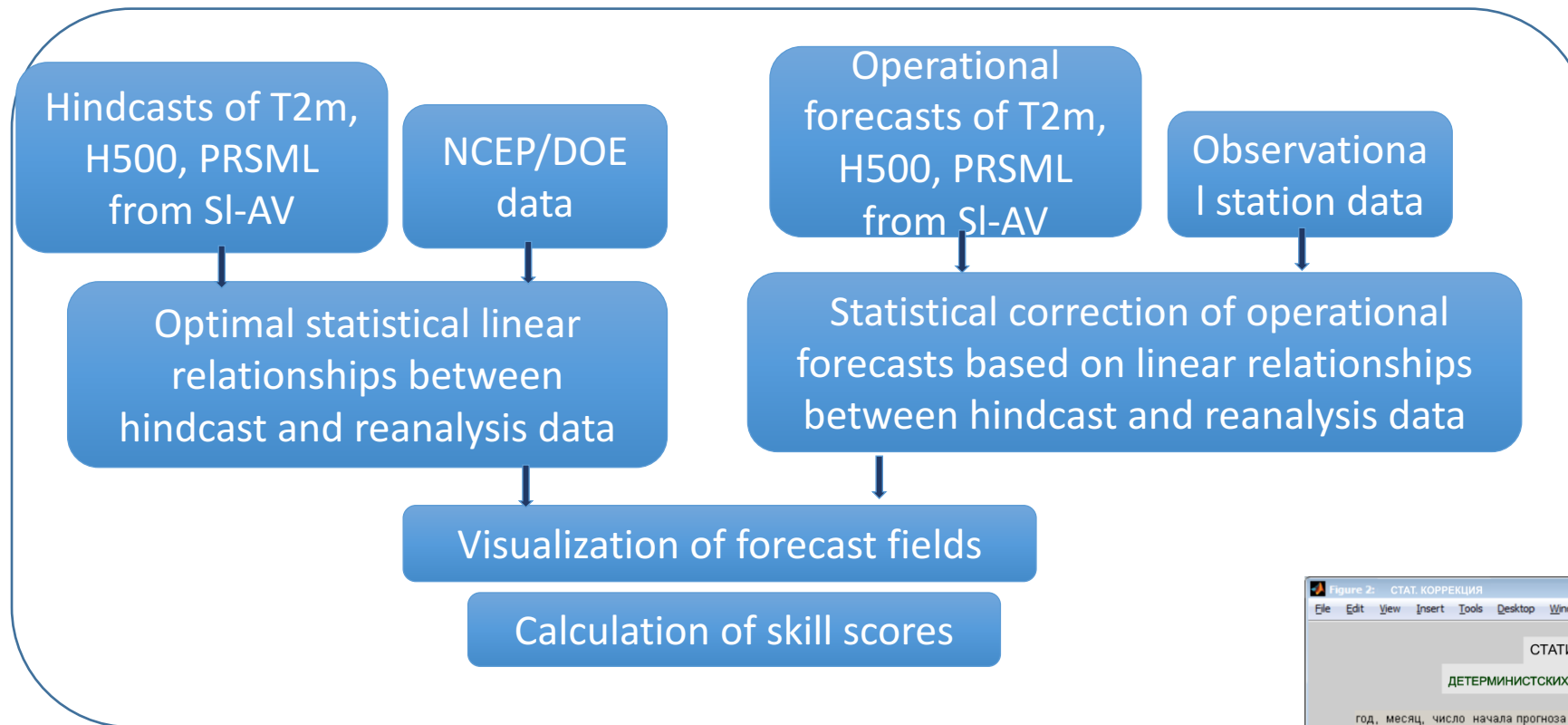
July 2019



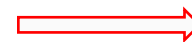
August 2019



MOS scheme for seasonal forecasts used at NEACC to increase forecast quality



Interface program for statistical correction of model outputs



The screenshot shows a software window titled 'Figure 2: СТАТИСТИЧЕСКАЯ КОРРЕКЦИЯ'. The main menu includes 'File', 'Edit', 'View', 'Insert', 'Tools', 'Desktop', 'Window', and 'Help'. The window is divided into several sections. At the top, it says 'СТАТИСТИЧЕСКАЯ КОРРЕКЦИЯ' and 'ДЕТЕРМИНИСТИЧЕСКИХ ПРОГНОЗОВ НА 4 МЕСЯЦА ПО МОДЕЛИ ПЛАВ'. Below this, there are input fields for 'год, месяц, число начала прогноза' with values '2016', '9', and '25'. A section labeled 'ВХОДНЫЕ ДАННЫЕ' contains dropdown menus for 'старый хиндкаст' (set to 'реанализ 1981-2010') and 'новый хиндкаст' (set to 'новый реанализ'). Another dropdown for 'РЕГИОН' is set to 'Северная Евразия' with 'Арктика' listed below it. On the right side, there are five buttons: 'чтение прогностических полей', 'расчет стат. коррекции', 'оценки на зависимом материале', 'графическое представление прогнозов', and 'прогноз по станциям'.

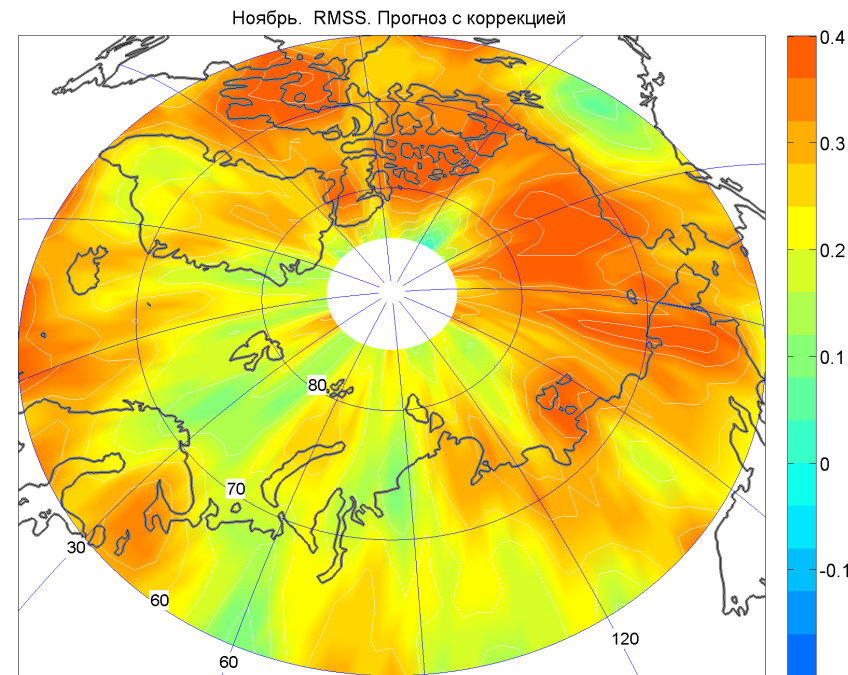
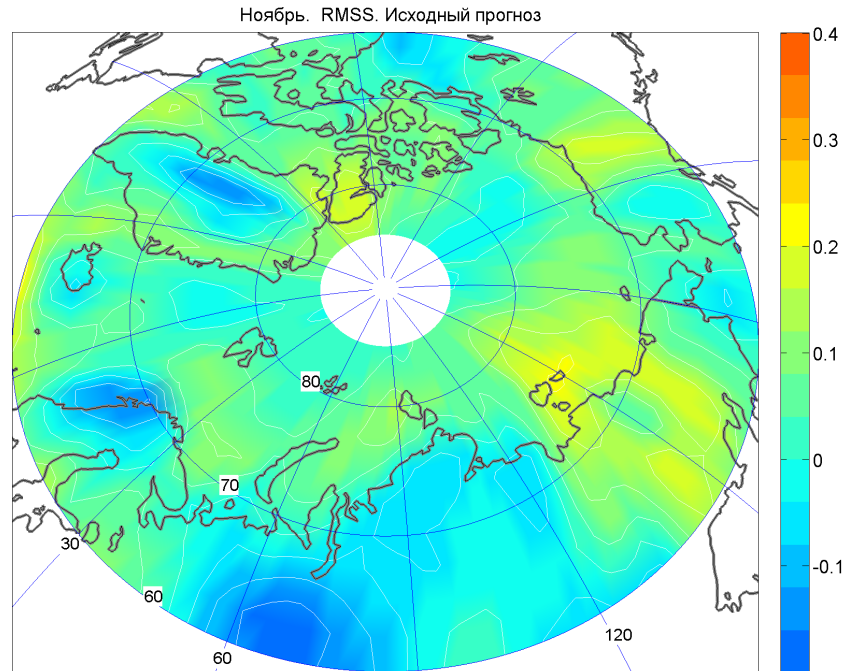
MOS approach to improve seasonal hindcasts from SI-AV model

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

RMSS of SL-AV model forecast of T2m anomaly

Hindcast data were used for period from 1982 to 2010

RMSS of corrected SL-AV model forecasts of T2m anomaly

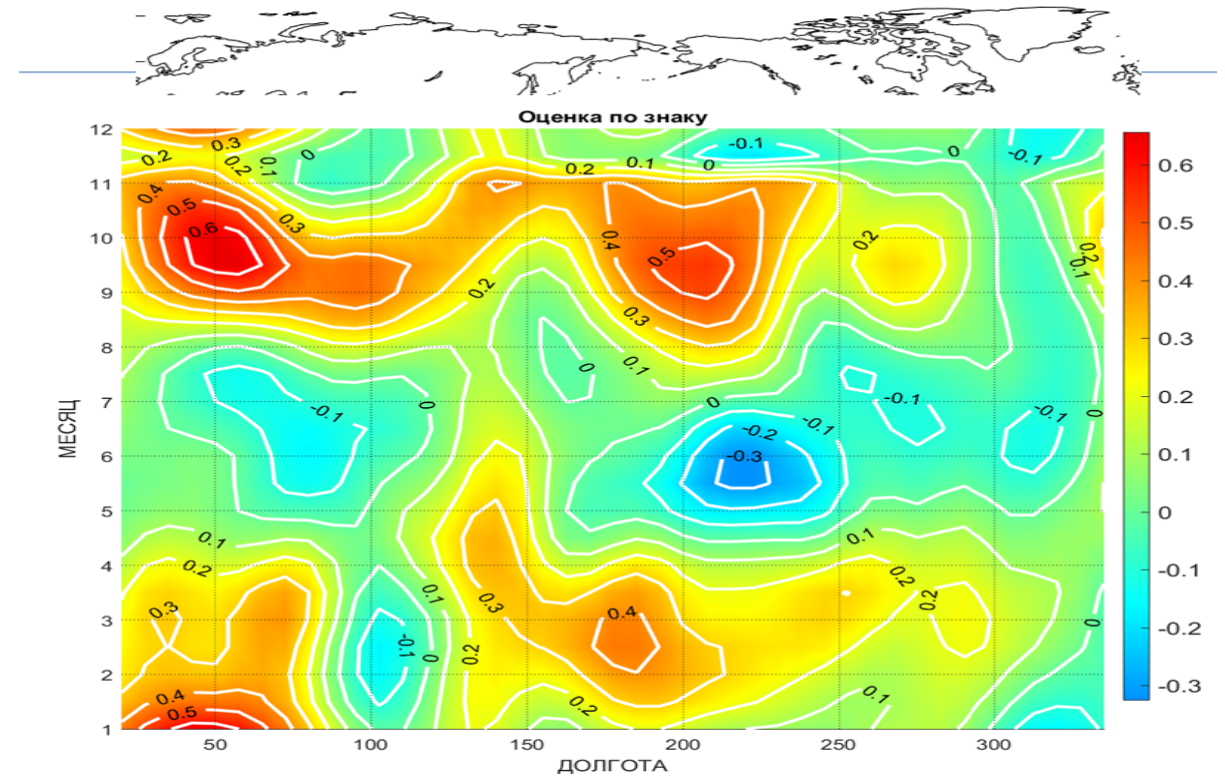


Assessment of improvement of using MOS approach for operational seasonal forecasts

Operational SI-AV forecasts were used for period from 2015 through 2018

Lead time	ACC	r	RMSSS	Kss
1 mon	0.09	0.11	-0.08	0.11
2 mon	0.16	0.06	0.08	0.06
3 mon	0.11	0.07	0.03	0.06
4 mon	0.09	0.12	0.01	0.09
Season	0.09	0.10	0.13	0.09

The largest improvements are revealed for transition seasons – autumn and spring.

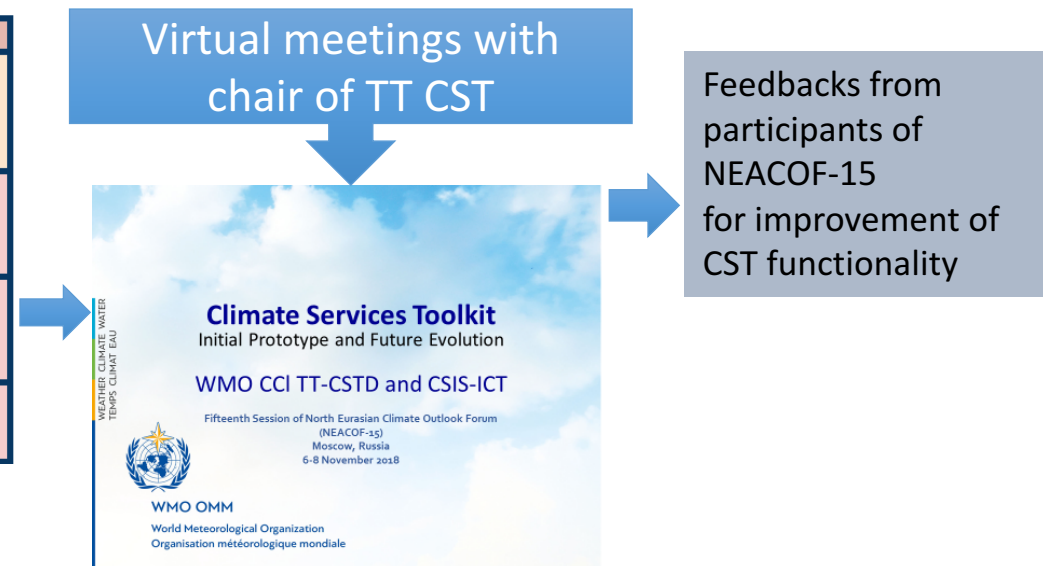


NEACC operations: Mandatory Functions

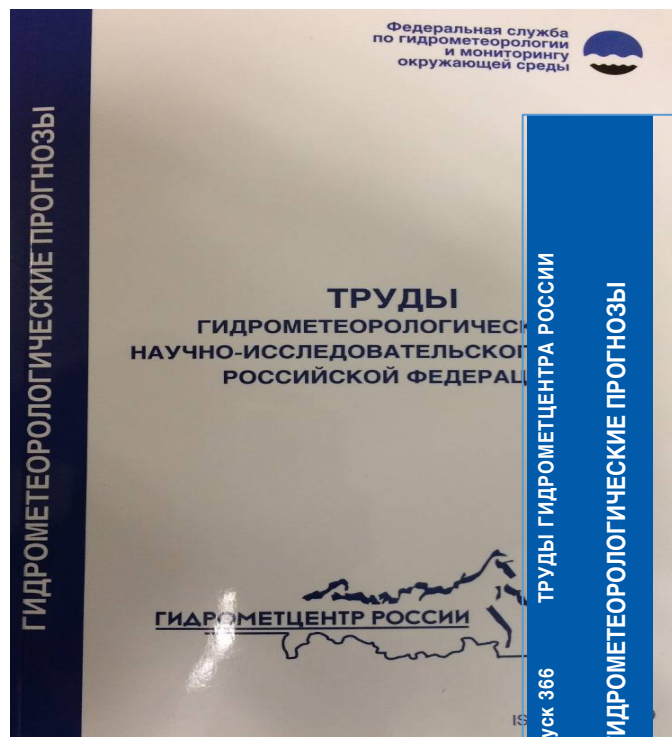
Training/Guidance in the use of RCC products

- Methodical and technical support of specialists of CIS NMHS in analysis and interpretation of monitoring and forecasting products
- Collaboration with the WMO-RTC Moscow on issues related to distance learning for long-range forecasting
- Training courses
- Expert visits
- Training module in NEACOF sessions

November 7, 2018 r.	
Training module: Introduction to some applications and software packages in support of climate services Chair: V.Mirvis Co-chair: D. Baidulloeva	
10.00-10.30	Evaluation of snow cover to predict the seasonal water content of rivers in Central Asia using the MODSNOW-Tool. Demonstration of basic functions. A. Gafurov, consultant of the CAMP4ASB project
10.30-11.00	Climate Services Toolkit developed by the WMO (Climate Services Toolkit CST). Demonstration of basic functions. V.Khan on behalf of TT CST WMO
11.00-11.30	Program complex "Long-term forecaster" Demonstration of basic functions. V.Yu. Tsepelev (North-Western UGMS, RSHU)



Materials of NEACOF session (research papers and technical notes) have been published in special issues of scientific-technical journal “Hydrometeorological Forecasting and Research ” (former “Trudy Hidrometcentra Rossii”)



2016

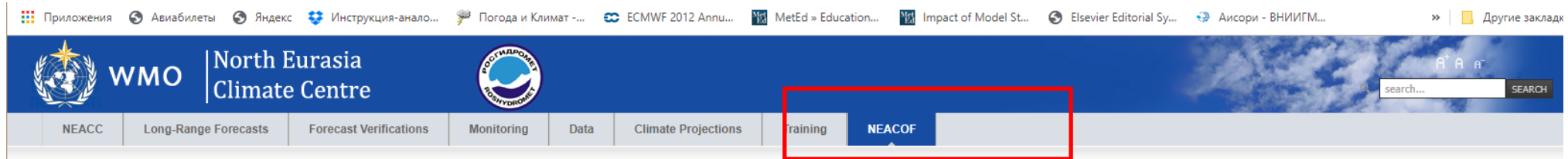


2017



2019

Role of North Eurasia Climate Outlook Forum (NEACOF) in RCOF process

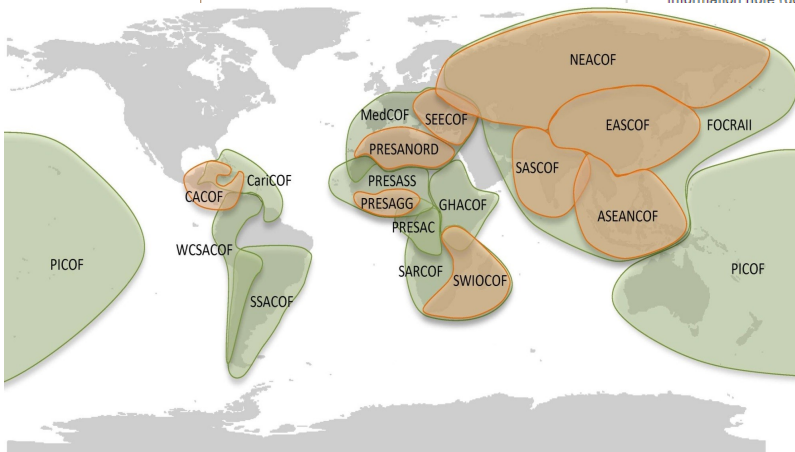


NEACOF

The Fifteenth session of North Eurasia Climate Outlook Forum (NEACOF-15)

The North-Eurasian Climate Center held the 15th session of NEACOF-15 in Moscow with the assistance of Hydrometeorological Centre of Russia, The Voeikov Main Geophysical Observatory, Institute of Global Climate and Ecology, All-Russian Institute of Hydrometeorological Information, All-Russian Research Institute of Agricultural Meteorology and National Meteorological Services of CIS countries. The main purposes of the Forum is to issue a consensus forecast for the winter of 2018/2019 and to discuss the current problems of monitoring and forecasting climate variability. Russian and foreign experts on long-term meteorological forecasting, as well as researchers, teachers, graduate students and students of scientific and educational institutions with a specialization in climatology are invited to participate in the Forum.

Information note (doc),



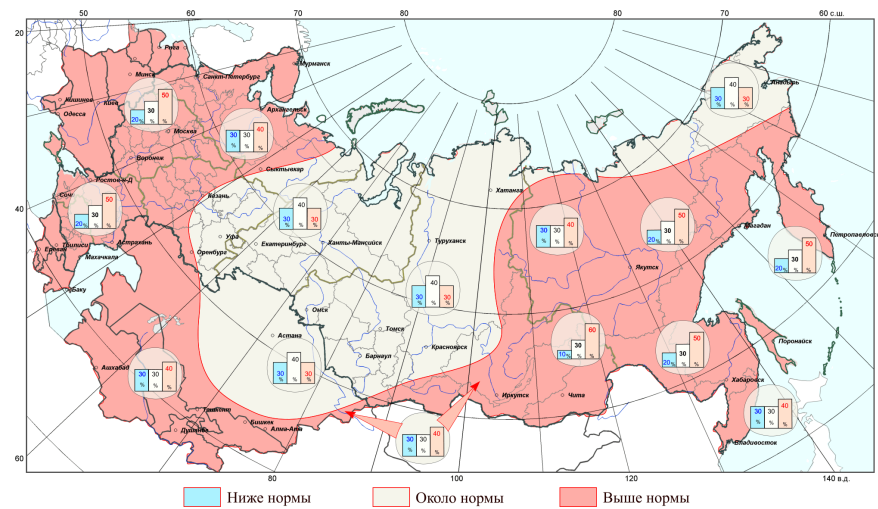
The NEACOF has been conducted twice a year at the end of the springtime, in May, (on the base of Internet resources) and at the end of the autumn, in November (physical sessions), with focus on the seasonal prediction for summer and winter respectively.

<http://seakc.meteoinfo.ru/about-centre/-neacof> (Russian version)

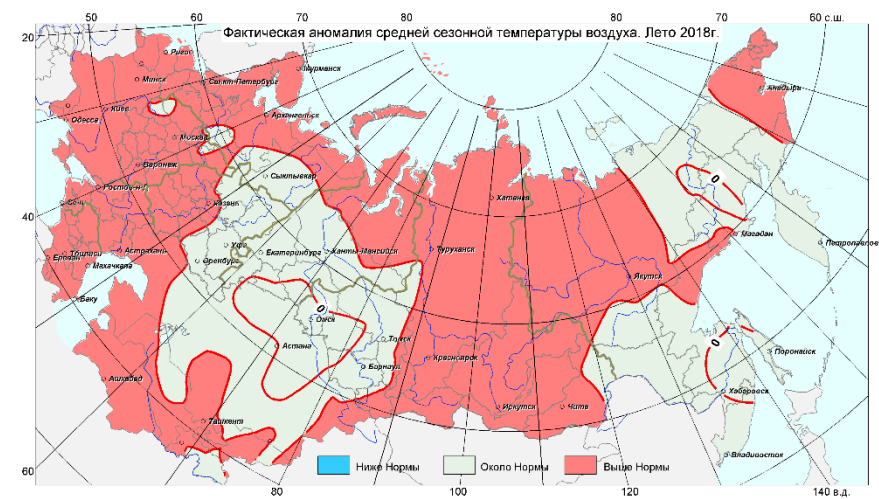
<http://neacc.meteoinfo.ru/neacc/north-eurasian-climate-outlook-forum> (English version)

Consensus forecasts and observed data fields for JJA 2018

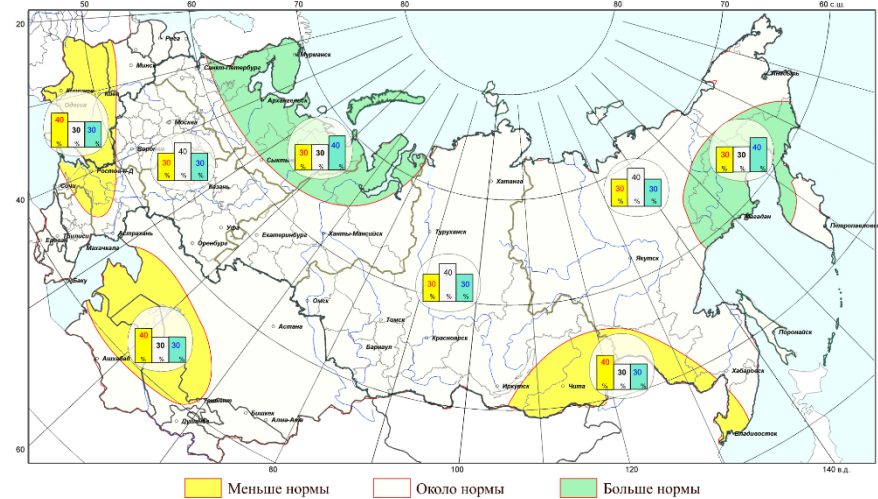
Consensus forecasts of T2m



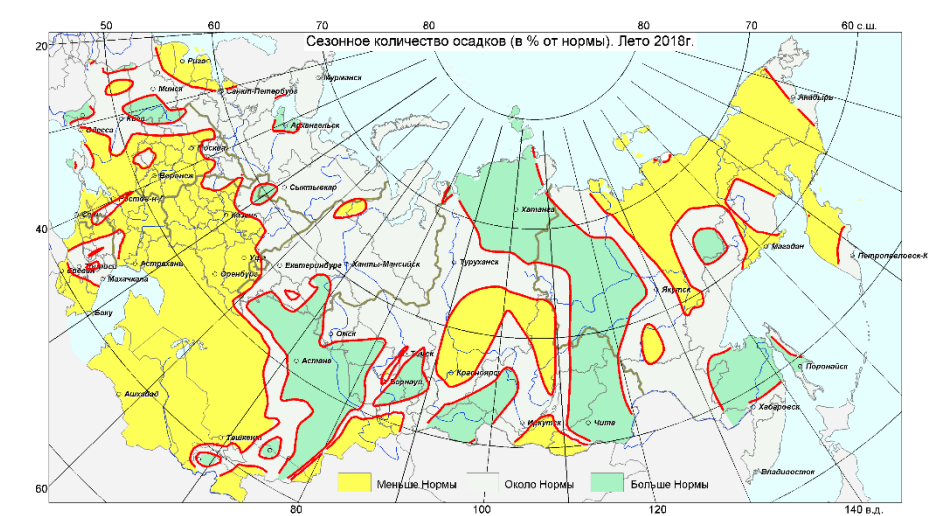
Ground station data of T2m



Precipitation of T2m



Ground station data of Precipitation



Region	T2m	Precipitation
North Eurasia	80	59
Russia, Belorussia, Moldova, Caucasus region	78	56
Kazakhstan and Central Asia	85	67

**Consensus process was mostly subjective
objective approach in on the way**

ПРОГРАММА МЕЖДУНАРОДНОЙ КОНФЕРЕНЦИИ
ПО ВЫЧИСЛИТЕЛЬНО-ИНФОРМАЦИОННЫМ ТЕХНОЛОГИЯМ ДЛЯ НАУК ОБ ОКРУЖАЮЩЕЙ СРЕДЕ

CITES 2019

(27 мая – 6 июня, г. Москва, Россия)

3 ИЮНЯ, ПОНЕДЕЛЬНИК

9:00 Регистрация

9:30–16:45 СЕКЦИЯ 1.
СУБСЕЗОННЫЕ И ДОЛГОСРОЧНЫЕ
МЕТЕОРОЛОГИЧЕСКИЕ
И КЛИМАТИЧЕСКИЕ ПРОГНОЗЫ

ПРИГЛАШЕННЫЕ ЛЕКЦИИ

William Merryfield
(Canadian Centre for Climate Modelling and Analysis, Canada)
Seasonal prediction of the cryosphere**Laura Ferranti**
(European Center for Mid-range Weather Forecasting, UK)
Early warning of cold spells and heat waves

11:30 – 12:00 ПЕРЕРЫВ

Yvan Orsolini, Fei Li (NILU, Norway)
Impact of snow initialization
on subseasonal-to-seasonal forecasts

12:30 – 14:00 ОБЕД

Adrian Tompkins
(Abdus Salam International Center for Theoretical Physics, Italy)
How do S2S subseasonal systems beat seasonal
forecasts?

ПРИГЛАШЕННЫЕ ДОКЛАДЫ

**Крупчатников В.^{1,2}, Мартынова Ю.^{1,3}, Боровко И.^{1,4},
Платов Г.^{4,2}**
(¹СибНИГМИ, ²ИИ НГУ, Новосибирск, ³ИМНЗС СО РАН, Томск,
⁴ИВМ ИГиГ СО РАН, Новосибирск, Россия)О связи изменчивости среднего потока и вихрей
с систематическими ошибками в моделях

15:30–16:00 КОФЕ

УСТНЫЕ ДОКЛАДЫ

Мартынова Ю.В.
(ИМНЗС СО РАН, Томск, Россия)
Оценка проявления межсезонной связи между
величиной снежного покрова и атмосферными
условиями в Сибири по данным различного типа**Фадеев Р.Ю.^{1,2,3}, Ушаков К.В.^{4,1,2}, Толстых М.А.^{1,2,3},
Ибраев Р.А.^{1,2,3,4}, Шашкин В.В.^{1,2,3}**
(¹ИВМ РАН, ²Гидрометцентр России, ³МФТИ, Долгопрудный,
⁴ИО РАН, Москва, Россия)Долгосрочный прогноз погоды на основе
совместной модели

КРАТКИЕ УСТНЫЕ СООБЩЕНИЯ

Савельева Е.С., Зуев В.В.
(ИМНЗС СО РАН, Томск, Россия)
Возможные варианты развития арктического
полярного вихря в весенний период**Мизяк В.Г.¹, Рогутев В.С.¹, Толстых М.А.²**
(¹Гидрометцентр РФ, ²ИВМ РАН, Москва, Россия)
Развитие ансамблевой системы среднесрочного
прогноза погоды в Гидрометцентре России.
Используемые наблюдения и особенности их
усвоения**Рогутев В.С.¹, Толстых М.А.^{2,1}, Мизяк В.Г.¹**
(¹Гидрометцентр РФ, ²ИВМ РАН, Москва, Россия)
Развитие системы ансамблевого прогноза
Гидрометцентра России. Подготовка ансамбля
начальных данных14:00–18:00 ПАРАЛЛЕЛЬНАЯ СЕКЦИЯ:
ШЕСТНАДЦАТАЯ СЕССИЯ
КЛИМАТИЧЕСКОГО ФОРУМА СТРАН
СНГ ПО СЕЗОННЫМ ПРОГНОЗАМ
(СЕАНОФ-16)

ВСТУПИТЕЛЬНЫЕ СЛОВА

Хан В.М.
(Гидрометцентр РФ, Москва, Россия)

- Знакомство с участниками форума
- Текущие вопросы по развитию СЕАНОФ и СЕАНОФ
- Текущее и ожидаемое развитие климатических
условий на территории Северной Евразии

ПРИГЛАШЕННЫЕ ДОКЛАДЫ

Нуликова И.А., Круглова Е.Н., Крызов В.Н.
(Гидрометцентр РФ, Москва, Россия)
Крупномасштабные моды атмосферной
изменчивости, влияющие на формирование
климатических условий
в летний период по территории Северной Евразии**Тищенко В.А., Круглова Е.Н., Нуликова И.А.,
Ганиева Е.С., Хан В.М.**
(Гидрометцентр РФ, Москва, Россия)
Оценка состояния климатической системы
на предстоящий сезон по данным мониторинга16th session of NEACOF is holding as an parallel section of
CITES2019

Way Forward

- ✧ Keep making efforts on provision of new LRF products
- ✧ Develop tool for production and verification of objective consensus forecasts
- ✧ Continue LRF area research within Russian and international projects
- ✧ Expand training activities in collaboration with academic and research communities
- ✧ Facilitate use of CST for NHMSs within area of responsibility

Possible WGSIP engagement with RCCs and RCOFs

- Support of RCOF sessions – exchange of knowledge about model improvements, ability of model to reproduce teleconnections, physical mechanisms of influence of large scale circulation patterns
- Keep in contact with RCCs to collect feedbacks about new requirements for LRF products
- The annual to decadal prediction is potential for climate services. It is becoming operational globally. WGSIP could support RCCs to undertake additional highly recommended functions. Role of RCCs in facilitating data of annual to decadal predictions and climate projections at regional level and in providing guidance on technical & scientific issues
- Support of regional training – as in pre-RCOF training for regions and sub-regions with common interests. Centralised programmes for RCC/RCOF leads i.e. global training of trainers programmes.

Thank you for your attention!

