Update on seasonal forecast system based on SL-AV model at Hydrometcentre of Russia.

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Seasonal version of SL-AV model

- Semi-implicit semi-Lagrangian vorticity-divergence dynamical core of own development (Tolstykh 2010), mostly ALADIN/LACE parameterizations.
- Current version: Resolution 1.4x1.125 degrees lon/lat, 28 levels. Described in (*Tolstykh et al, Izvestia RAN, Ser. PhA&O, 2010) with updates in (Tolstykh et al Izvestia RAN, 2014)*
- *Computer resources limitation*
- *Changes since last session:*

- snow analysis now uses also hydrological data for Russia

- more accurate sea ice account (to enter before the end of the year)

New version of the model

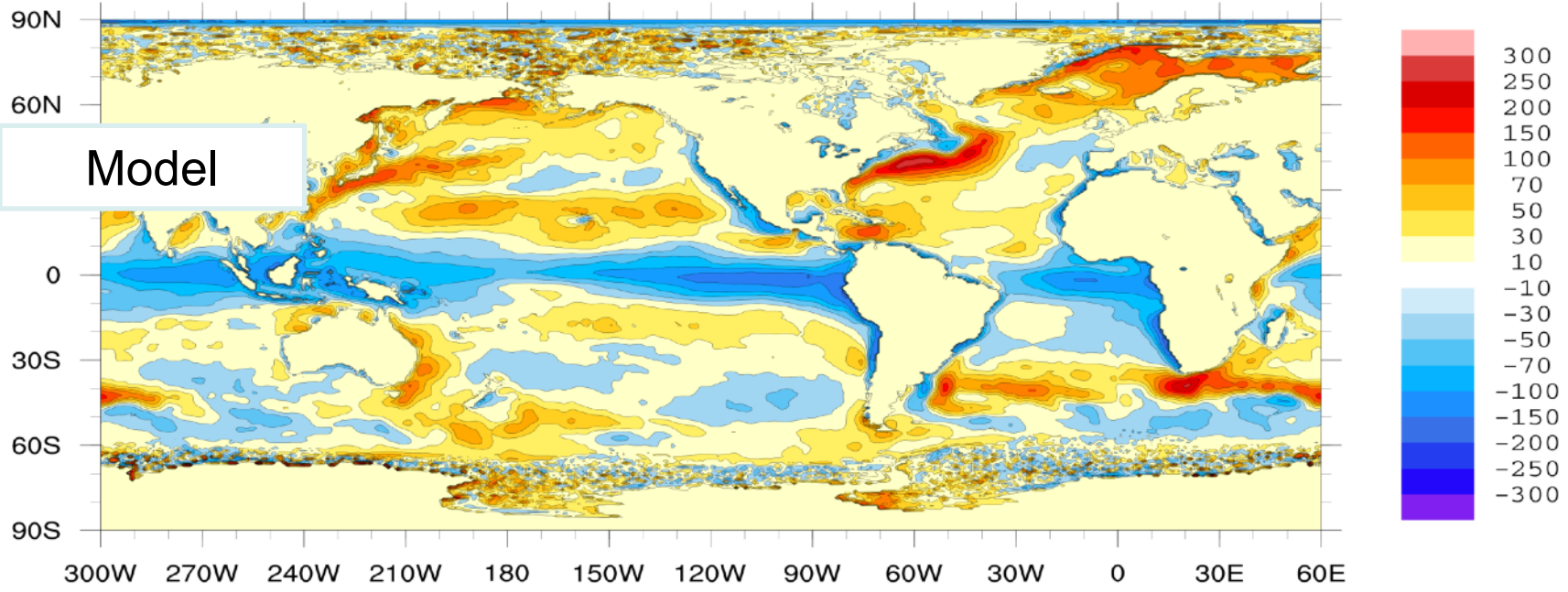
- More accurate SW and LW radiation parameterization(CLIRAD SW + RRTM LW).
- ALARO-0 microphysics
- Increased horizontal resolution (0.72°x0.9° lat-lon)
- INM RAS multilayer soil model (from INMCM)
- Requires new computer (hopefully, at the end of 2017)

Development of the new coupled model

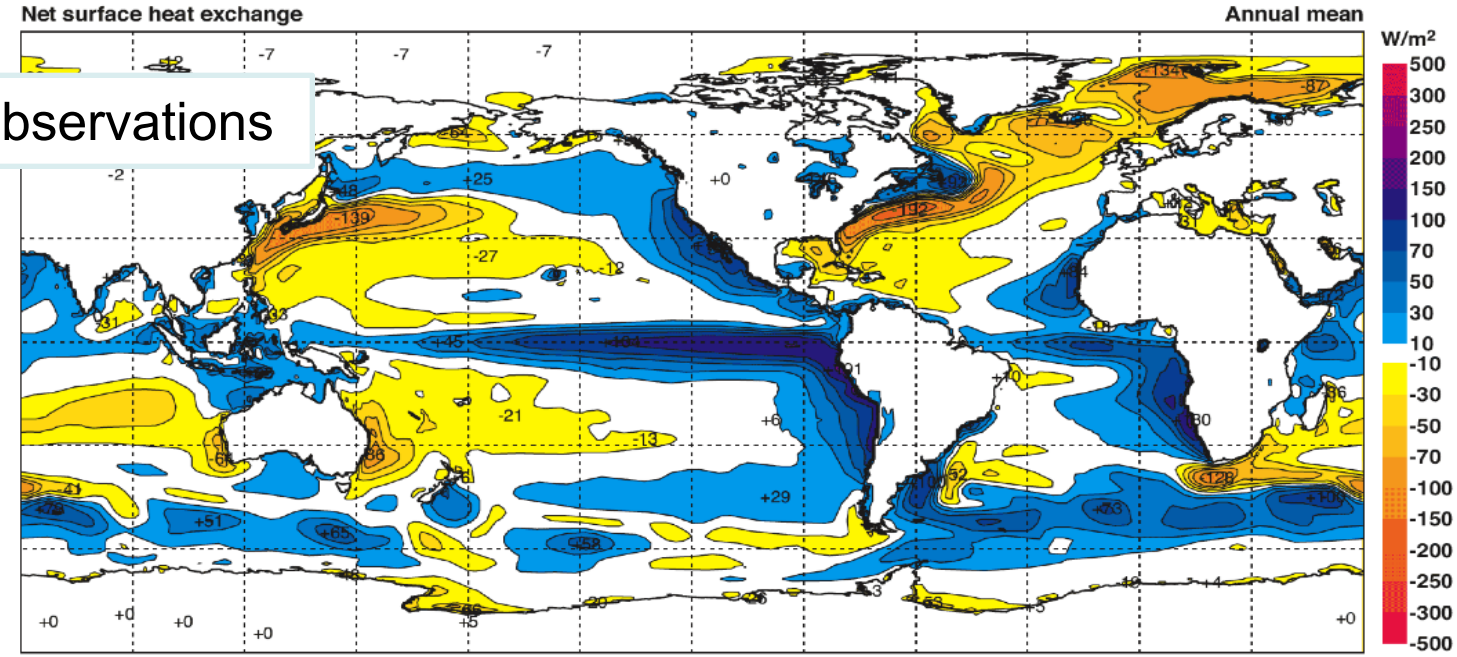
- New version of SL-AV atmospheric model, 0.9^o x 0.72^o, 28 levels.
- INMIO ocean model (Ibrayev et al), 0.5^o, 49 levels.
- Sea ice : CICE.
- Coupler of own development (V.Kalmykov)

Mean annual surface heat flux in the model with prescribed ocean

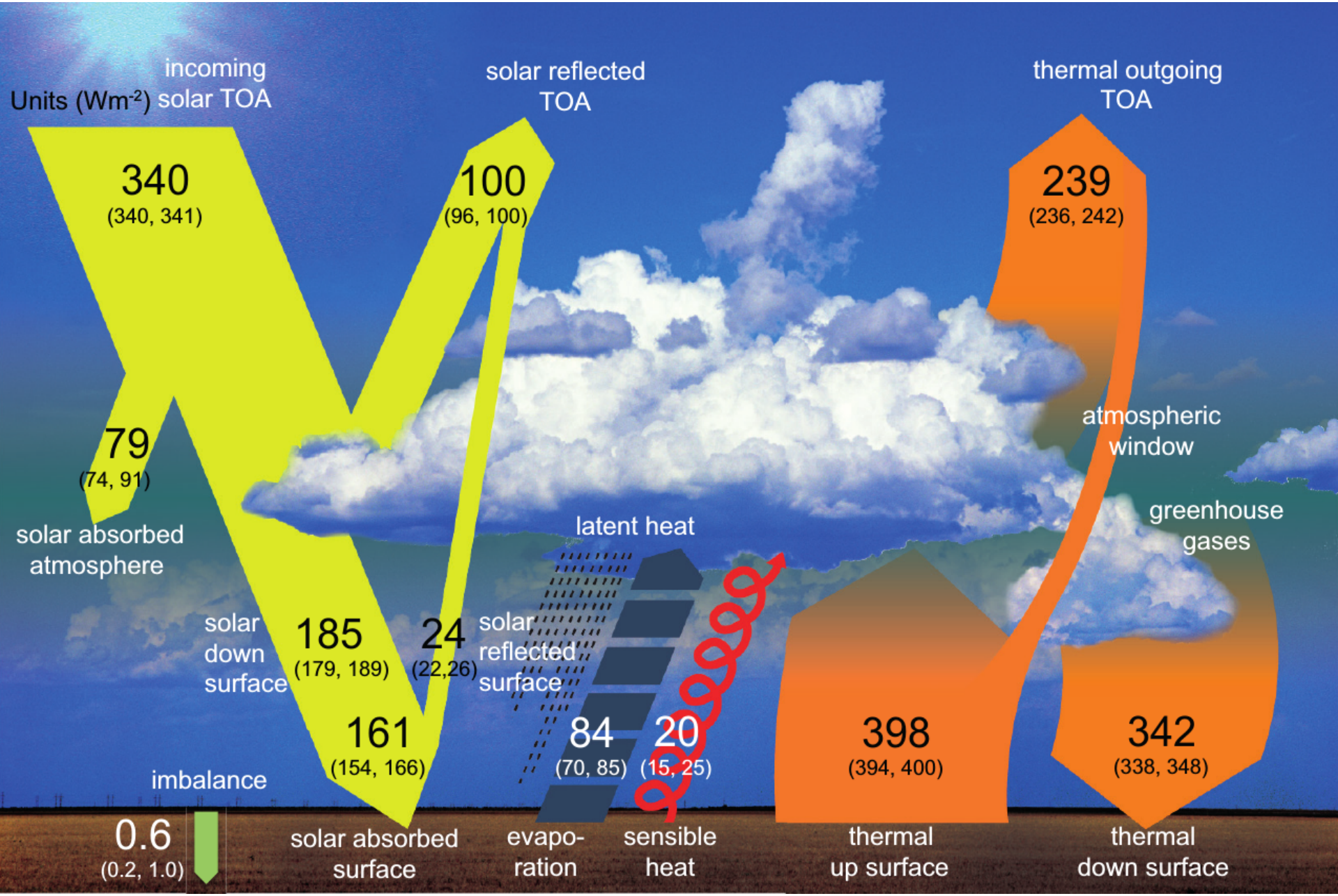
Model



Observations



Атмосфера с предписанной ТПО и льдом (AMIP2), 3года


Units (Wm^{-2})
incoming solar TOA
340
(340, 341)
solar reflected TOA
100
(96, 100)
thermal outgoing TOA
239
(236, 242)
79
(74, 91)
solar absorbed atmosphere
atmospheric window
greenhouse gases
latent heat
solar down surface
185
(179, 189)
24
(22,26)
solar reflected surface
161
(154, 166)
84
(70, 85)
20
(15, 25)
398
(394, 400)
342
(338, 348)
imbalance
0.6
(0.2, 1.0)
solar absorbed surface
evapo-ration
sensible heat
thermal up surface
thermal down surface

Components of the heat balance (Wm-2)

Title	IPCC data (range, abs values)	IPCC data (recommend ed values)	Model with prescribed ocean	Coupled model
Top downward solar radiation	340-:-341	341.3	341.6	341.6
Top upward solar radiation	96-:-100	100	109.3	107.1
Top outgoing longwave radiation	-(236-:-242)	-239	-232.4	-234.6
Solar radiation absorbed by the surface	154-:-166	161	164.9	165,5
LW radiation surface balance	-(54-:-58)	-56	-60.5	-60.4
Surface sensible heat flux	-(15-:-25)	-20	-17.9	-21.8
Surface latent heat flux	-(70-:-85)	-84	-86.4	-83.9
Surface heat balance	-	1	0.1	-0.6

North Eurasian Climate Center

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.

The structure of NEACC:

NHMSs of CIS (Azerbaijan, Armenia, Belorussia, Kazakhstan, Kirgizstan, Moldova, Russian Federation, Tajikistan, Uzbekistan, *Ukraine).*

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Consortium of the Roshydromet organizations:

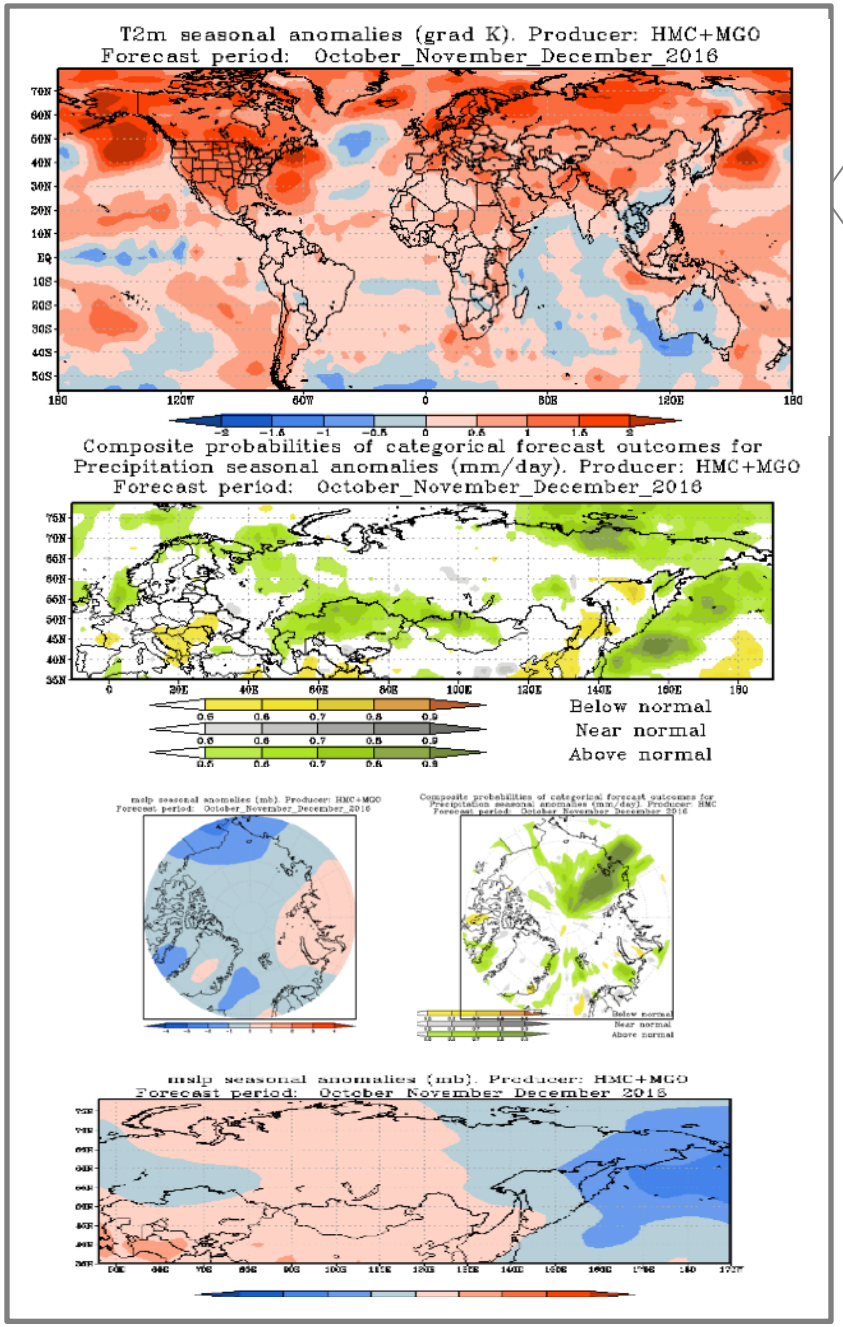
1. Hydrometeorological Research Centre of the Russian Federation
2. Institute of Global Climate and Ecology
3. Russian Research Institute for Hydrometeorological Information – World Data Centre
4. A.I. Voeikov Main Geophysical Observatory
5. Droughts Monitoring Centre, Russian Research Institute of Agricultural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

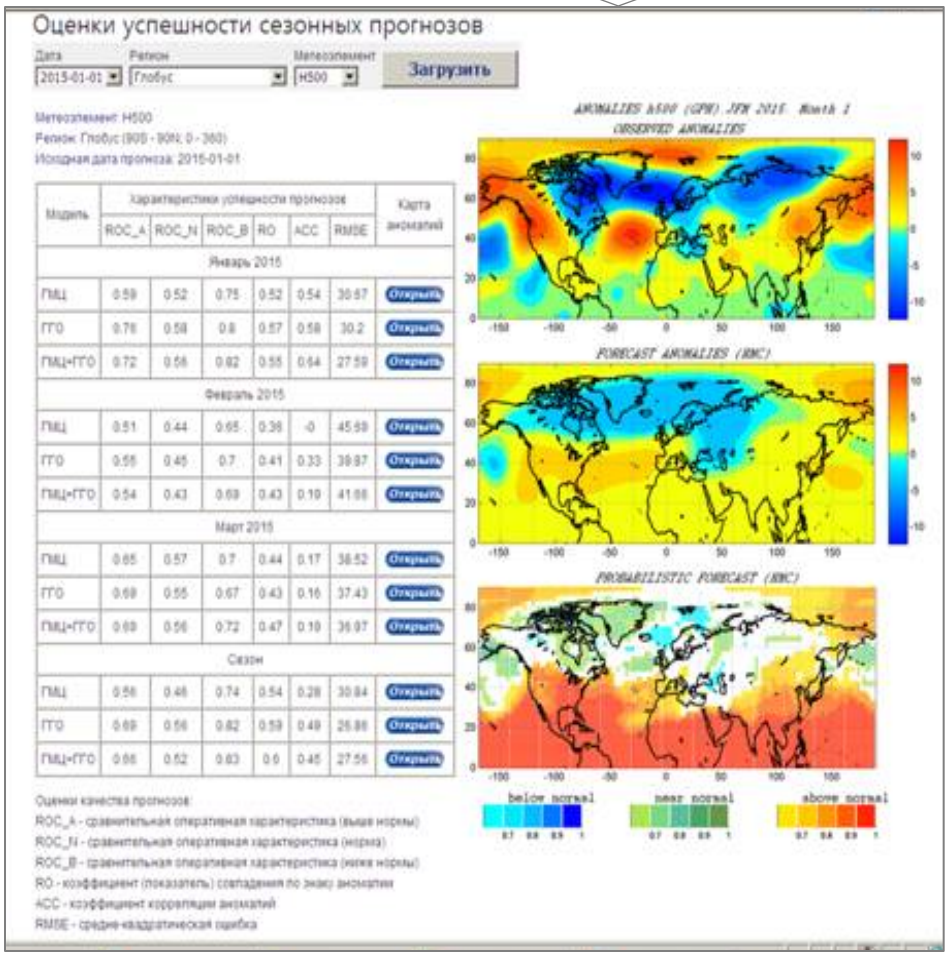
The North Eurasia Climate Centre (NEACC) is coordinated by the Russian Federation under the auspices of the Commonwealth of Independent States (CIS). NEACC was formally designated as a WMO RCC NEACC by WMO Executive Council in May 2013.

http://seakc.meteoinfo.ru/

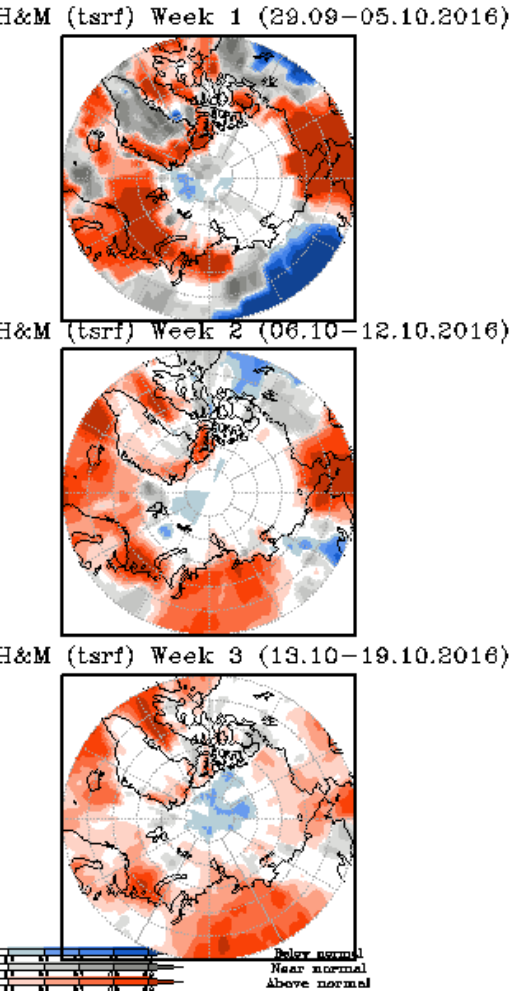
Forecast maps

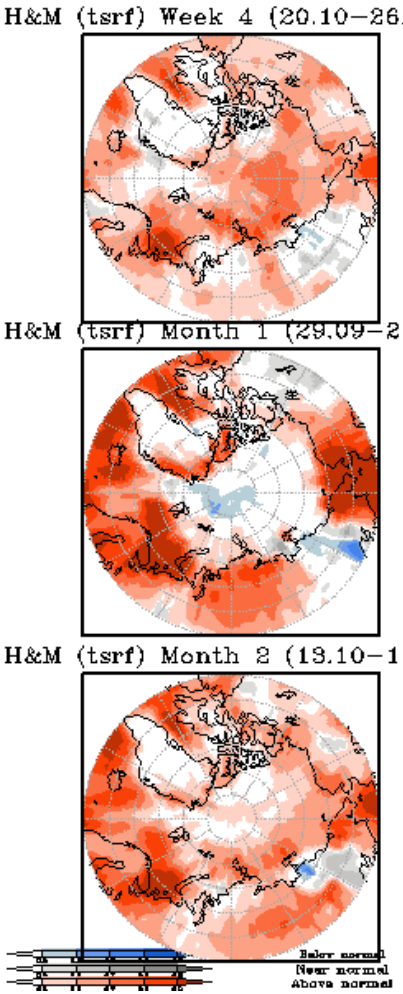
Skill scores of operational forecasts





Sub-seasonal forecast technology (experimental regime)





d0-63: Once a week, 20 members ensemble initialized on 00Z every Wednesday forced py persisted SST anomalies (mean for 2 weeks) from NCEP (Reynolds SST OI v2). Perturbation from a breeding cycle. Re-forecast suite with 10 members spanning 30 years (1981-2010) run in real-time.

Skill scores of sub seasonal forecasts

ELEMENT trsf
EUROPE (10-60, 35 - 70)

	RO	Q	MSE	MSSS	AC	RMS	ROC_BN	ROC_NO	ROC_AN	ROC_AG
week1_HMC	0.79	2.40	8.52	-0.15	0.58	2.92	0.83	0.62	0.73	0.73
week1_MGO	0.78	0.79	3.71	0.50	0.71	1.93	0.60	0.68	0.74	0.67
week2_HMC	0.05	2.68	8.80	-1.66	0.32	2.97	0.53	0.47	0.53	0.51
week2_MGO	0.34	0.65	3.47	-0.05	0.34	1.86	0.73	0.60	0.75	0.69
week3_HMC	0.32	4.97	11.85	-0.95	0.28	3.44	0.34	0.49	0.51	0.45
week3_MGO	0.16	1.63	5.83	0.04	0.27	2.41	0.37	0.58	0.61	0.52
week4_HMC	0.58	4.27	10.76	-0.78	0.41	3.28	0.41	0.48	0.50	0.46
week4_MGO	0.20	1.46	5.97	0.01	0.22	2.44	0.48	0.54	0.54	0.52
month1_HMC	0.60	4.84	5.96	-0.82	0.58	2.44	0.49	0.49	0.48	0.49
month1_MGO	0.56	1.18	2.12	0.35	0.60	1.46	0.71	0.61	0.69	0.67
month2_HMC	0.51	7.42	8.88	-2.70	0.48	2.98	0.45	0.51	0.45	0.47
month2_MGO	0.46	0.93	1.62	0.33	0.61	1.27	0.62	0.57	0.68	0.62

North Eurasia Climate Outlook Forum

Objectives of NEACOF

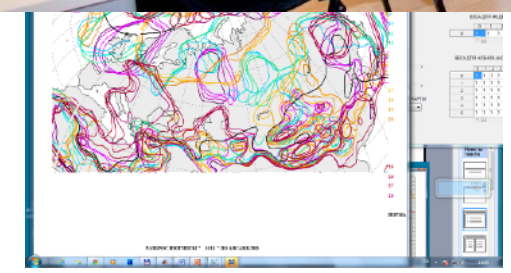
- **Integration on a professional basis of national, regional and international experts on climate monitoring and prediction and assistance in capacity building of NMHS CIS to meet national (and regional) requirements for climate services**

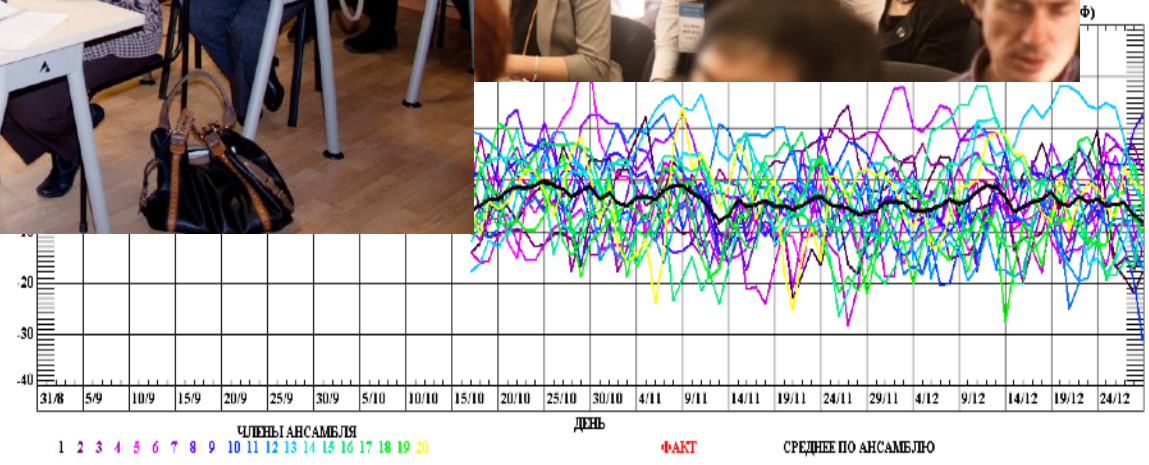
The scope of NHMS climate services in the area of NEACC differ from country to country. Some of NHMS monitor and assess regional climate variability, while some deal with operational climate forecasting. In some cases, climate services are not enough transparent. So, the use of information from consensus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

Participating countries: Azerbaijan, Armenia, Belorussia, Kazakhstan, Kirgizstan, Moldova, Russian Federation, Tajikistan, Uzbekistan, *Ukraine.*

Capacity Building Activities

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





Thank you for attention!