NORTH EURASIA CLIMATE CENTRE

WMO RA VI
WMO RA II
RCC-Network

V Forum, Moscow, October 2013

SEASONAL FORECAST BULLETIN

WINTER 2013-2014

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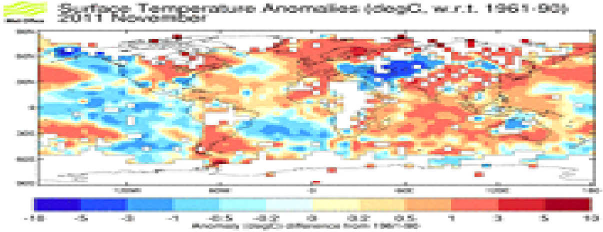
INTRODUCTION. FORECAST OBJECTS

AT PRESENT HMC and NEACC PRODUCE:

- the probabilistic forecasts of three equiprobable categories for sea surface temperature, surface air temperature, precipitation, 500 hPa height and mean sea level pressure;
- the deterministic seasonal and monthly mean values of meteorological variables (ensemble averages and anomalies).

November



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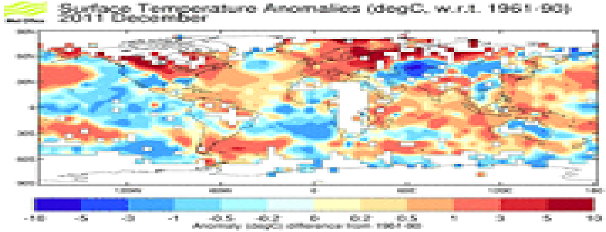

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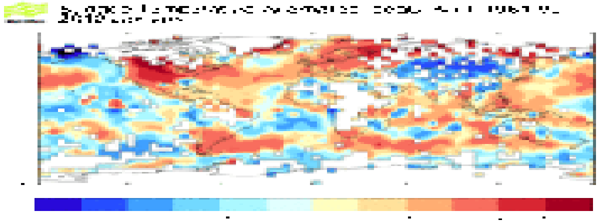

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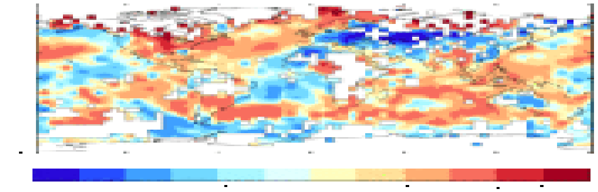

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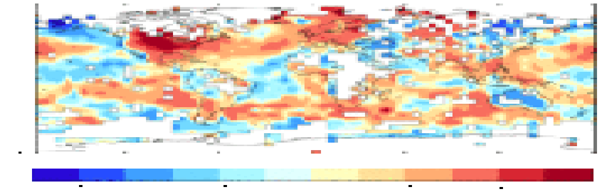

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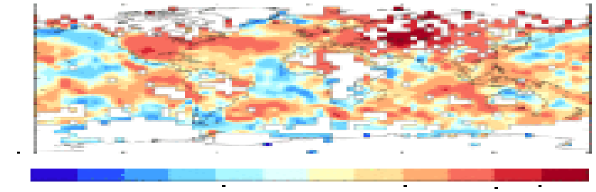

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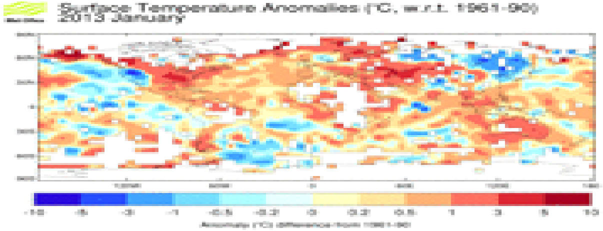

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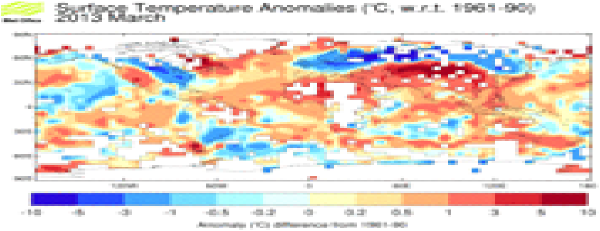

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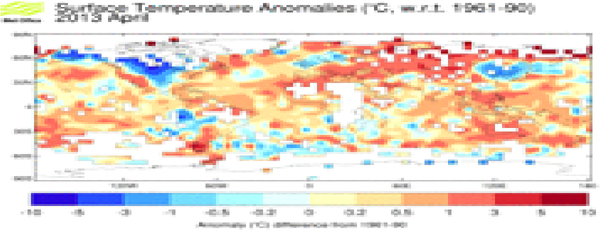


PHYSICAL ASSUMPTIONS

The practical predictability interval is 5-7 day. It may be increased up to 2 – 3 weeks depending on a season, region and stability of atmospheric circulation.

The first kind of predictability is, firstly, restricted by sensitvity to uncertainty of initial conditions, and, secondly, by branching because of bifurcation in nonlinear systems. Eve small disturbances (similar to a wave of wings butterflies) can change results of integration of General Circulation Models (GCM).

Predictability of the second kind, in which the object is to predict the evolution of the statistical properties of the system in response to changes in external forcings over time. Predictability of the second kind is essentially a boundary value problem, requiring good information on all boundary conditions which might influence system over time, e.g., variations in sea surface temperature, a surface of a land (an ice, a snow cover and humidity of ground). These parameters are more inertial that is why it is easier to predict environments. The other important external conditions are luminosity of the Sun, a content of hotbed gases, volcanic eruption, etc.. The predictability of the second kind defines possibilities of the forecast of large-scale structures of atmospheric circulation, as well as statistical characteristics of meteorological fields on seasonal and longer intervals of time.

METEOROLOGICAL SERVICES

Multi Model Forecasts use data from several sources to produce highly accurate deterministic and probabilistic forecasts. Multimodel seasonal forecasts are made in some world meteorological centers and have, basically, research character.

The North EurAsia Climate Centre (NEACC) was established by the Intergovernmental Council for Hydrometeorology of the Common wealth of Independent States (CIS – Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, the Russian Federation, Tajikistan, Turkmenistan, Uzbekistan and Ukraine) at its 18th Session held in Dushanbe, Tajikistan, 4-5 April 2007- http://seakc.meteoinfo.ru

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.

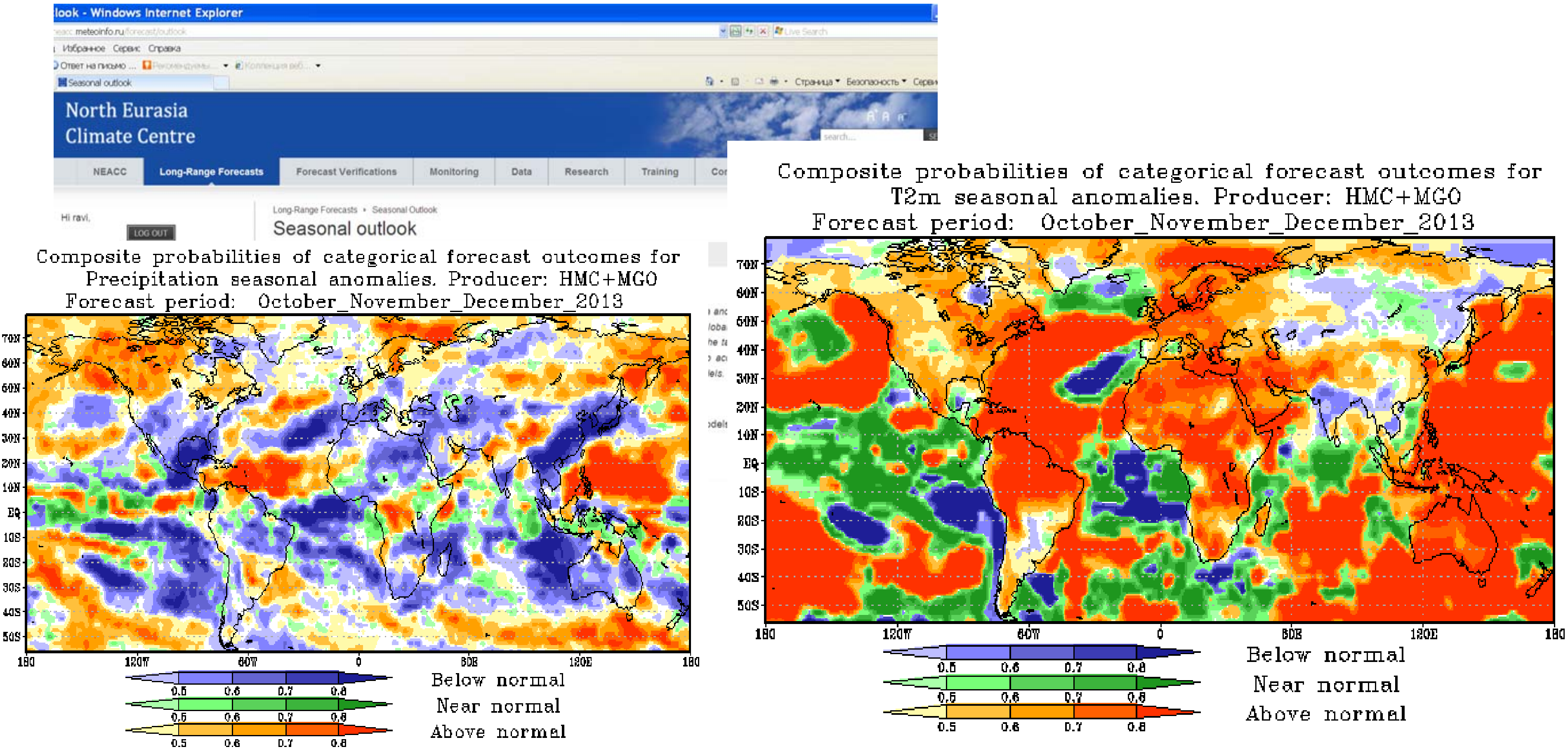
The International Research Institute for Climate and Society (The IRI's) (США)- http://iri.columbia.edu.

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, Met Office, **Tokyo Climate Centre (TCC), World Climate Service (W.C.S.) -** http://www.worldclimateservice.com

Main products and textual summary outlook regularly allocated on the web-site http://neacc.meteoinfo.ru.



Seasonal outlook

Composite probabilities of categorical forecast outcomes for Precipitation seasonal anomalies. Producer: HMC+MGO
Forecast period: October_November_December_2013

Composite probabilities of categorical forecast outcomes for T2m seasonal anomalies. Producer: HMC+MGO
Forecast period: October_November_December_2013

HYDRODYNAMICAL MODELS

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 1.125 lat x 1.40625 lon. 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) - T42L14. Ensemble size for the forecast is 9. 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.

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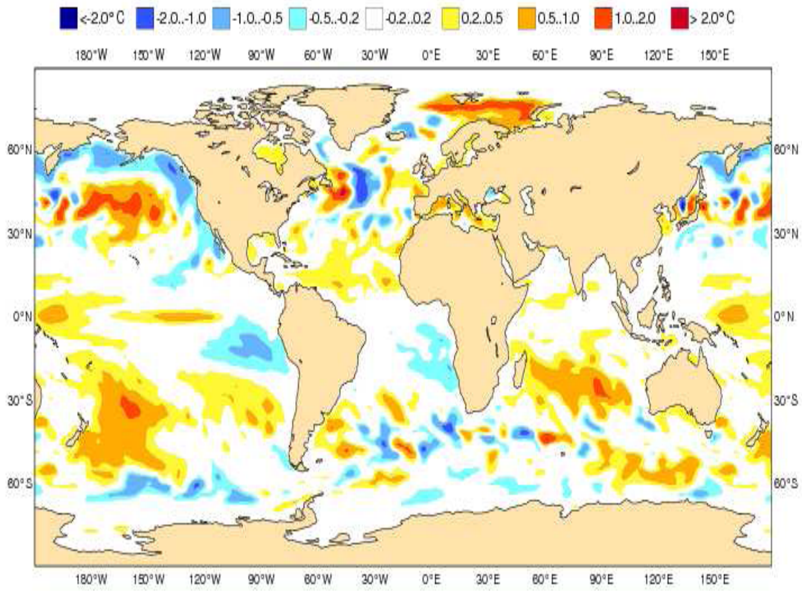
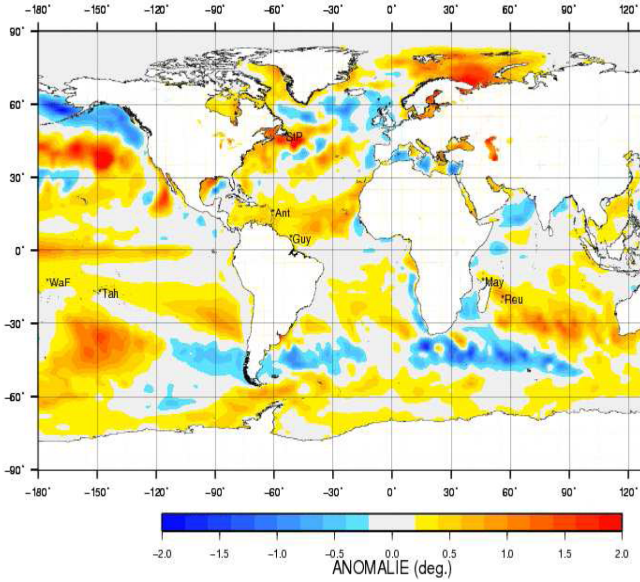
OCEANIC FORECASTS SEA SURFACE TEMPERATURE (SST)

November 2013-January 2014

Forecast issued in October 2013



ECMWF

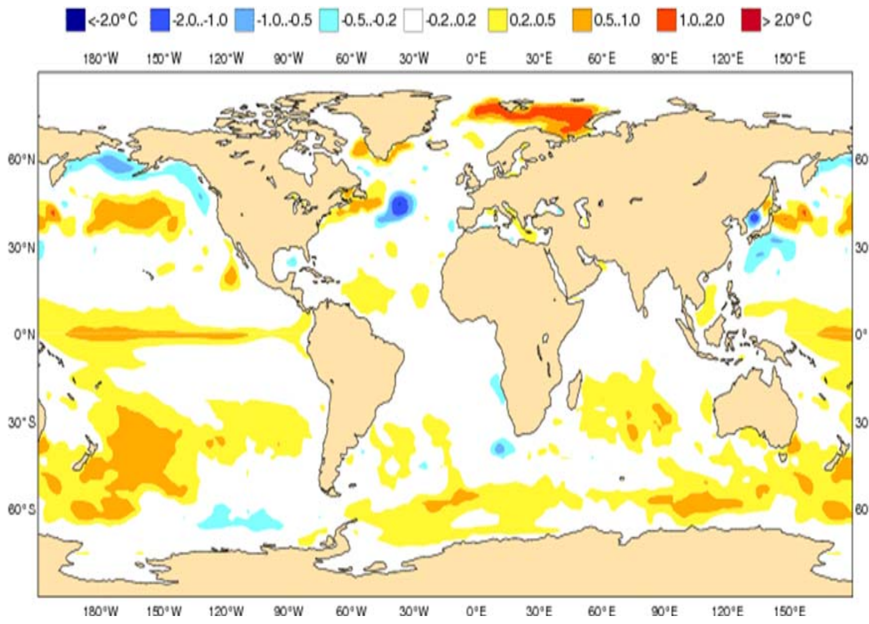


Global climate bulletin N°173 – November 2013
Meteo France

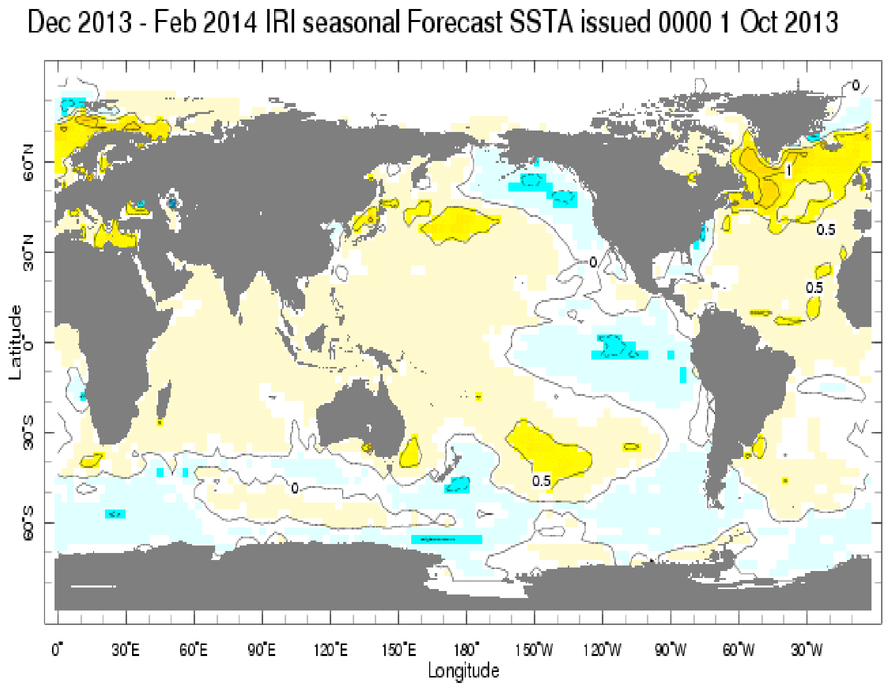
OCEANIC FORECASTS SEA SURFACE TEMPERATURE (SST)

December 2013-February 2014

Forecast issued in October 2013



EUROSIP: ECMWF/Met Office/Meteo-France/NCEP

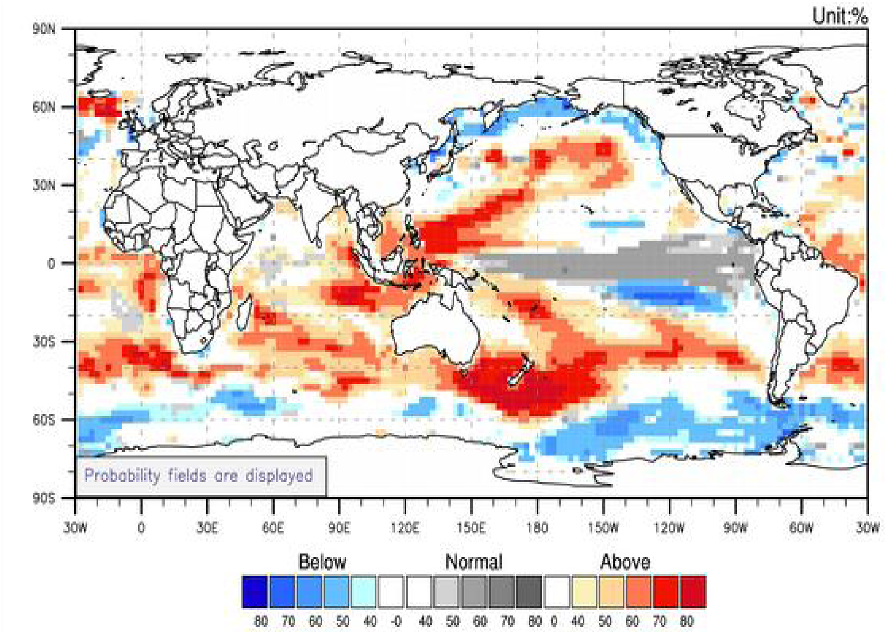

Dec 2013 - Feb 2014 IRI seasonal Forecast SSTA issued 0000 1 Oct 2013

The International Research Institute for Climate and Society (The IRI's) (США).

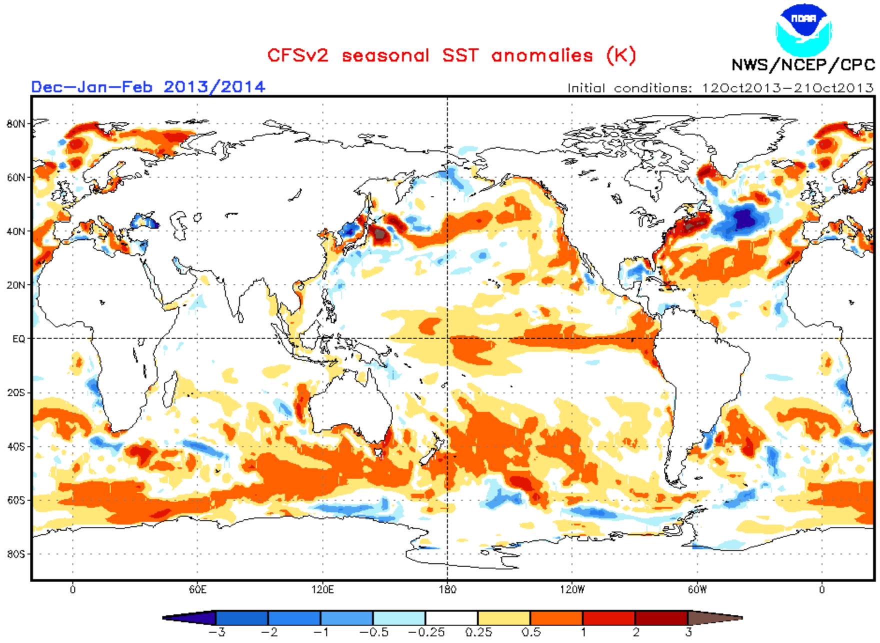
V Forum, Moscow, October 2013

OCEANIC FORECASTS SEA SURFACE TEMPERATURE (SST)

December 2013-February 2014



APCC



CLIMATE PREDICTION CENTRE
NATIONAL WEATHER SERVICE of USA

The forecast was performed with initial conditions:

of August 2013 with lead time of 1-6months.

12 October 2013 - 21October 2013

SEA SURFACE TEMPERATURE (SST)

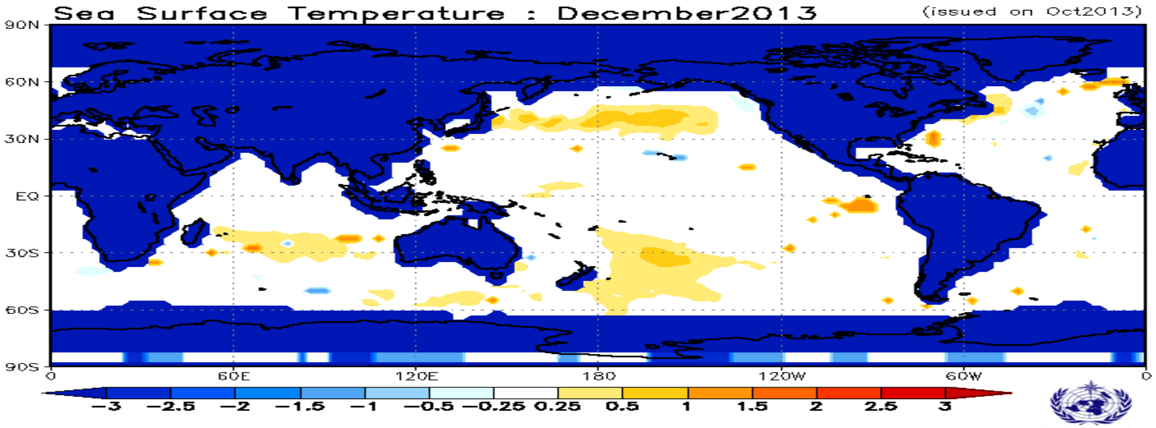
LC MMELRF-WMO Lead Centre for MME LRF

Forecast issued in October 2013

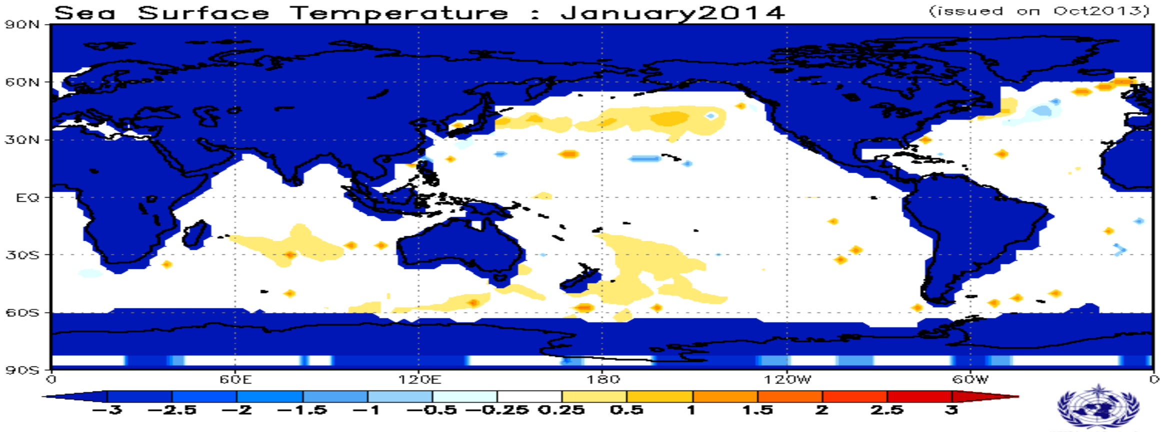
MODELs:

- Beijing
- CPTEC
- ECMWF
- Exeter
- Melbourne
- Montreal
- Moscow
- Pretoria
- Seoul
- Toulouse
- Tokyo
- ashington

December 2013



January 2014



LC MMELRF – WMO Lead Centre for MME LRF

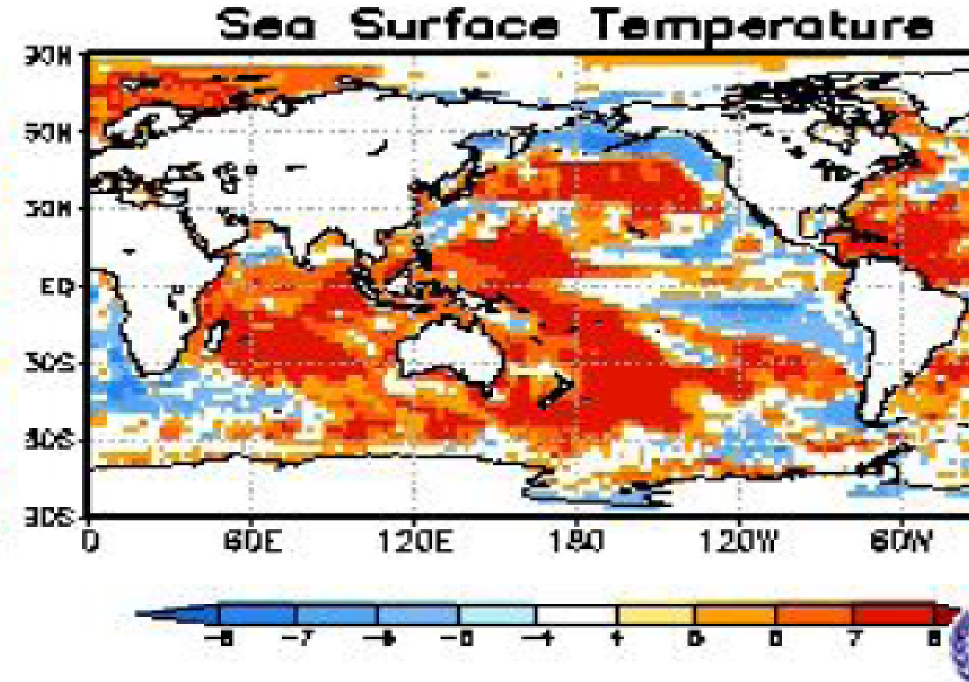
SST Anomaly forecast for November 2013 – January 2014

Forecast issued in October 2013

Models:

- GPC_seoul
- Washington
- Melbourne
- Montreal
- ECMWF
- Exeter
- Tokyo
- Toulouse
- Beijing

Consistency map

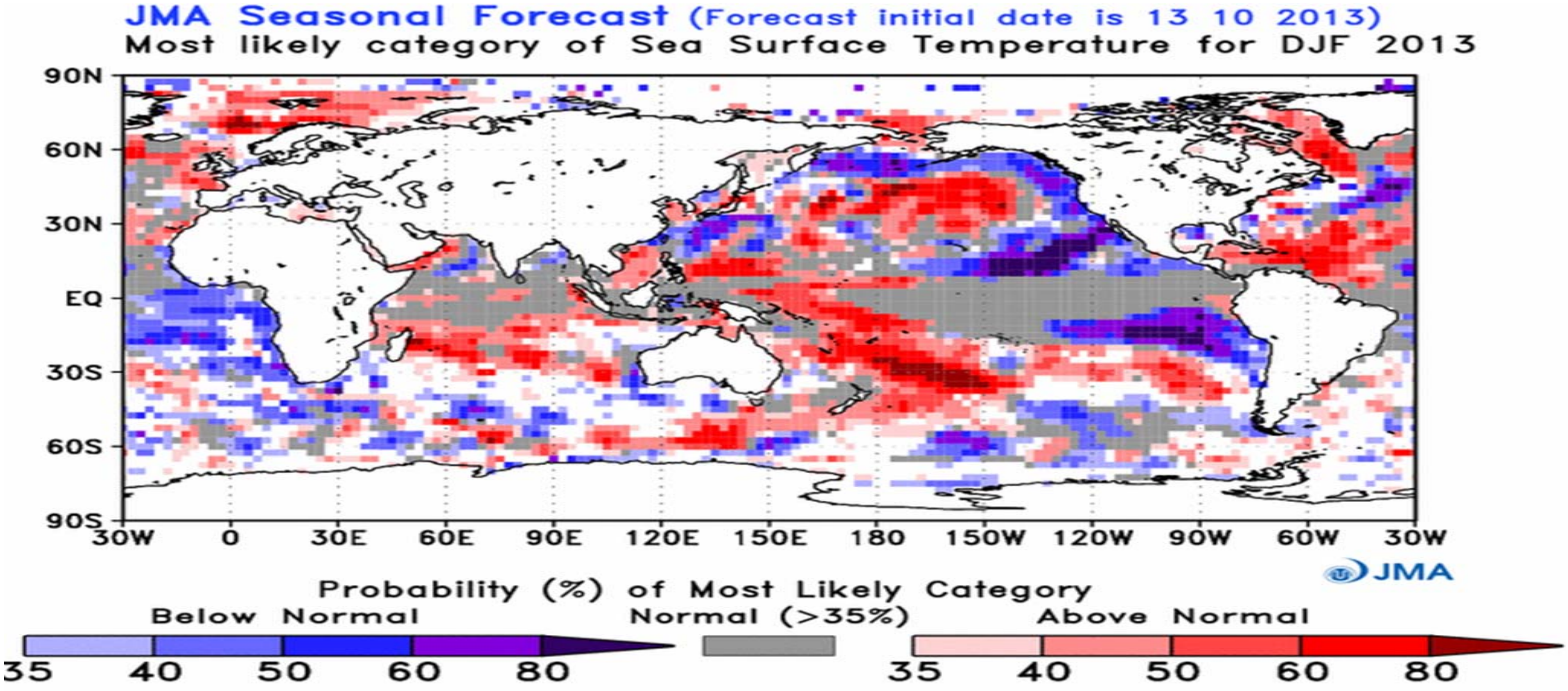


where, the positive numbers mean the number of models, that predict positive anomaly and vice versa.

OCEANIC FORECASTS SEA SURFACE TEMPERATURE (SST)

December 2013-February 2014

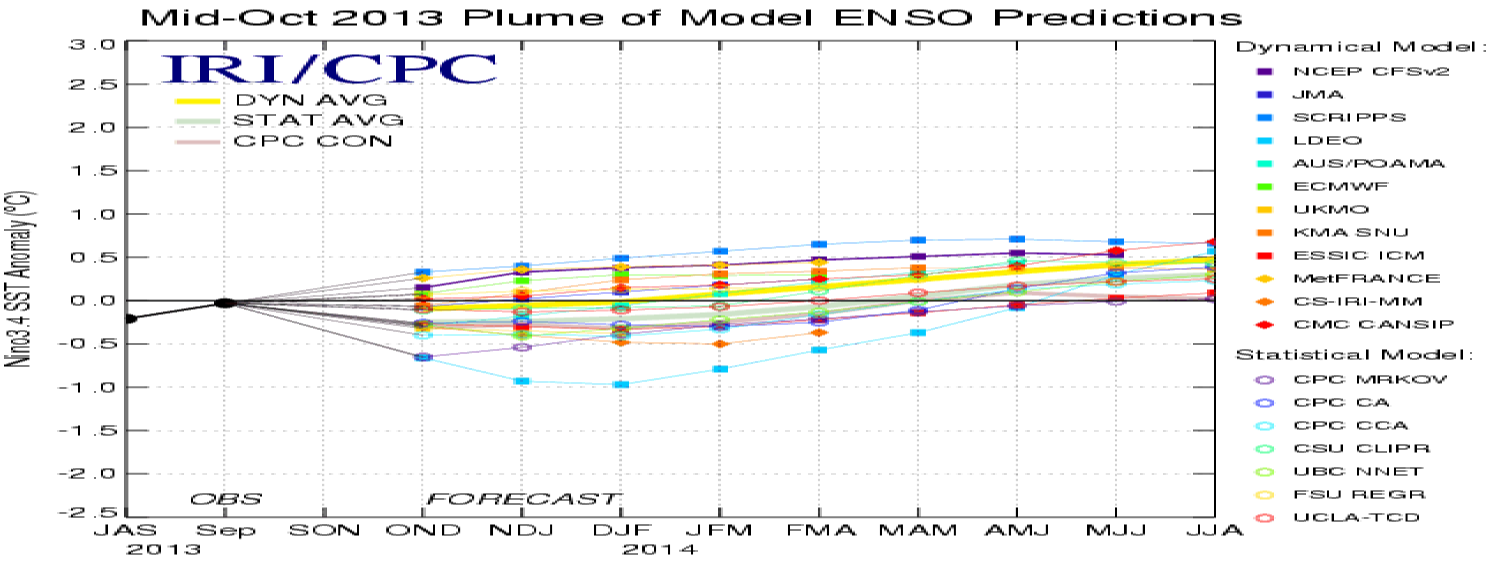
TOKYO CLIMATE CENTRE



The forecast was performed with initial conditions: 13 October 2013

ENSO FORECAST

Synthesis of Nino 3.4 forecasts (120-170W, 5S-5N) issued in October by IRI : http://iri.columbia.edu/climate/ENSO/currentinfo/SST_table.html



During September through October the observed ENSO conditions remained neutral. Most of the ENSO prediction models indicate a continuation of neutral ENSO through 2013 and the first quarter of 2014. A long-lasting mean disagreement between statistical and dynamical models (statistical leaning cooler, dynamical warmer) has diminished. The average forecast of all models indicates a gradual warming tendency during the first half of 2014. The probabilities for La Nina, neutral and El Nino conditions (using -0.5C and 0.5C thresholds) over the coming DJF season are: 7%, 91% u 2 %.

ENSO, based on the NINO3.4 index (120-170W, 5S-5N)

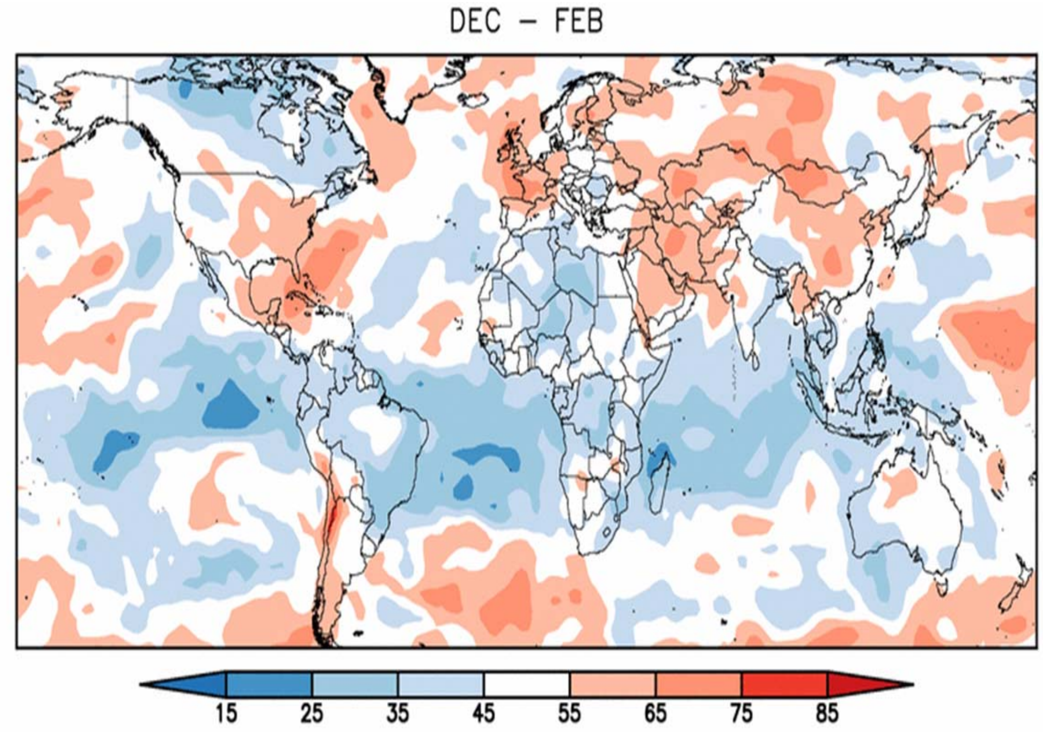
Nearly neutral ENSO

Percentage of years with above normal temperature

The World Climate Service

ENSO Analogs

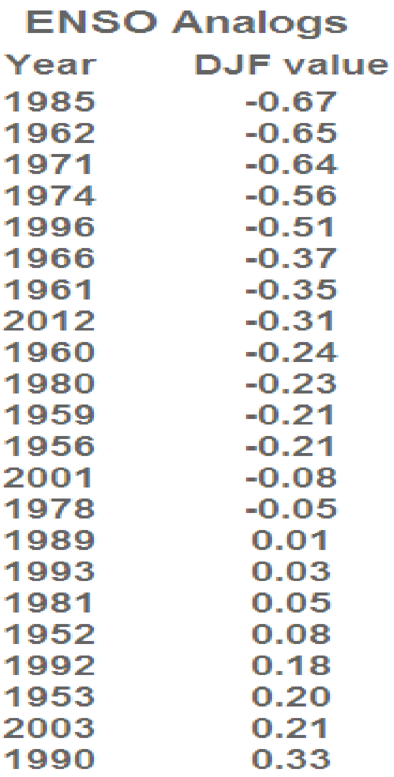
Year	DJF value
1985	-0.67
1962	-0.65
1971	-0.64
1974	-0.56
1996	-0.51
1966	-0.37
1961	-0.35
2012	-0.31
1960	-0.24
1980	-0.23
1959	-0.21
1956	-0.21
2001	-0.08
1978	-0.05
1989	0.01
1993	0.03
1981	0.05
1952	0.08
1992	0.18
1953	0.20
2003	0.21
1990	0.33



NEARLY NEUTRAL ENSO

Percentage of years with above normal precipitation

The World Climate Service



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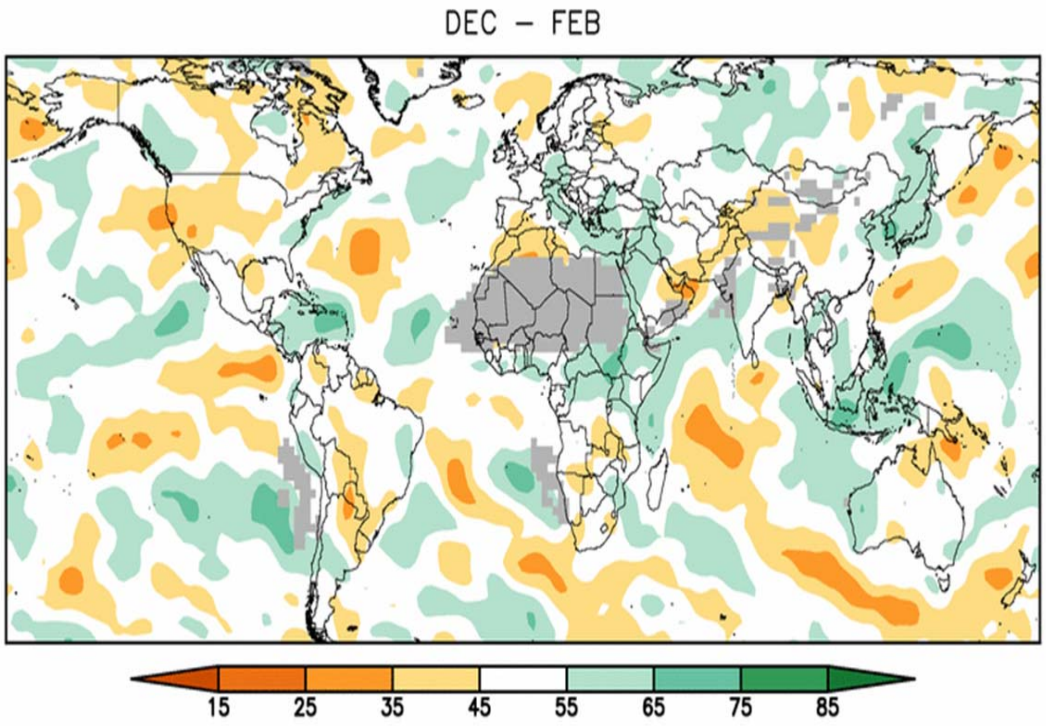

NEARLY NEUTRAL ENSO

Percentage of years with above normal mean sea level pressure (MSLP)

The World Climate Service

ENSO Analogs

Year	DJF value
1985	-0.67
1962	-0.65
1971	-0.64
1974	-0.56
1996	-0.51
1966	-0.37
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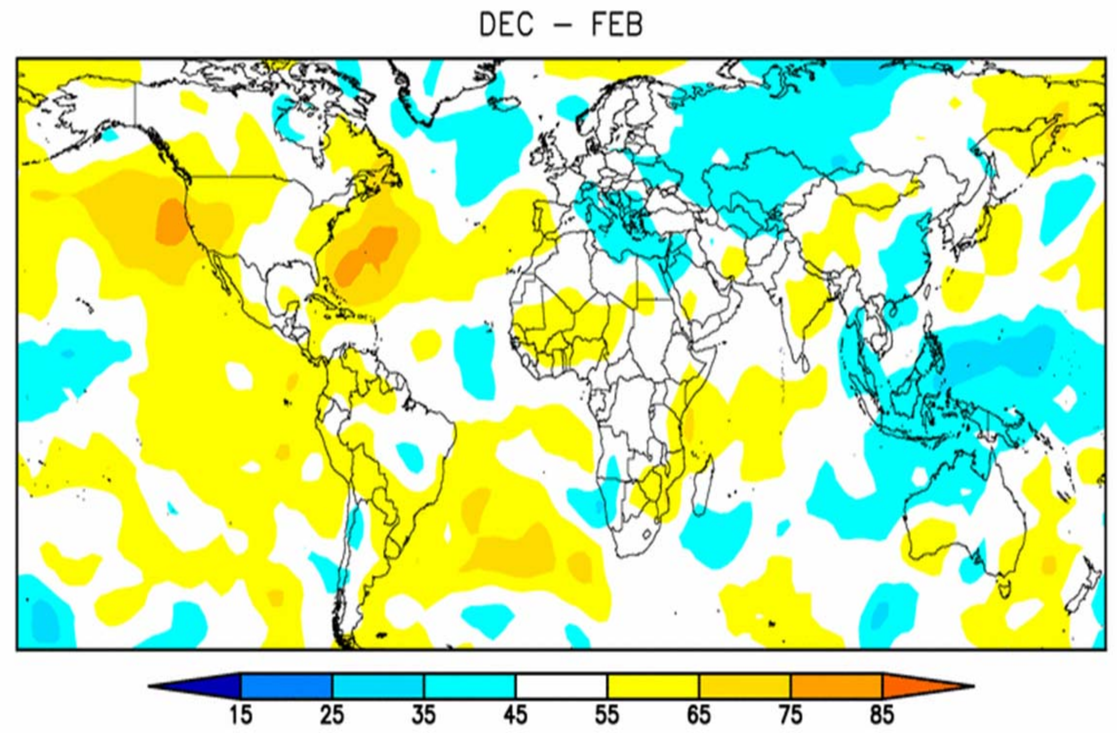
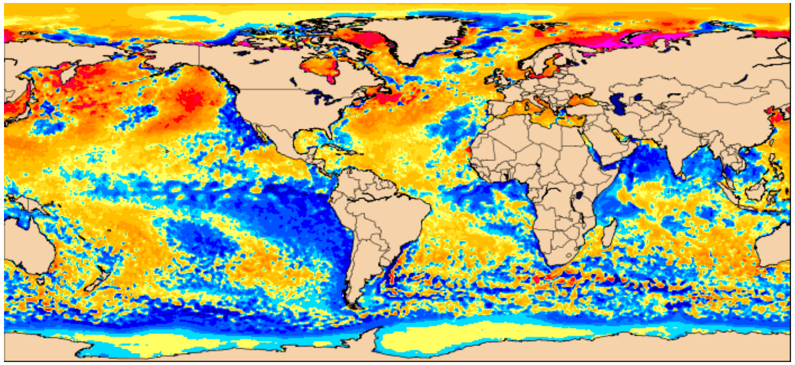


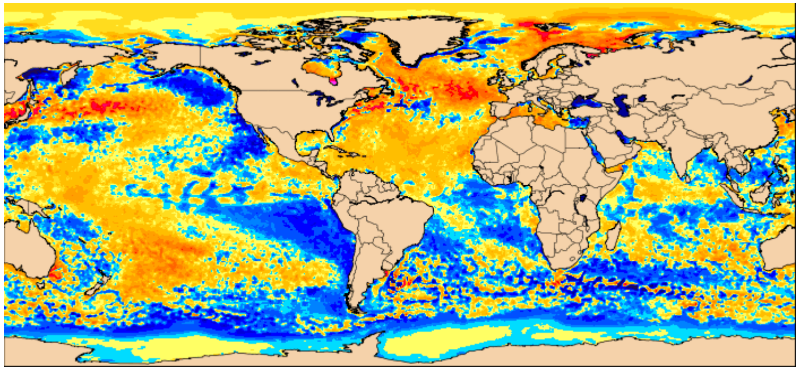
SEA SURFACE TEMPERATURE

WORLD CLIMATE SURVACE. Weekly SST Anomaly History

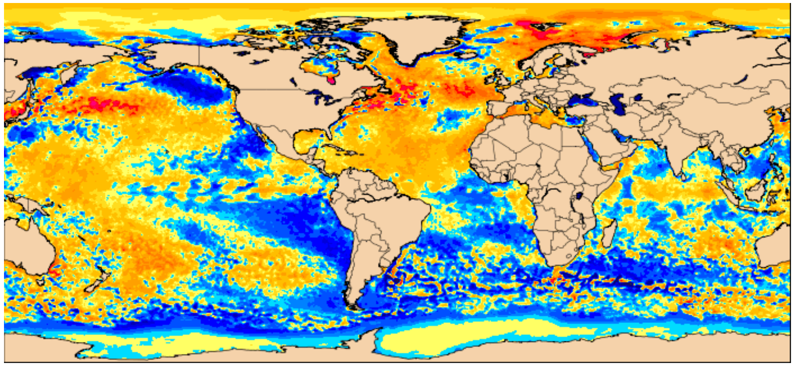
Week Ending 12 August 2013



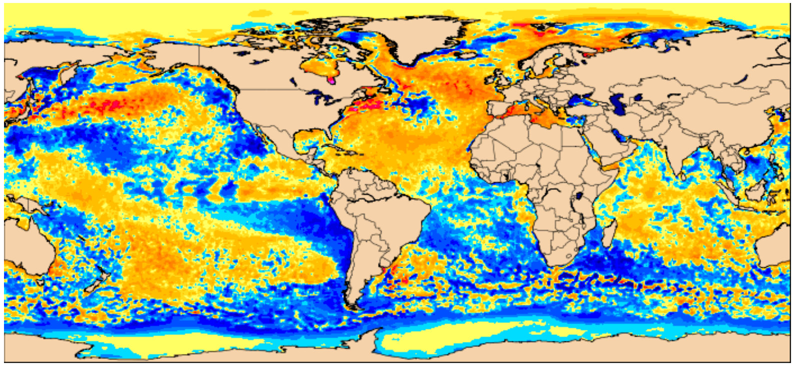
Week Ending 14 October 2013



Week Ending 7 October 2013



Week Ending 21 October 2013



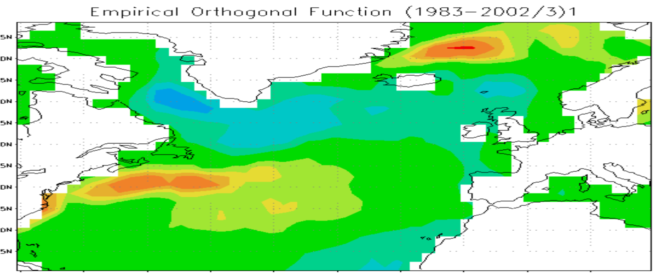
OCEANIC FORECASTS SEA SURFACE TEMPERATURE (SST)

OUTLOOK

In the Indian Ocean: the most significant SST anomalies (mostly positive) are found in the southern hemisphere. Several centers predict negative SST anomalies in the vicinity of the Indian subcontinent in the northern hemisphere. It can cause the winter monsoon weakening.

In the Pacific Ocean: most models indicate possible increased temperature contrasts between the eastern and the central part of the area in the northern hemisphere. It can result in an increase in the degree of meridional atmospheric circulation in the Russian Far East. However , in the west of the equatorial latitudes there is an emergence of positive temperature anomalies that may serve as a precursor of the El Niño phenomenon. Most of the ENSO prediction models indicate a continuation of neutral ENSO through 2013 and the first quarter of 2014. A long-lasting mean disagreement between statistical and dynamical models (statistical leaning cooler, dynamical warmer) has diminished. The average forecast of all models indicates a gradual warming tendency during the first half of 2014. The probabilities for La Nina, neutral and El Nino conditions (using -0.5C and 0.5C thresholds) over the coming DJF season are: 7%, 91% и 2 %.

In the North Atlantic: The tripole is the principal mode of SST variability in the North Atlantic (see picture). According to TCC, it is characterized by positive anomalies in the cold Labrador and Canary currents and the negative anomalies in the central part of the area . This means that the temperature contrasts in the waters of the North Atlantic, situated to the south of 50N will be weakened, and the zonal transport of air mass is less intensive than it is necessary under the climate. Another conclusion follows from the analysis of the CPC forecasts. According to the CPC, there are significant positive SST anomalies in the Gulf Stream and the NEO. In this case, the pattern is reversed. Increasing temperature contrasts can lead to an exacerbation of atmospheric fronts and increased cyclonic activity . The forecasts of the EuroSIP and the IRI indicate the signal associated with the appearance of positive SST anomalies in the NEO, too.



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. They are traced since the end of July and the beginning of August 2013 up to the present time in the actual maps presented by the WCC. Significant positive SST anomalies that persist for a long time (since the summer) may result in a further reduction in the area of ice cover in the Arctic.

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GENERAL CIRCULATION

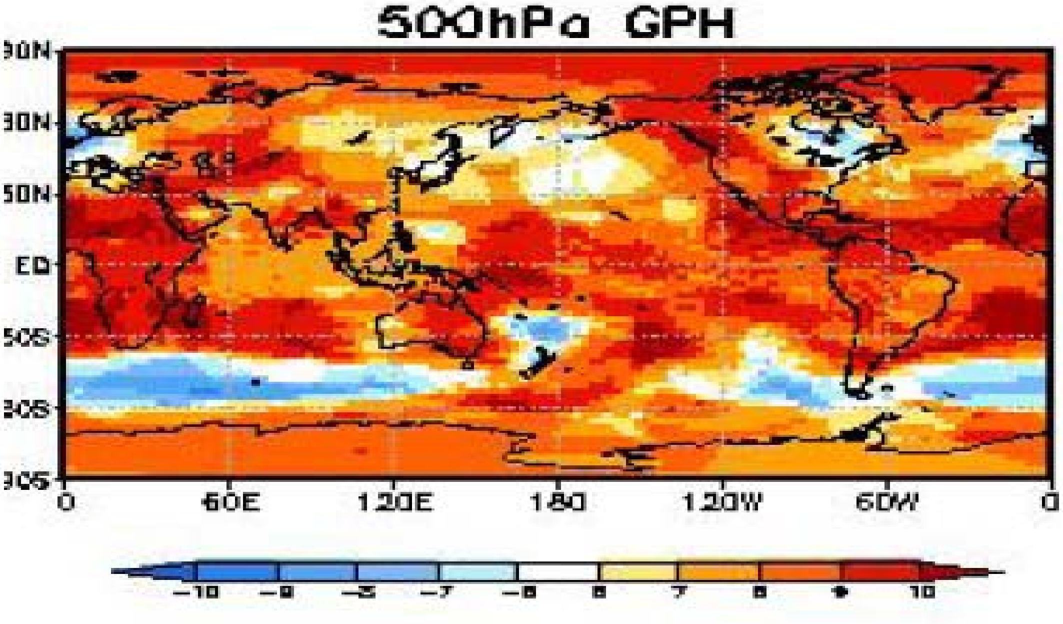
LC MMELRF-WMO Lead Centre for MME LRF

MODELs:

- **GPC_Seoul**
- **Beijing**
- **CPTEC**
- **ECMWF**
- **Melbourne**
- **Montreal**
- **Moscow**
- **Toulouse**
- **Tokyo**
- **Washington**

Consistency map

November 2013 - January 2014



where, the positive numbers mean the number of models, that predict positive anomaly and vice versa.

GENERAL CIRCULATION. 500 HPA HEIGHT ANOMALIES

LC MMELRF-WMO Lead Centre for MME LRF

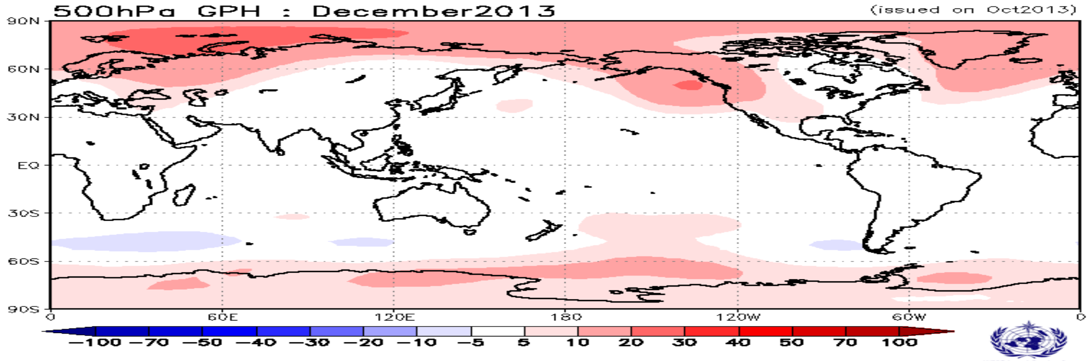
Forecast issued in October 2013

MODELs:

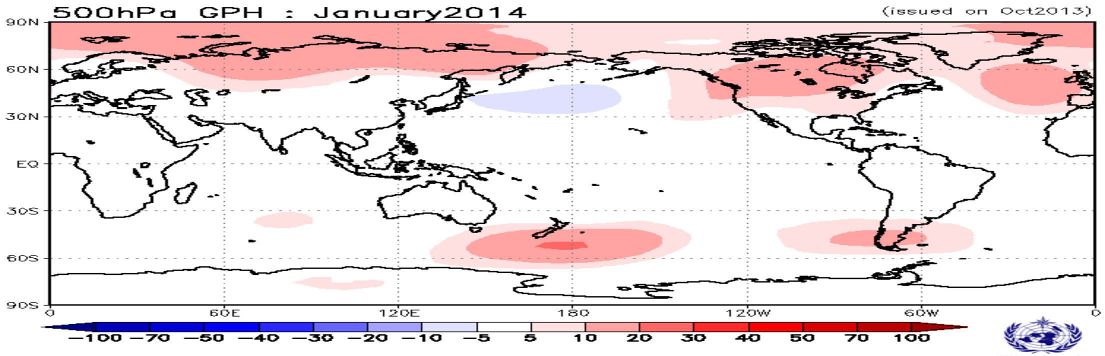
- Beijing
- CPTEC
- ECMWF
- Exeter
- Melbourne
- Montreal
- Moscow
- Pretoria
- Seoul
- Toulouse
- Tokyo
- Washington

Simple composite map

December 2013



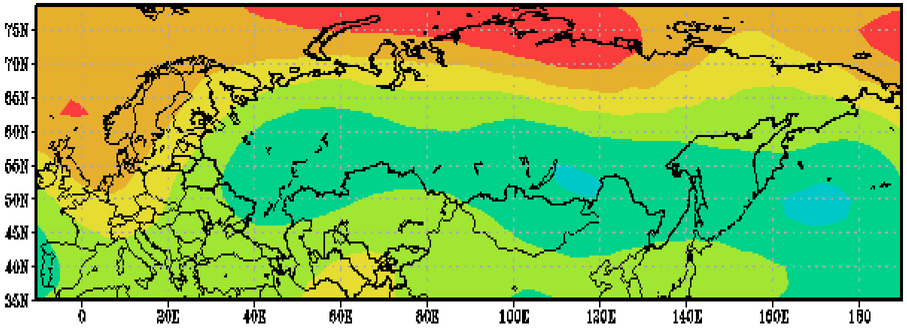
January 2014



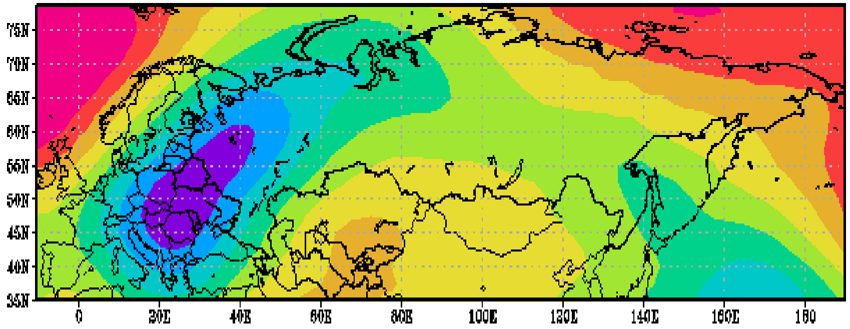
THE GENERAL CIRCULATION. 500 hPa height anomalies

HIDROMETEOROLOGICAL CENTRE OF RUSSIA: SL-AV(HMC)

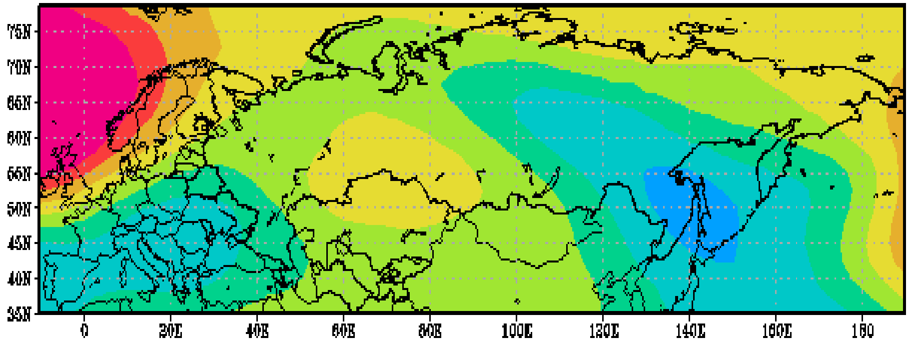
December 2013



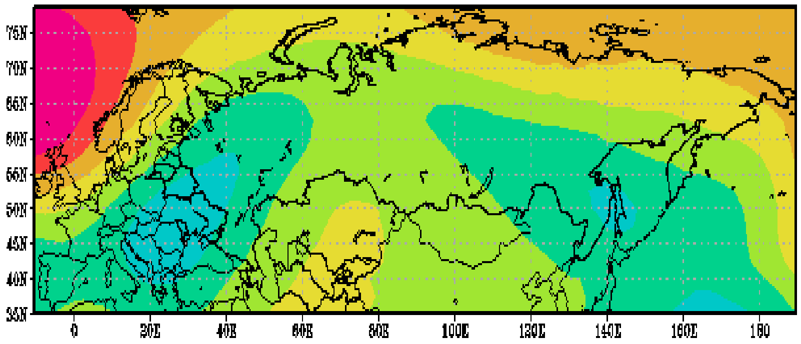
February 2014

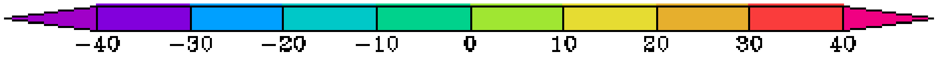


January 2014



December 2013- February 2014



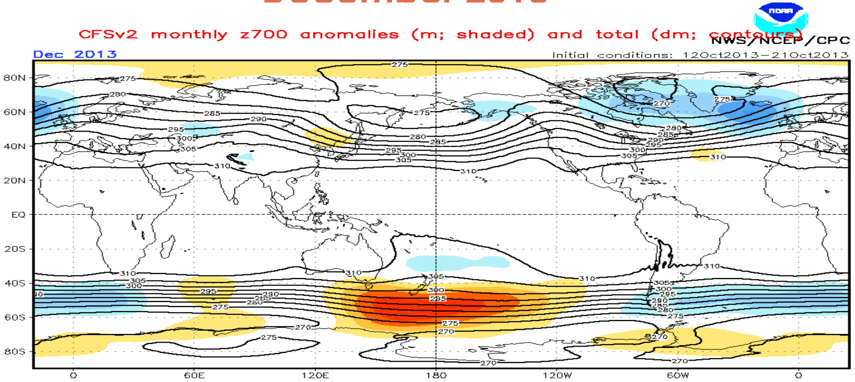


Forecast issued
in October 2013

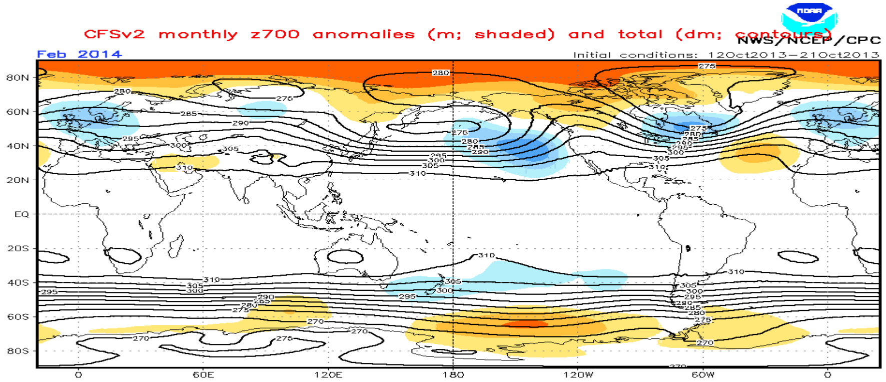
GENERAL CIRCULATION. H700 ANOMALIES

CLIMATE PREDICTION CENTRE
NATIONAL WEATHER SERVICE of USA

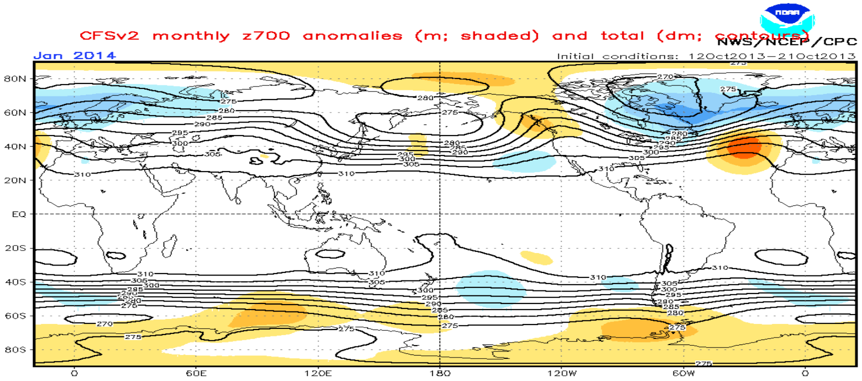
December 2013



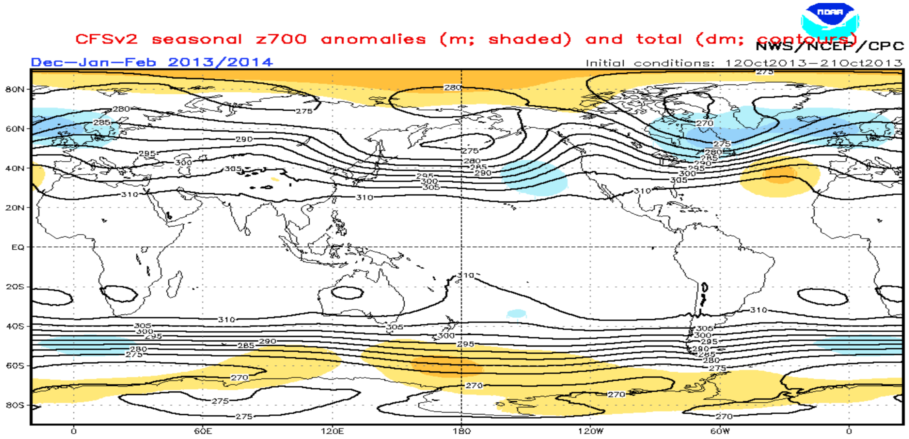
February 2014

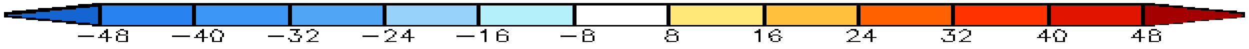


January 2014



December 2013-February 2014





Forecast issued in October 2013

http://www.cpc.ncep.noaa.gov/products/CFSv2/CFSv2seasonal.shtml

GENERAL CIRCULATION

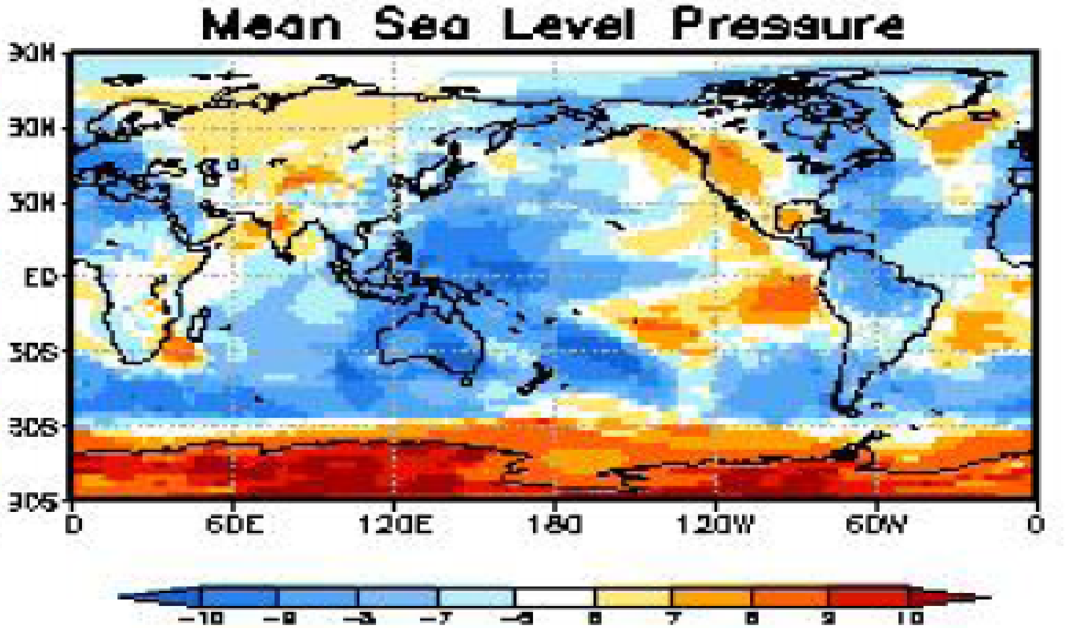
LC MMELRF-WMO Lead Centre for MME LRF

November 2013 – January 2014

MODELs:

- GPC_Seoul
- Beijing
- CPTEC
- ECMWF
- Melbourne
- Montreal
- Moscow
- Toulouse
- Tokyo
- Washington

Consistency map



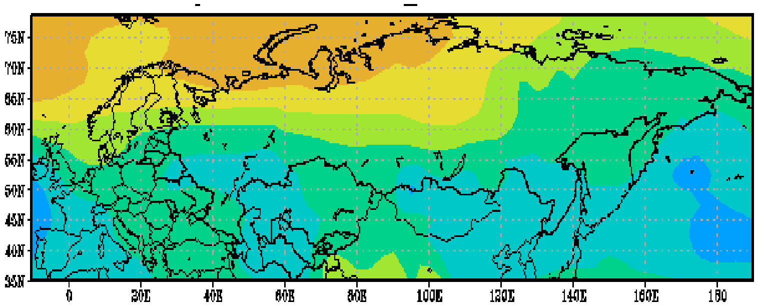
where, the positive numbers mean the number of models, that predict positive anomaly and vice versa.

THE MEAN SEA LEVEL PRESSURE (gPa)

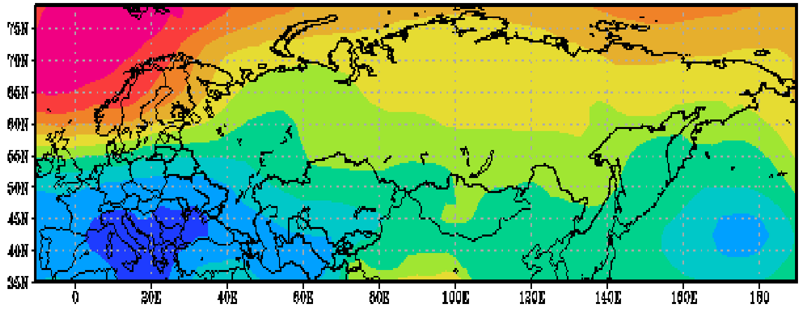
HIDROMETEOROLOGICAL CENTRE OF RUSSIA: SL-AV(HMC)

Forecast issued in October 2013

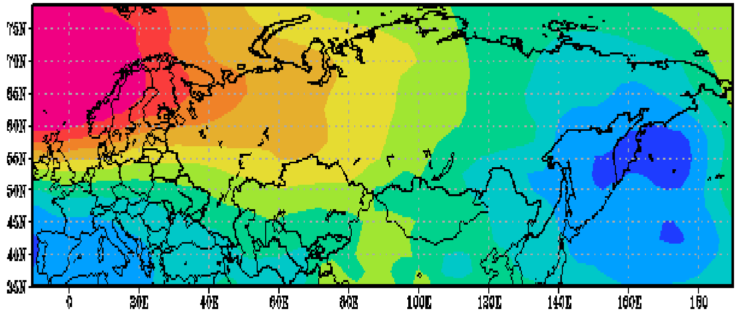
December 2013



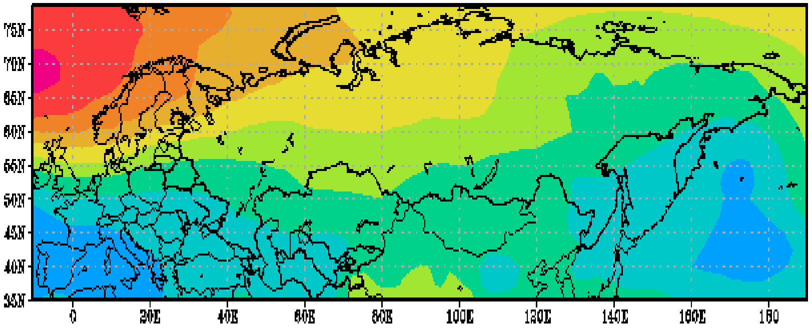
February 2014

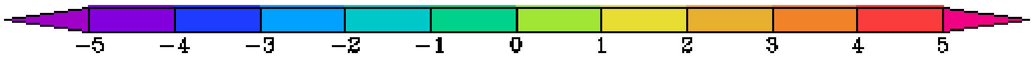


January 2014



December 2013- February 2014

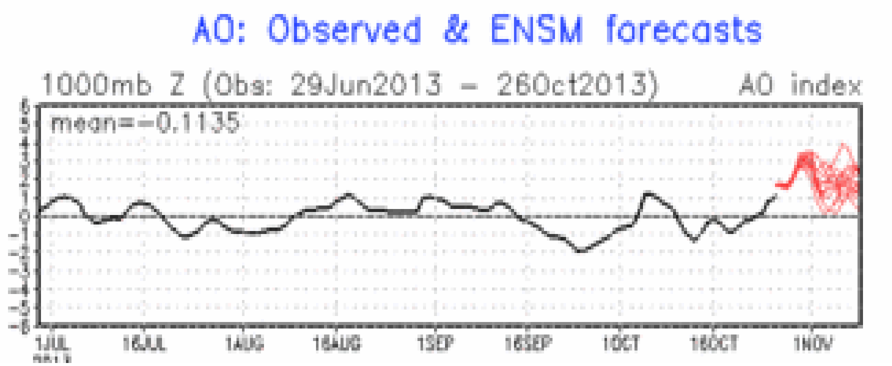




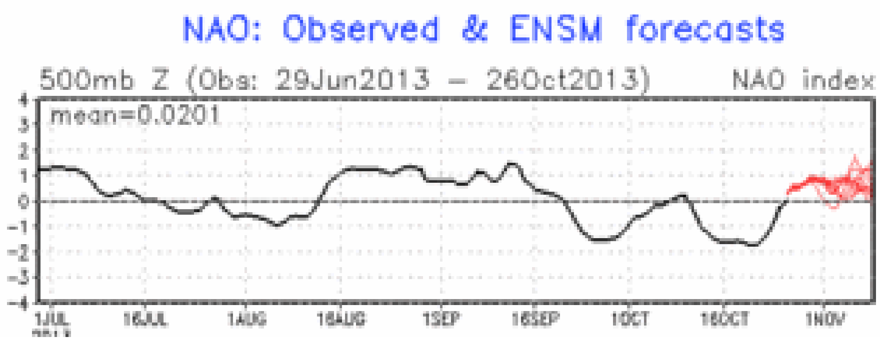
NORTH EURASIA CLIMATE CENTRE

TELECONNECTION INDICES

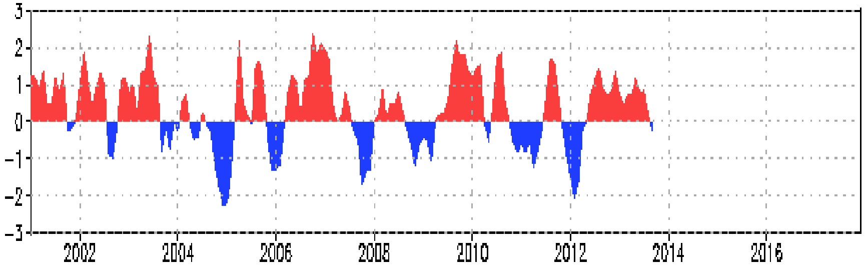
ARCTIC OSCILLATION (AO)



NORTH ATLANTIC OSCILLATION (NAO)

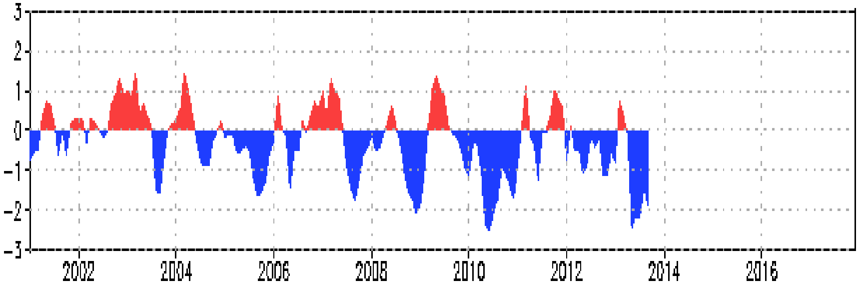


EAST ATLANTIC OSCILLATION (EA)



The standardized 3-month running mean value of the EA index. The departures are standardized using the 1981-2010 base period statistics.

EAST ATLANTIC/WESTERN RUSSIA PATTERN



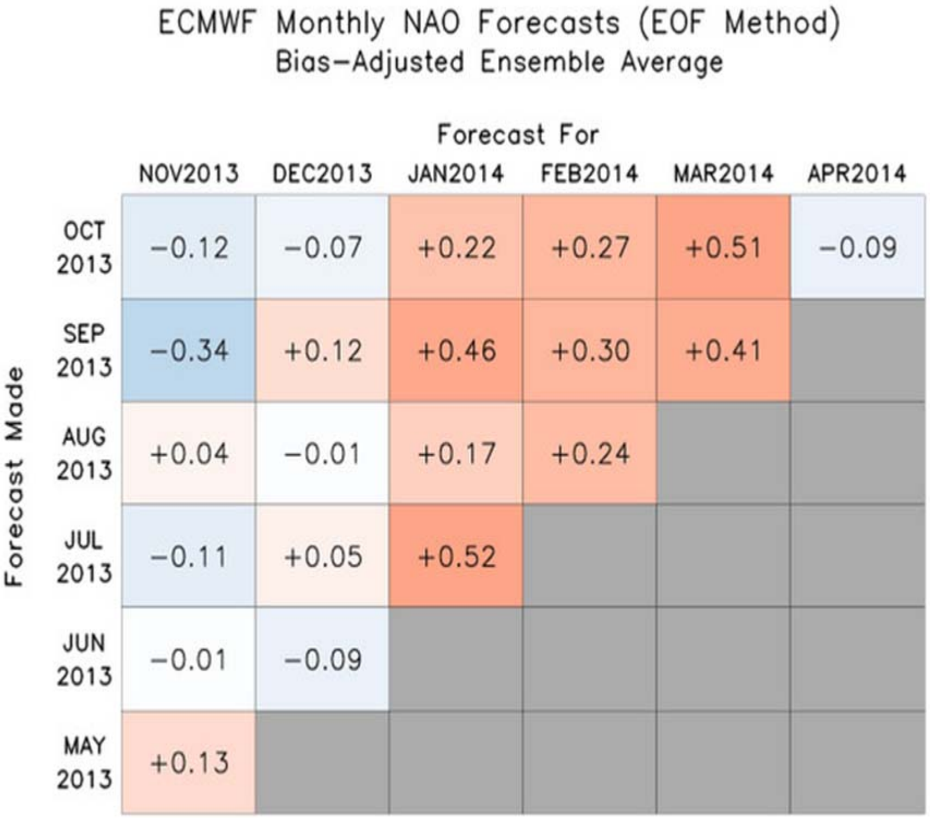
http://www.cpc.ncep.noaa.gov/products/precip/CWlink/daily_ao_index/teleconnections.shtml

V Forum, Moscow, October 2013

NORTH ATLANTIC OCSILLATION FORECASTS

World Climate Service

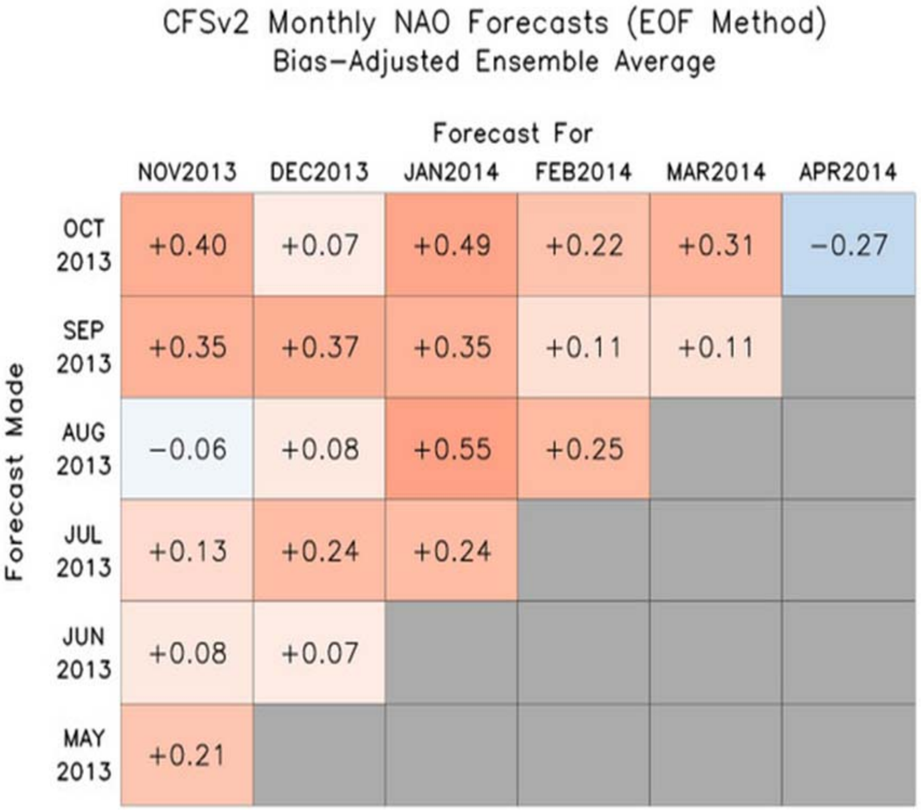
http://www.worldclimateservice.com/



ECMWF Monthly NAO Forecasts (EOF Method)
Bias–Adjusted Ensemble Average

Forecast For

Forecast Made	NOV2013	DEC2013	JAN2014	FEB2014	MAR2014	APR2014
OCT 2013	−0.12	−0.07	+0.22	+0.27	+0.51	−0.09
SEP 2013	−0.34	+0.12	+0.46	+0.30	+0.41	
AUG 2013	+0.04	−0.01	+0.17	+0.24		
JUL 2013	−0.11	+0.05	+0.52			
JUN 2013	−0.01	−0.09				
MAY 2013	+0.13					



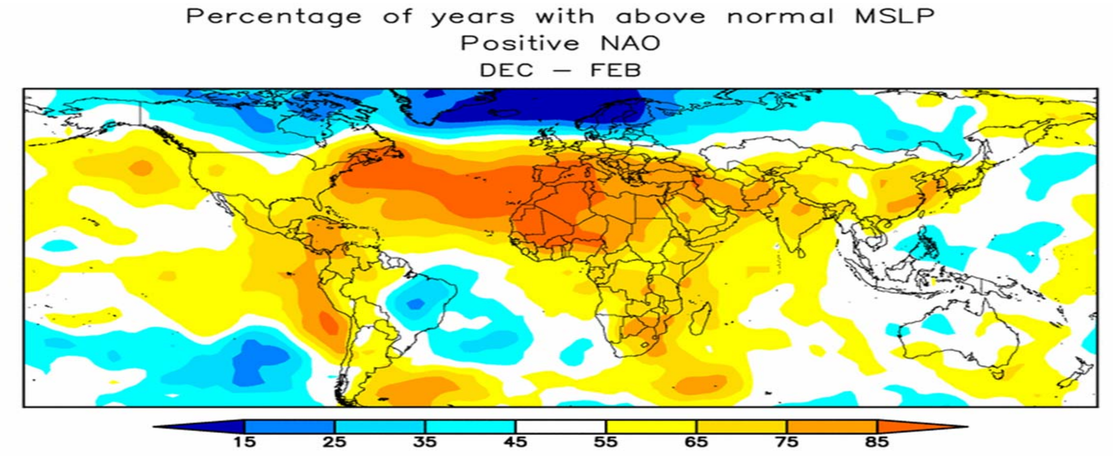
CFSv2 Monthly NAO Forecasts (EOF Method)
Bias–Adjusted Ensemble Average

Forecast For

Forecast Made	NOV2013	DEC2013	JAN2014	FEB2014	MAR2014	APR2014
OCT 2013	+0.40	+0.07	+0.49	+0.22	+0.31	−0.27
SEP 2013	+0.35	+0.37	+0.35	+0.11	+0.11	
AUG 2013	−0.06	+0.08	+0.55	+0.25		
JUL 2013	+0.13	+0.24	+0.24			
JUN 2013	+0.08	+0.07				
MAY 2013	+0.21					

NORTH ATLANTIC OSCILLATION

Positive NAO


Percentage of years with above normal MSLP
Positive NAO
DEC — FEB

ANALOGS

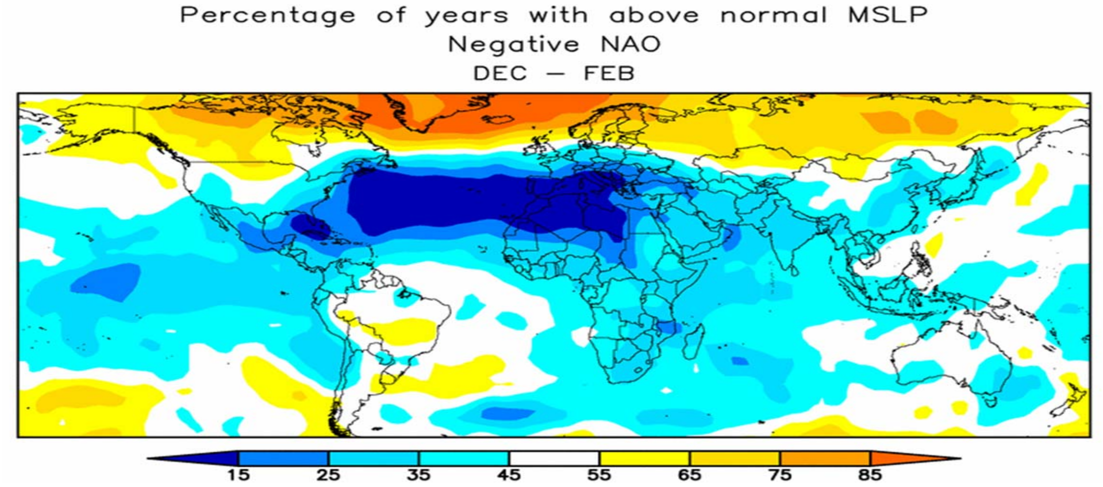
NAO Analogs

Year	DJF value
2011	1.37
1994	1.36
1999	1.30
1988	1.26
1993	1.02
1982	0.95
2004	0.89
1983	0.89
1992	0.86
1990	0.71
1987	0.70
1980	0.69
2007	0.65
1998	0.64
1973	0.51
1974	0.49
1951	0.47
1991	0.47
1989	0.43
1956	0.42

NAO Analogs

Year	DJF value
2009	-1.67
1962	-1.47
1963	-1.43
1968	-1.26
1978	-1.21
1976	-1.04
1959	-0.91
1977	-0.85
1954	-0.76
1984	-0.70
1970	-0.70
2010	-0.68
1995	-0.62
1964	-0.61
1965	-0.59
1967	-0.54
1957	-0.49
1955	-0.39
1969	-0.38
1986	-0.30

ANALOGS

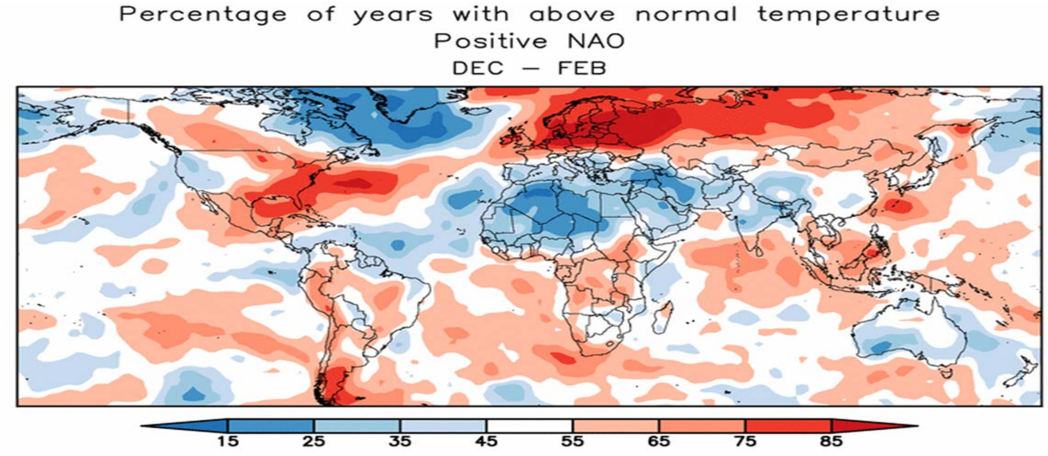

Percentage of years with above normal MSLP
Negative NAO
DEC — FEB

Negative NAO

http://www.worldclimateservice.com/

NORTH ATLANTIC OSCILLATION

Positive NAO



Percentage of years with above normal temperature
Positive NAO
DEC – FEB

A N A L O G S

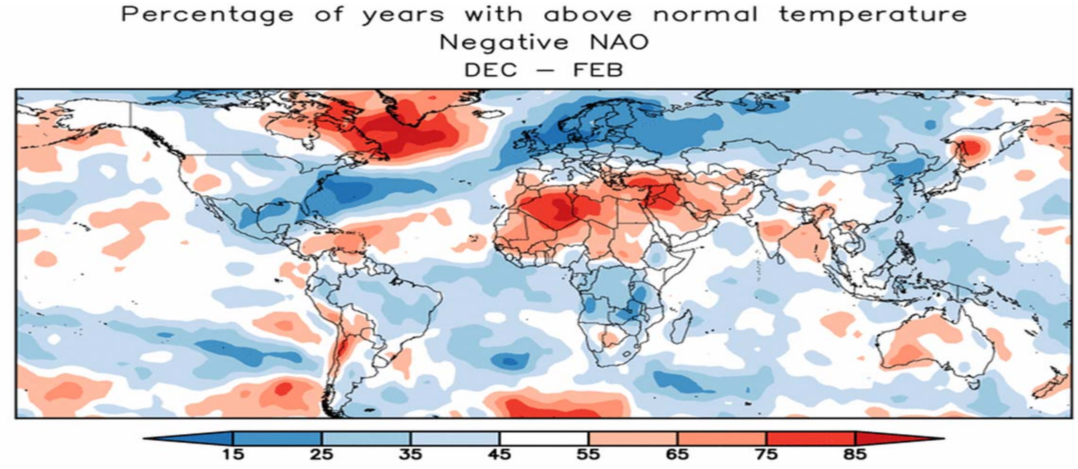
NAO Analogs

Year	DJF value
2011	1.37
1994	1.36
1999	1.30
1988	1.26
1993	1.02
1982	0.95
2004	0.89
1983	0.89
1992	0.86
1990	0.71
1987	0.70
1980	0.69
2007	0.65
1998	0.64
1973	0.51
1974	0.49
1951	0.47
1991	0.47
1989	0.43
1956	0.42

NAO Analogs

Year	DJF value
2009	-1.67
1962	-1.47
1963	-1.43
1968	-1.26
1978	-1.21
1976	-1.04
1959	-0.91
1977	-0.85
1954	-0.76
1984	-0.70
1970	-0.70
2010	-0.68
1995	-0.62
1964	-0.61
1965	-0.59
1967	-0.54
1957	-0.49
1955	-0.39
1969	-0.38
1986	-0.30

A N A L O G S



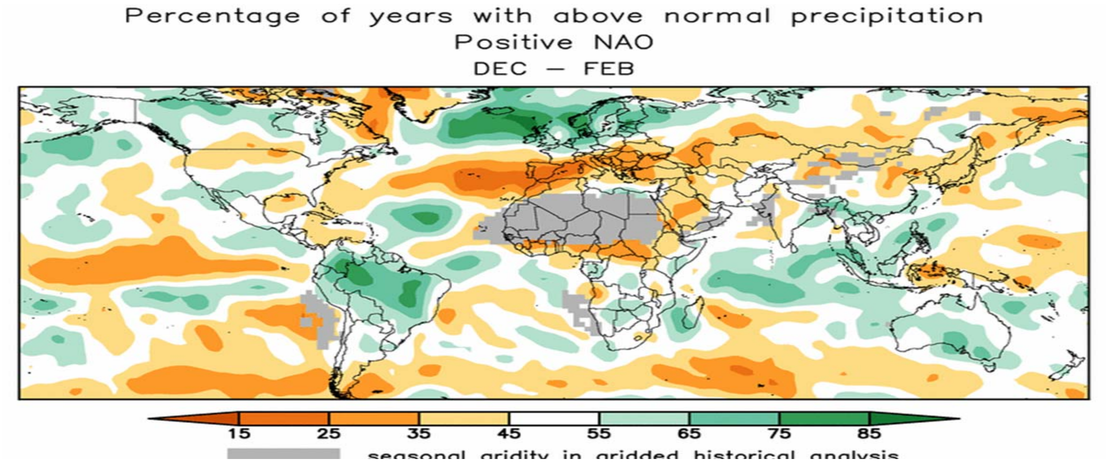
Percentage of years with above normal temperature
Negative NAO
DEC – FEB

Negative NAO

http://www.worldclimateservice.com/

NORTH ATLANTIC OSCILLATION

Positive NAO



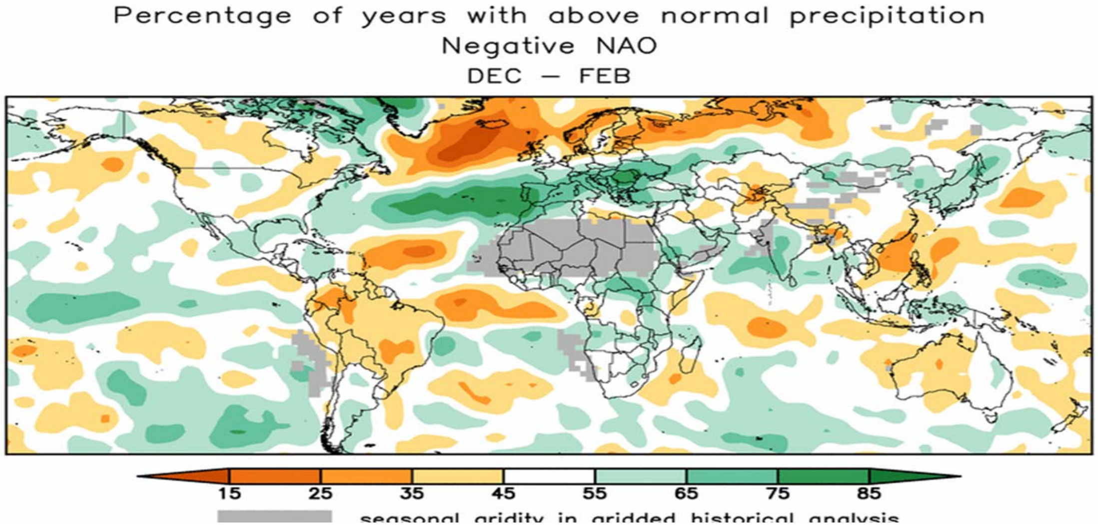
Percentage of years with above normal precipitation
Positive NAO
DEC – FEB

ANALOGS

NAO Analogs

Year	DJF value
2011	1.37
1994	1.36
1999	1.30
1988	1.26
1993	1.02
1982	0.95
2004	0.89
1983	0.89
1992	0.86
1990	0.71
1987	0.70
1980	0.69
2007	0.65
1998	0.64
1973	0.51
1974	0.49
1951	0.47
1991	0.47
1989	0.43
1956	0.42

Negative NAO



Percentage of years with above normal precipitation
Negative NAO
DEC – FEB

ANALOGS

NAO Analogs

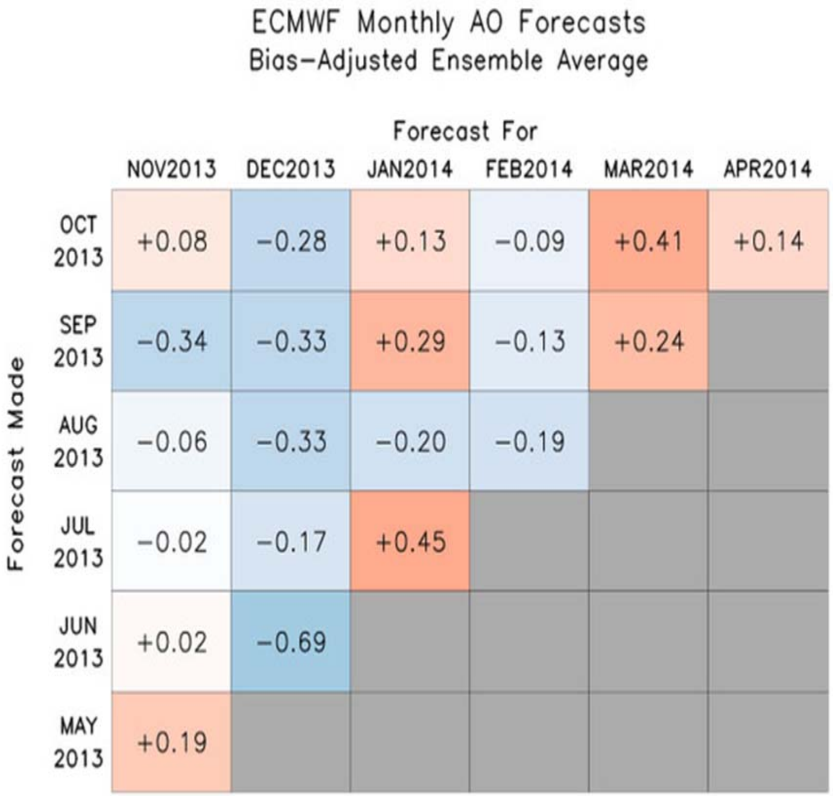
Year	DJF value
2009	-1.67
1962	-1.47
1963	-1.43
1968	-1.26
1978	-1.21
1976	-1.04
1959	-0.91
1977	-0.85
1954	-0.76
1984	-0.70
1970	-0.70
2010	-0.68
1995	-0.62
1964	-0.61
1965	-0.59
1967	-0.54
1957	-0.49
1955	-0.39
1969	-0.38
1986	-0.30

http://www.worldclimateservice.com/

ARCTIC OCSILLATION (AO) FORECASTS

World Climate Service

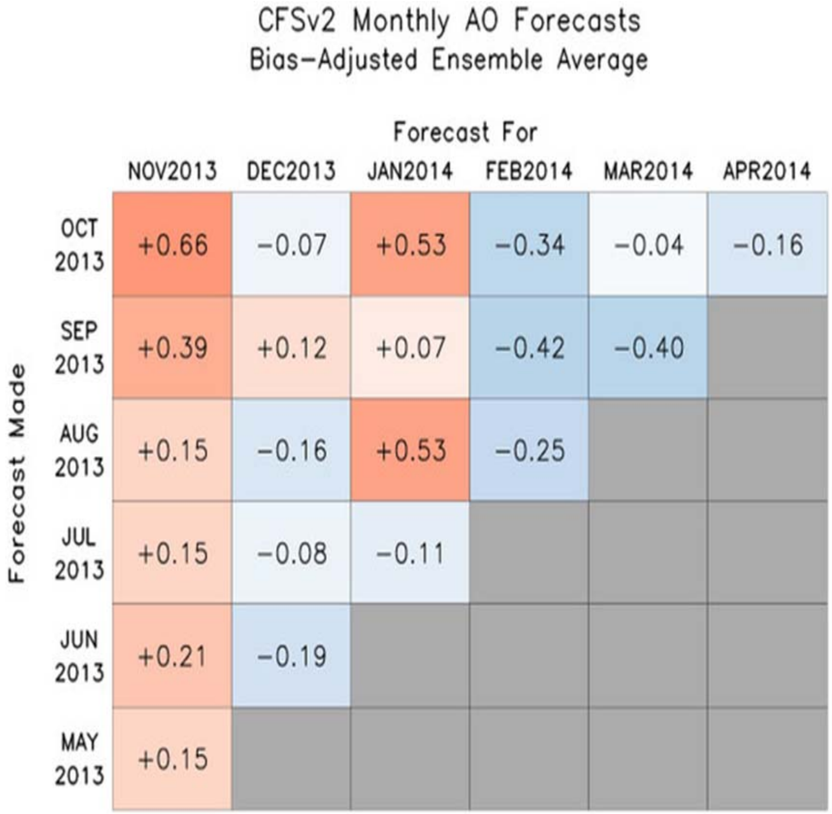
http://www.worldclimateservice.com/



ECMWF Monthly AO Forecasts
Bias–Adjusted Ensemble Average

Forecast Made	NOV2013	DEC2013	JAN2014	FEB2014	MAR2014	APR2014
OCT 2013	+0.08	−0.28	+0.13	−0.09	+0.41	+0.14
SEP 2013	−0.34	−0.33	+0.29	−0.13	+0.24	
AUG 2013	−0.06	−0.33	−0.20	−0.19		
JUL 2013	−0.02	−0.17	+0.45			
JUN 2013	+0.02	−0.69				
MAY 2013	+0.19					

Forecast For



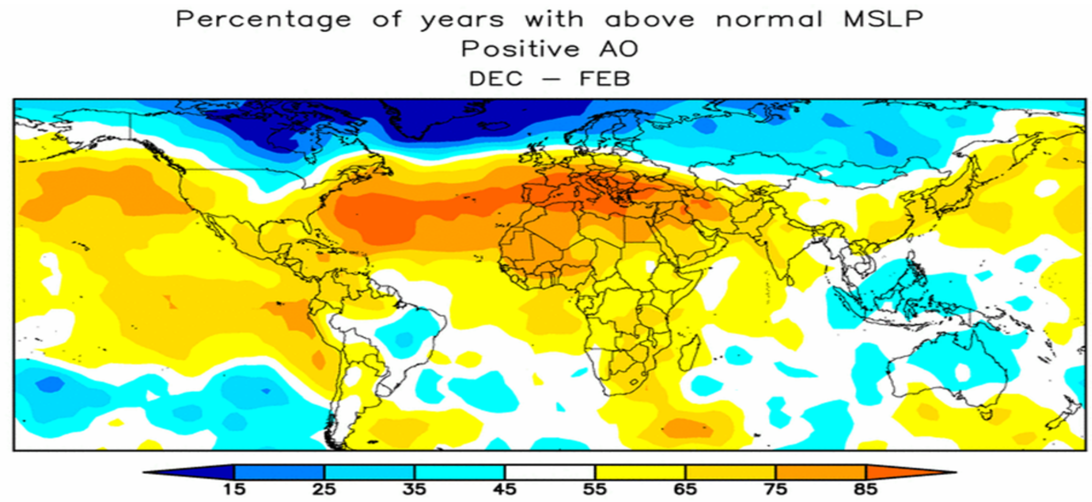
CFSv2 Monthly AO Forecasts
Bias–Adjusted Ensemble Average

Forecast Made	NOV2013	DEC2013	JAN2014	FEB2014	MAR2014	APR2014
OCT 2013	+0.66	−0.07	+0.53	−0.34	−0.04	−0.16
SEP 2013	+0.39	+0.12	+0.07	−0.42	−0.40	
AUG 2013	+0.15	−0.16	+0.53	−0.25		
JUL 2013	+0.15	−0.08	−0.11			
JUN 2013	+0.21	−0.19				
MAY 2013	+0.15					

Forecast For

ARCTIC OSCILLATION

Positive AO


Percentage of years with above normal MSLP
Positive AO
DEC – FEB

ANALOGS

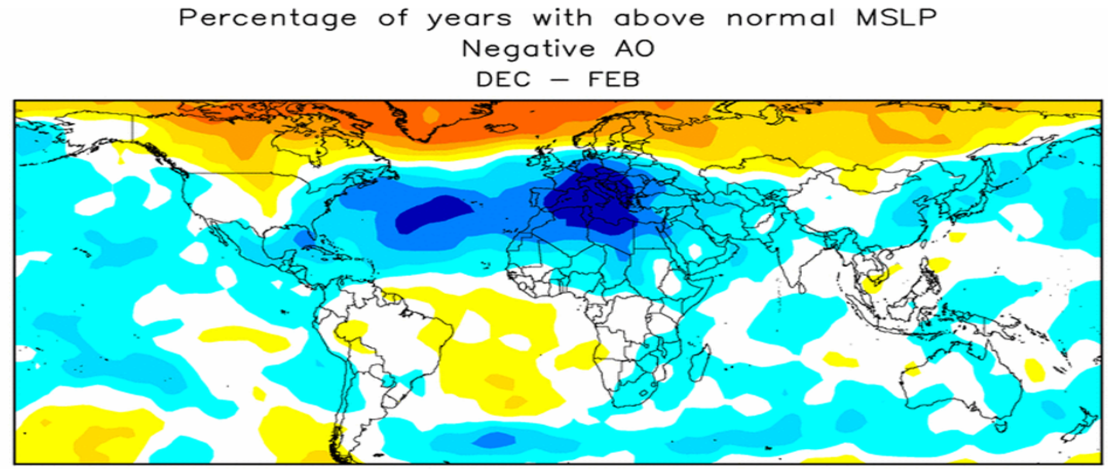
AO Analogs

Year	DJF value
1988	2.69
1992	1.77
1989	1.25
1999	1.13
1991	1.09
1972	1.09
2006	1.00
1975	0.99
2007	0.86
1974	0.78
1994	0.72
2011	0.66
1998	0.65
2001	0.45
1990	0.37
1971	0.27

AO Analogs

Year	DJF value
2009	-3.42
1976	-2.62
1968	-2.29
1962	-1.91
1969	-1.86
1985	-1.81
1959	-1.58
1965	-1.50
2000	-1.31
1978	-1.30
1984	-1.27
1955	-1.23
1977	-1.20
1964	-1.13
2012	-1.12
1995	-1.05
1952	-1.04
2003	-0.98
1967	-0.97
1957	-0.95

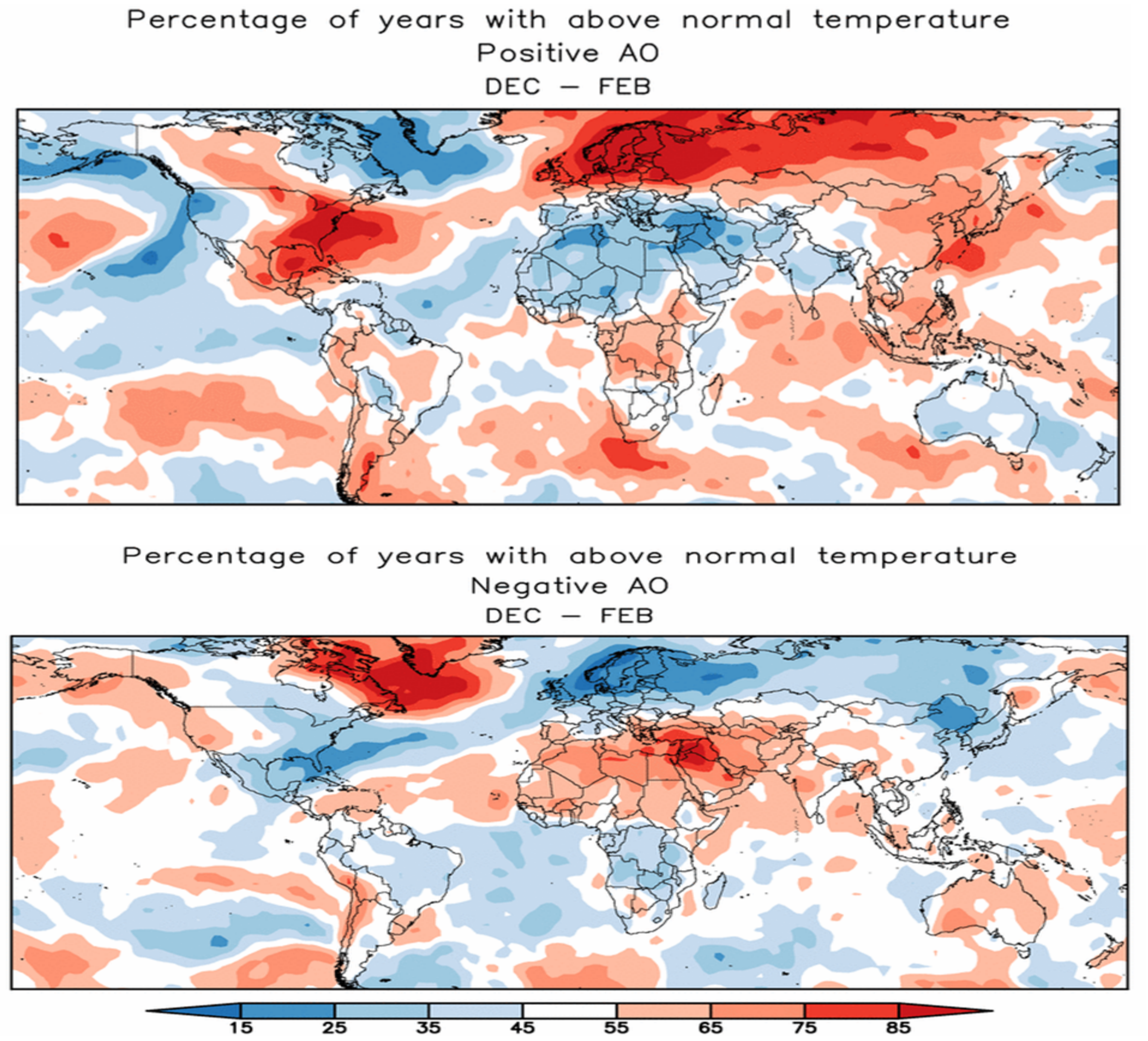
ANALOGS


Percentage of years with above normal MSLP
Negative AO
DEC – FEB

Negative AO

http://www.worldclimateservice.com/

ARCTIC OSCILLATION


Percentage of years with above normal temperature
Positive AO
DEC – FEB

Percentage of years with above normal temperature
Negative AO
DEC – FEB

Positive AO

ANALOGS

AO Analogs

Year	DJF value
1988	2.69
1992	1.77
1989	1.25
1999	1.13
1991	1.09
1972	1.09
2006	1.00
1975	0.99
2007	0.86
1974	0.78
1994	0.72
2011	0.66
1998	0.65
2001	0.45
1990	0.37
1971	0.27

Negative AO

ANALOGS

AO Analogs

Year	DJF value
2009	-3.42
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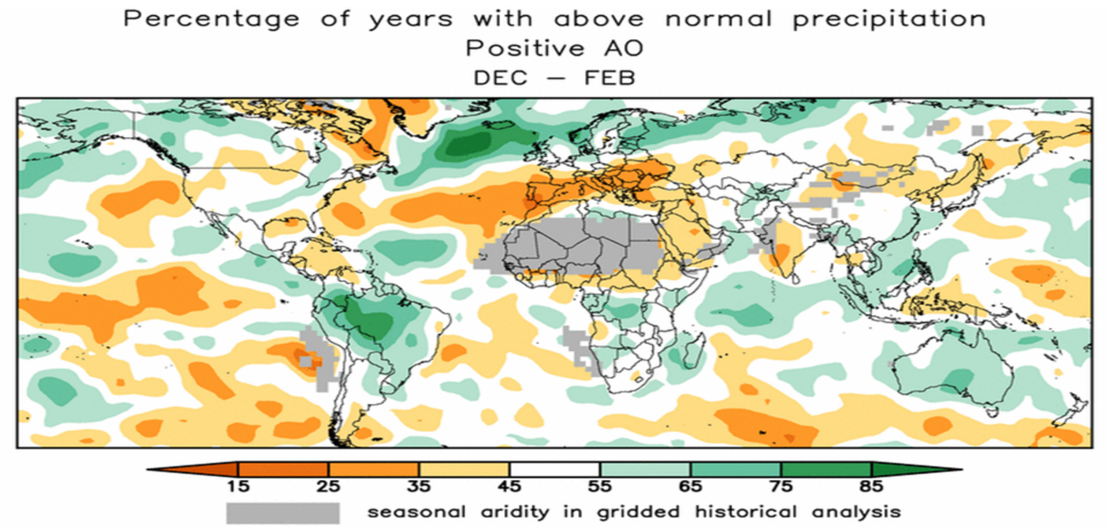
1968	-2.29
1962	-1.91
1969	-1.86
1985	-1.81
1959	-1.58
1965	-1.50
2000	-1.31
1978	-1.30
1984	-1.27
1955	-1.23
1977	-1.20
1964	-1.13
2012	-1.12
1995	-1.05
1952	-1.04
2003	-0.98
1967	-0.97
1957	-0.95

http://www.worldclimateservice.com/

ARCTIC OSCILLATION

Positive AO

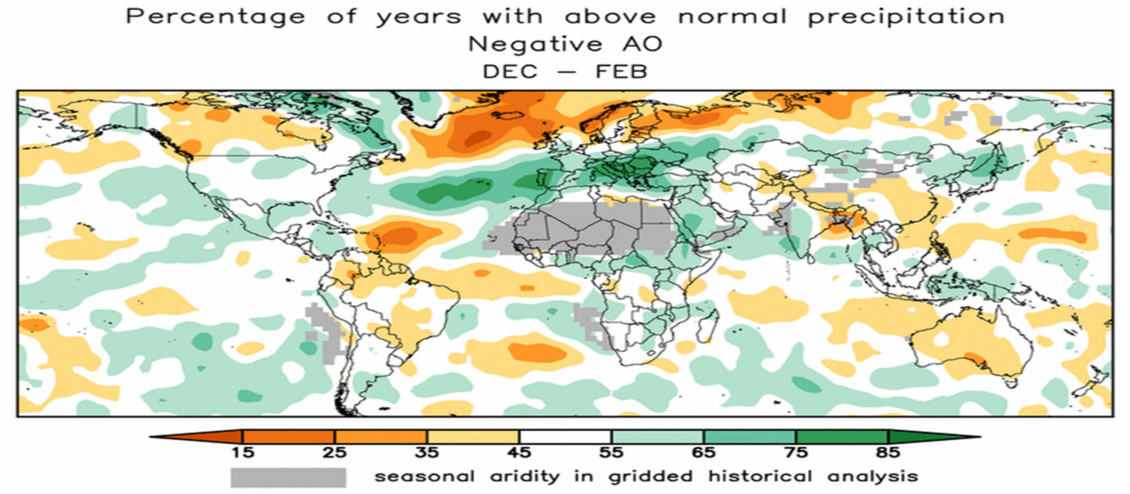

Percentage of years with above normal precipitation
Positive AO
DEC – FEB

ANALOGS

AO Analogs

Year	DJF value
1988	2.69
1992	1.77
1989	1.25
1999	1.13
1991	1.09
1972	1.09
2006	1.00
1975	0.99
2007	0.86
1974	0.78
1994	0.72
2011	0.66
1998	0.65
2001	0.45
1990	0.37
1971	0.27
1983	0.26
2008	0.26
1951	0.20
1956	0.18

Negative AO


Percentage of years with above normal precipitation
Negative AO
DEC – FEB

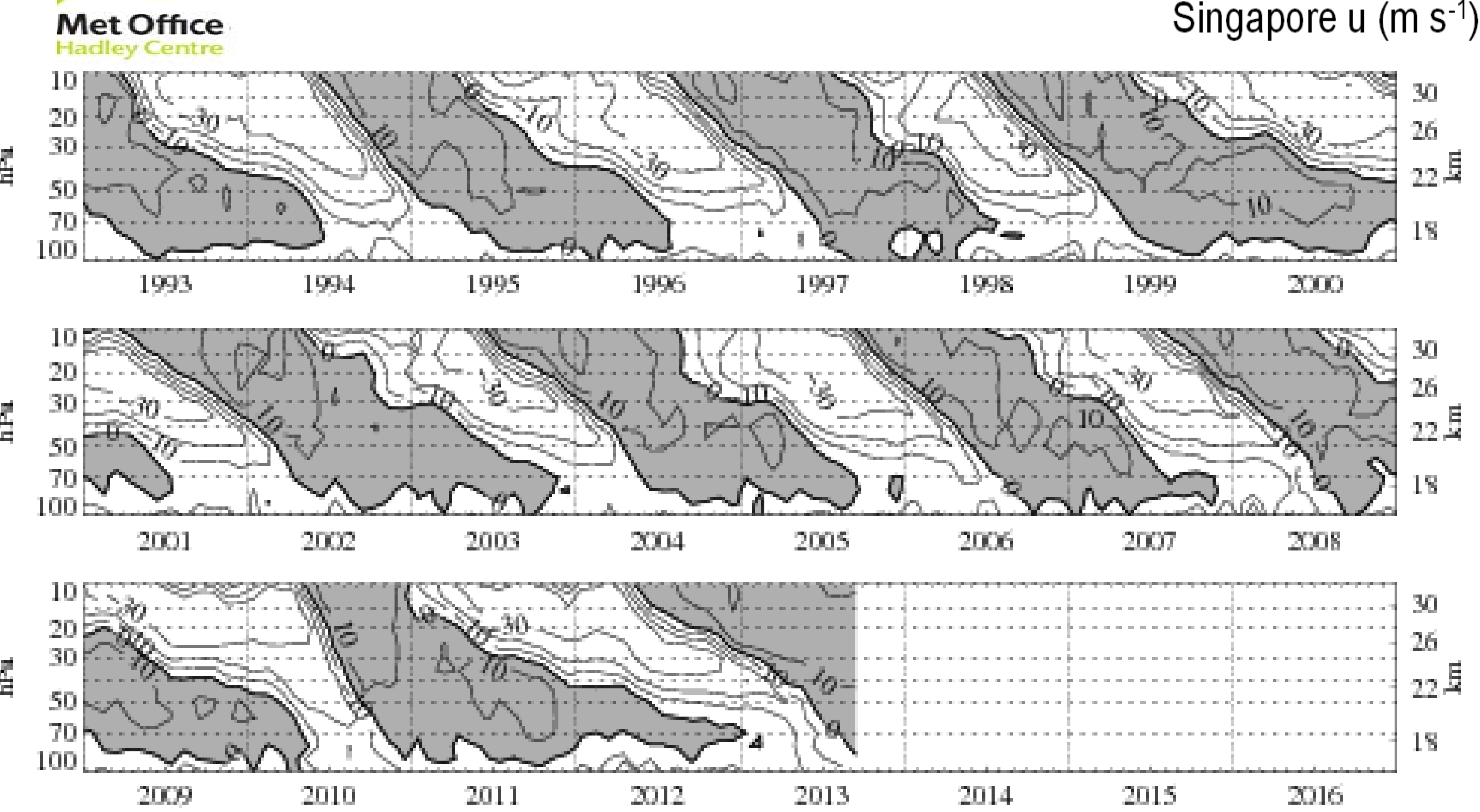
ANALOGS

AO Analogs

Year	DJF value
2009	-3.42
1976	-2.62
1968	-2.29
1962	-1.91
1969	-1.86
1985	-1.81
1959	-1.58
1965	-1.50
2000	-1.31
1978	-1.30
1984	-1.27
1955	-1.23
1977	-1.20
1964	-1.13
2012	-1.12
1995	-1.05
1952	-1.04
2003	-0.98
1967	-0.97
1957	-0.95

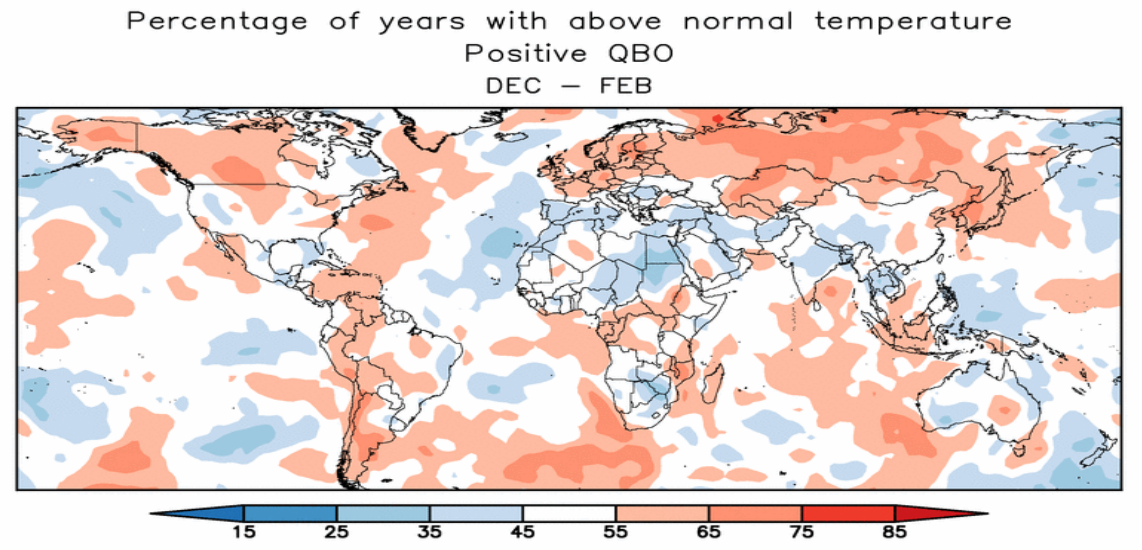
http://www.worldclimateservice.com/

STRATOSPHERE - QBO



STRATOSPHERE - QBO

Positive AO



ANALOGS

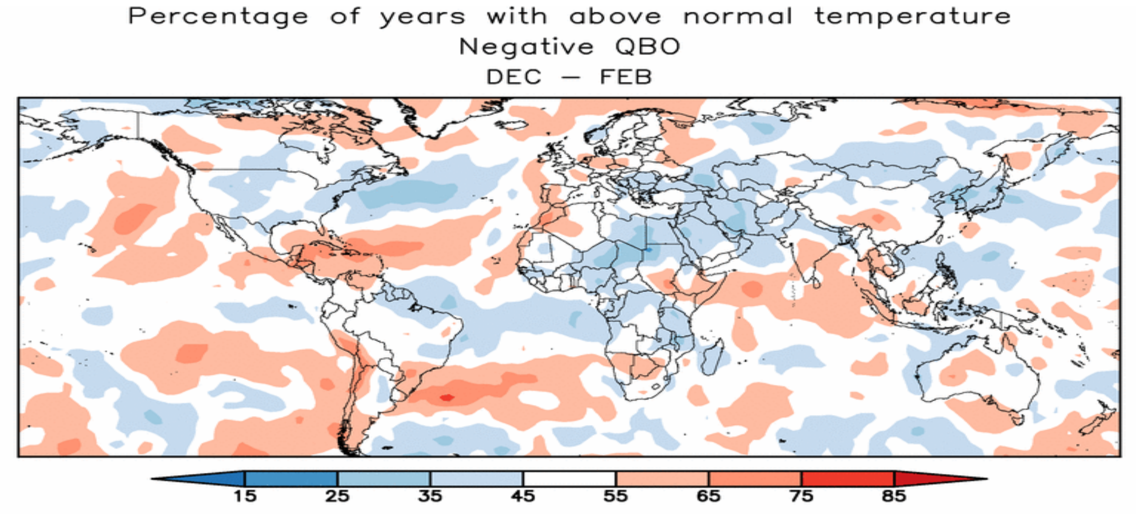
QBO Analogs

Year	DJF value
1966	11.59
2008	11.17
1982	10.87
2010	10.07
1975	9.70
1992	9.54
1985	9.47
1990	9.28
1971	8.42
1980	8.32
1987	7.46
1994	7.44
1957	5.57
1959	5.49
1999	5.16
1963	4.89
2001	4.71
1961	4.26
2006	3.75
1977	3.66

QBO Analogs

Year	DJF value
1965	-20.10
1958	-18.75
2005	-18.37
1974	-18.22
1962	-16.40
2009	-16.19
2011	-15.86
2000	-15.26
1976	-13.73
1991	-13.66
1956	-13.32
1981	-13.18
2007	-12.20
1983	-11.14
1979	-10.92
1986	-10.60
1970	-10.58
1989	-9.66
1967	-8.62
1968	-8.12

ANALOGS

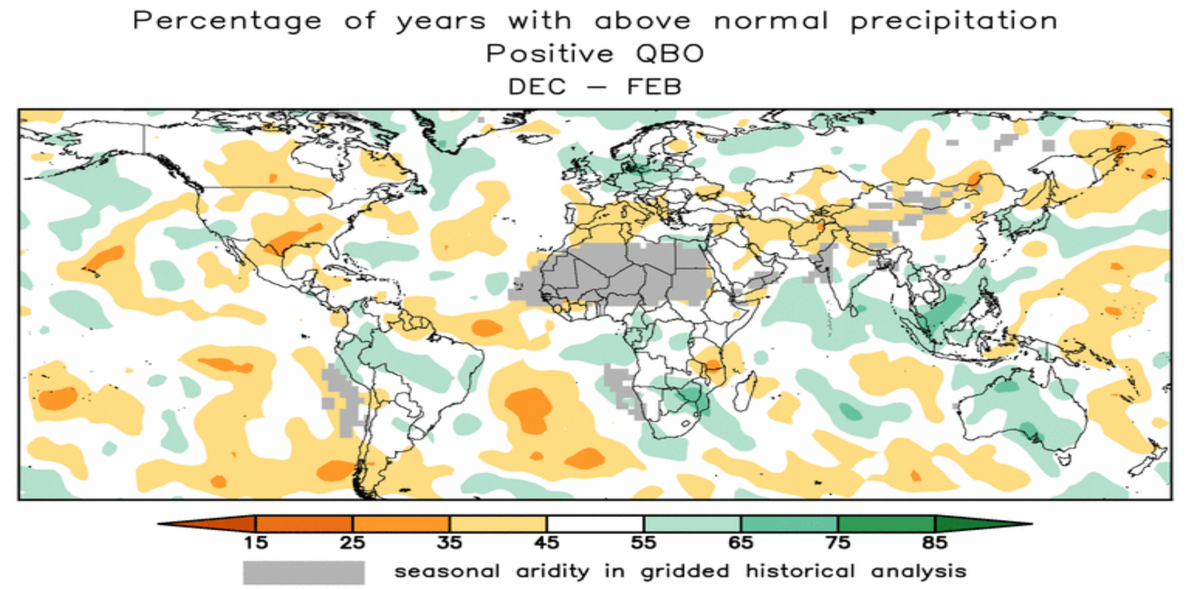


Negative AO

http://www.worldclimateservice.com/

STRATOSPHERE - QBO

Positive AO



A N A L O G S

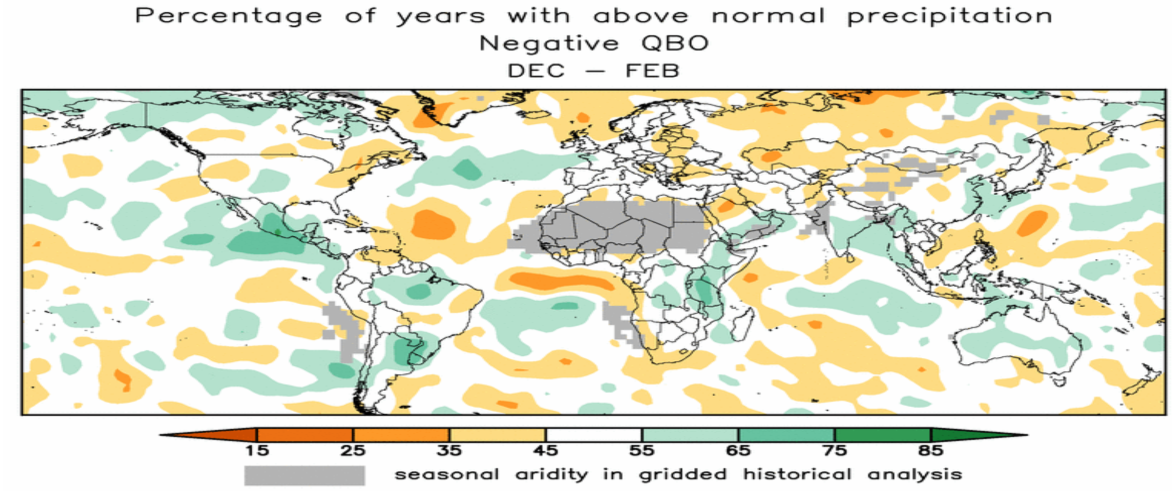
QBO Analogs

Year	DJF value
1966	11.59
2008	11.17
1982	10.87
2010	10.07
1975	9.70
1992	9.54
1985	9.47
1990	9.28
1971	8.42
1980	8.32
1987	7.46
1994	7.44
1957	5.57
1959	5.49
1999	5.16
1963	4.89
2001	4.71
1961	4.26
2006	3.75
1977	3.66

QBO Analogs

Year	DJF value
1965	-20.10
1958	-18.75
2005	-18.37
1974	-18.22
1962	-16.40
2009	-16.19
2011	-15.86
2000	-15.26
1976	-13.73
1991	-13.66
1956	-13.32
1981	-13.18
2007	-12.20
1983	-11.14
1979	-10.92
1986	-10.60
1970	-10.58
1989	-9.66
1967	-8.62
1968	-8.12

A N A L O G S



Negative AO

http://www.worldclimateservice.com/

GENERAL CIRCULATION

OUTLOOK

The atmospheric circulation regimes are the important factors, decided the formation of the fields of temperature and precipitation on seasonal time intervals. The concept of atmospheric regimes (also called weather, planetary and climate regimes) has emerged in dynamical meteorology over recent decades. Atmospheric regimes represent preferred states of atmospheric circulation, for which atmospheric blocking, «teleconnection pattern» (refers to a recurring and persistent, large-scale pattern of pressure and circulation anomalies that spans vast geographical areas) are the good examples. To identify the leading teleconnection patterns in the atmospheric circulation, point correlation, Emperical Orthogonal Function (EOF), the Rotated Principal Component Analysis (RPCA) and etc. , were applied. Despite the variety of approaches, we have similar equivalent barotropic structures in all cases. We use teleconnection indices by Barnston and Livezey (1987, Mon. Wea. Rev., 115, 1083-1126). The information on the teleconnection pattern regularly allocated on the CPC web site. 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 nearly neutral (positive) phase of NAO is predicted by EuroSIP and CPC in December (January and February). These centers predict negative phase of AO index in December and February, and the positive phase of AO index is predicted in January. Thus, AO index changes indicate a possible reorganization of the atmospheric circulation during the winter season in the Far East. The atmospheric circulation is more stable during the winter season in Europe and Siberia.

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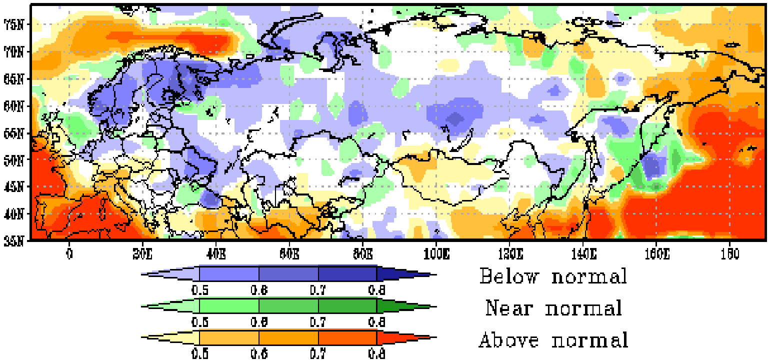
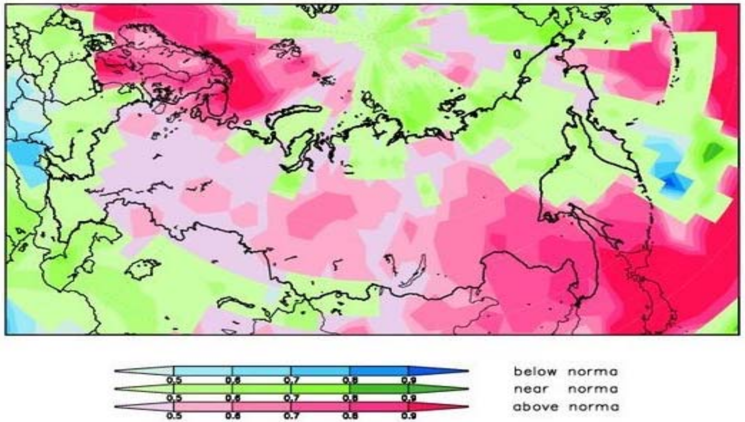
December 2013 – January 2014

Composite probabilities of categorical forecast outcomes for
T2m seasonal anomalies. Producer: HMC
Forecast period: December_January_February_2013

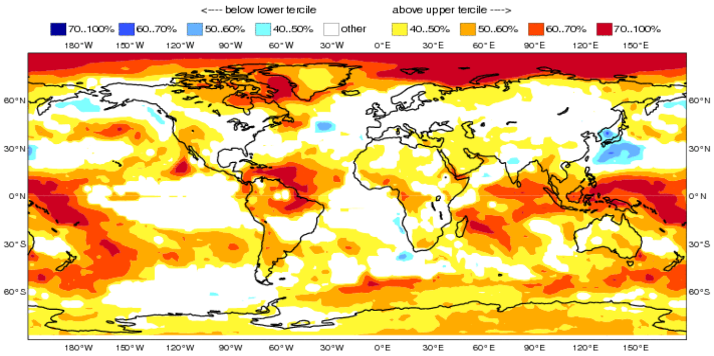


MGO

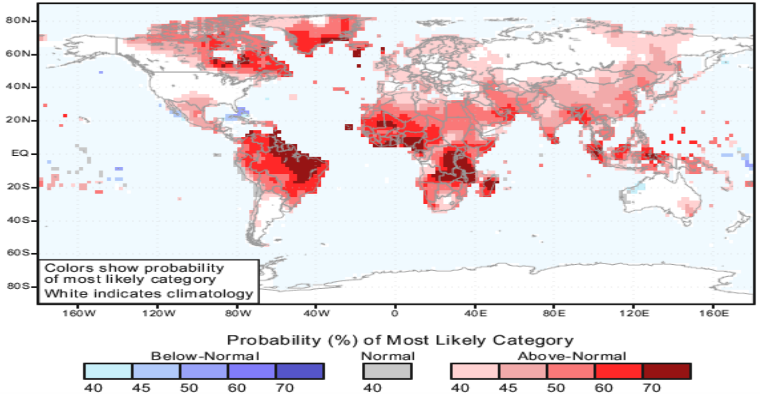


EUROSIP multi-model seasonal forecast
Prob(most likely category of 2m temperature)
Forecast start reference is 01/10/13
Unweighted mean

ECMWF/Met Office/Meteo-France/NCEP
DJF 2013/14



IRI Multi-Model Probability Forecast for Temperature
for December-January-February 2014, Issued October 2013

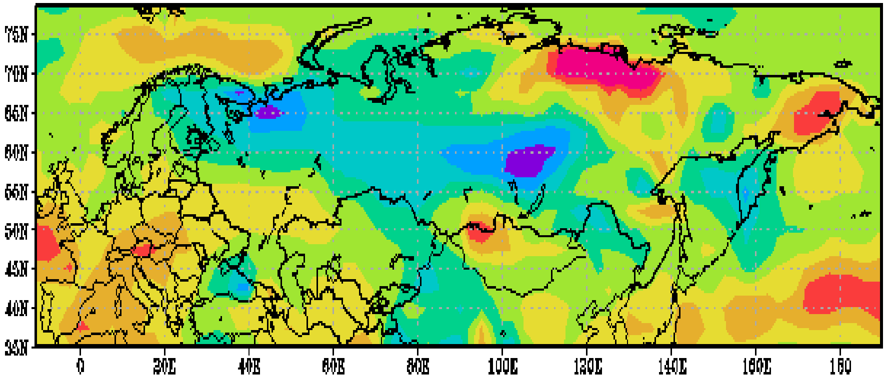


Forecasts issued in October 2013

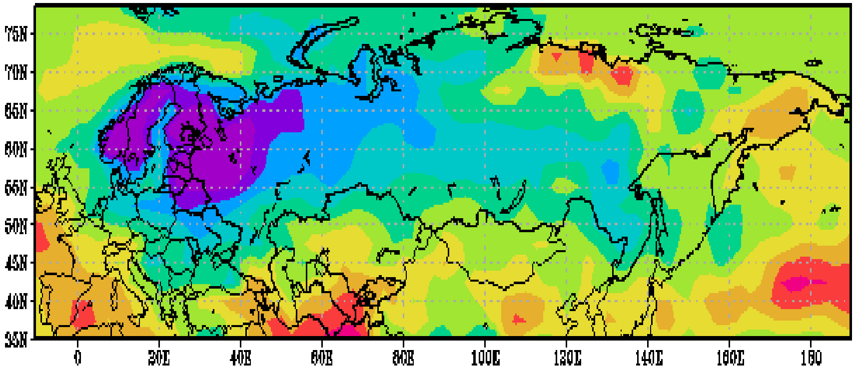
THE DETERMINISTIC FORECASTS OF AIR TEMPERATURE

HIDROMETEOROLOGICAL CENTRE OF RUSSIA: SL-AV(HMC)

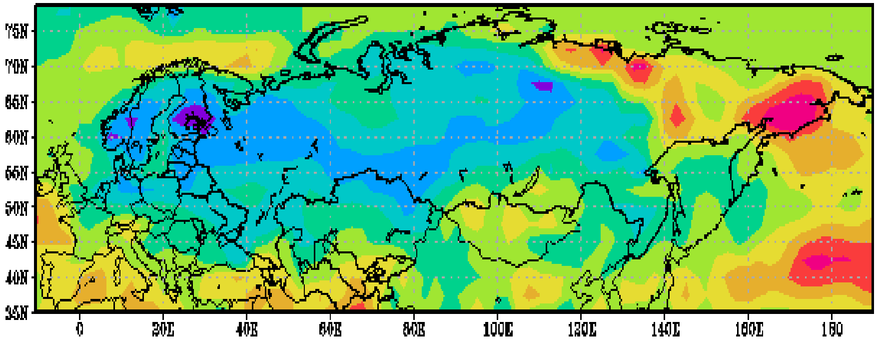
December 2013



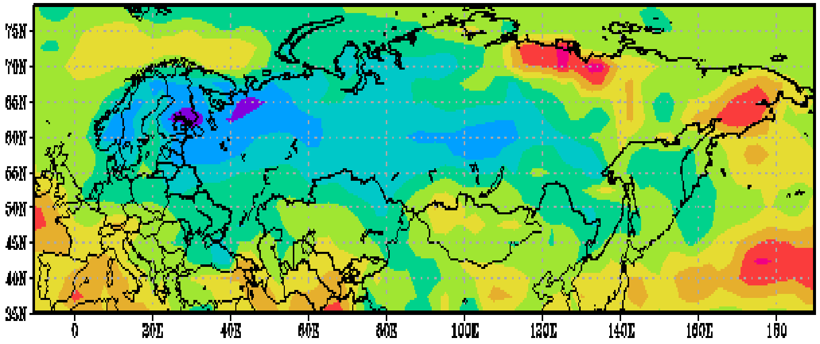
February 2014

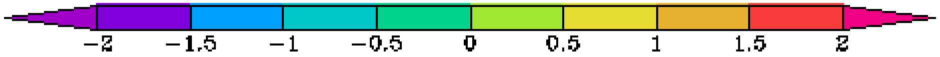


January 2014



December 2013-January 2014



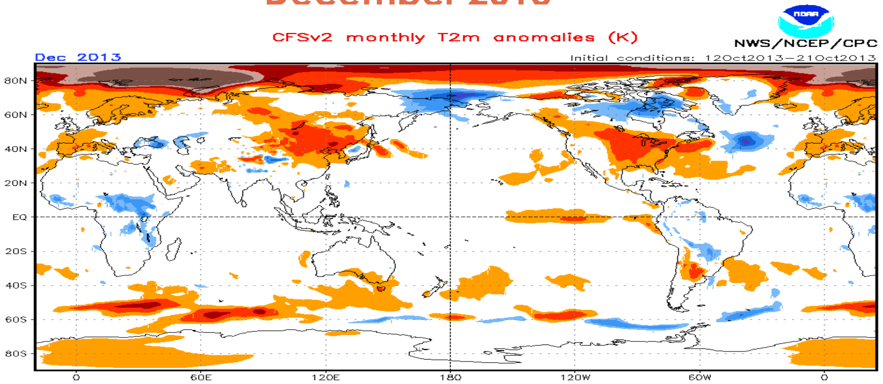


Forecast issued
in October 2013

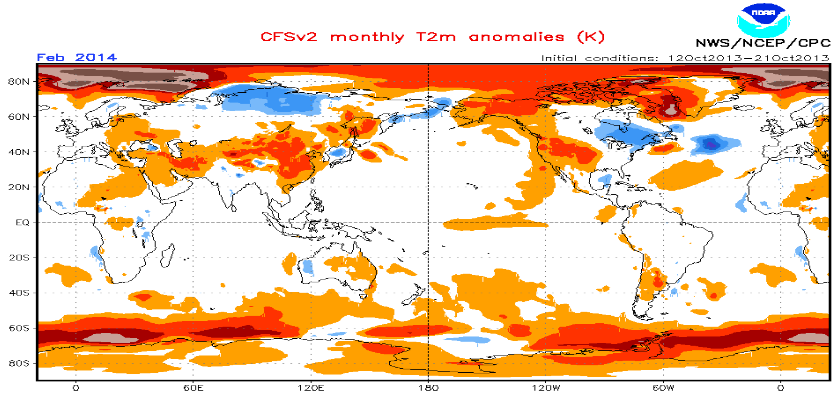
DETERMINISTIC FORECASTS OF AIR TEMPERATURE

CLIMATE PREDICTION CENTRE
NATIONAL WEATHER SERVICE of USA

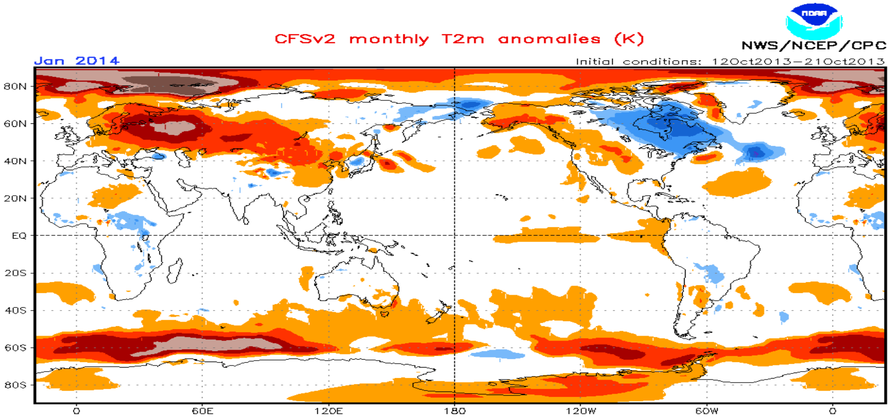
December 2013



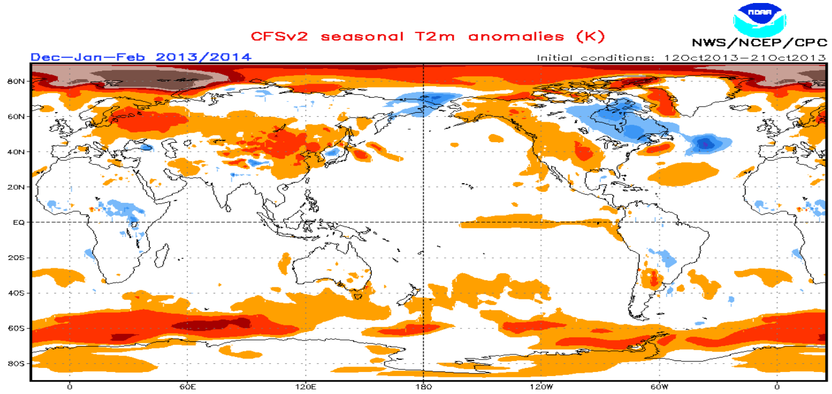
February 2014



Januarv 2014



December 2013-February 2014



−4 −3 −2 −1 −0.5 0.5 1 2 3 4

Forecast issued in
October 2013

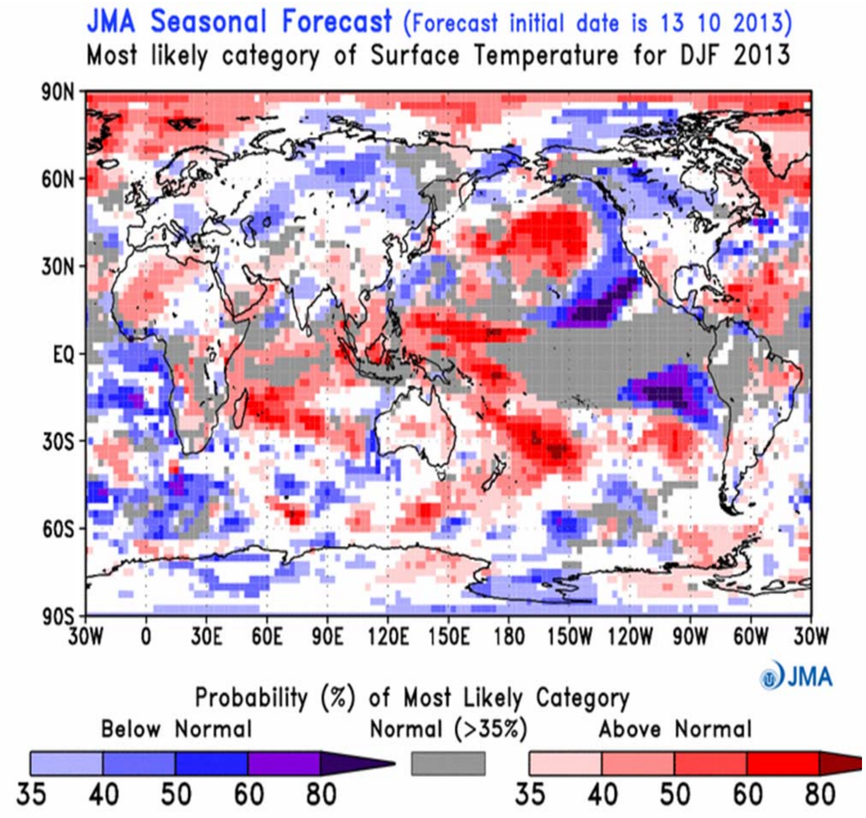
http://www.cpc.ncep.noaa.gov/products/CFSv2/CFSv2seasonal.shtml

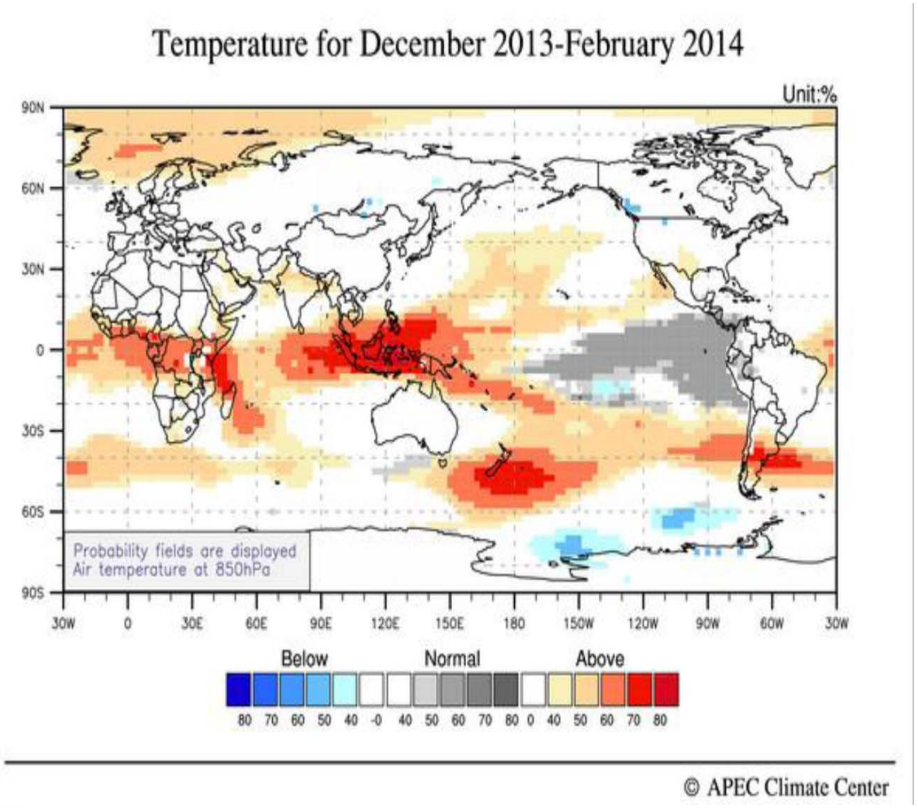
THE PROBABILISTIC FORECASTS OF AIR TEMPERATURE

TOKYO CLIMATE CENTRE

December 2013-February 2014

APCC





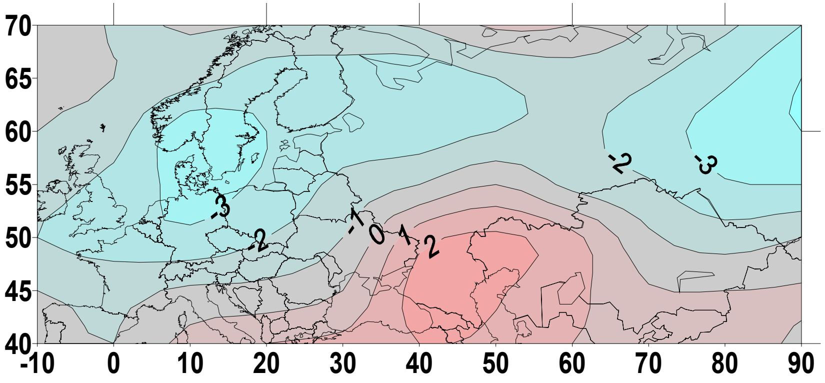
The forecast was performed with initial conditions: 13Oct2013

Forecast issued in August 2013

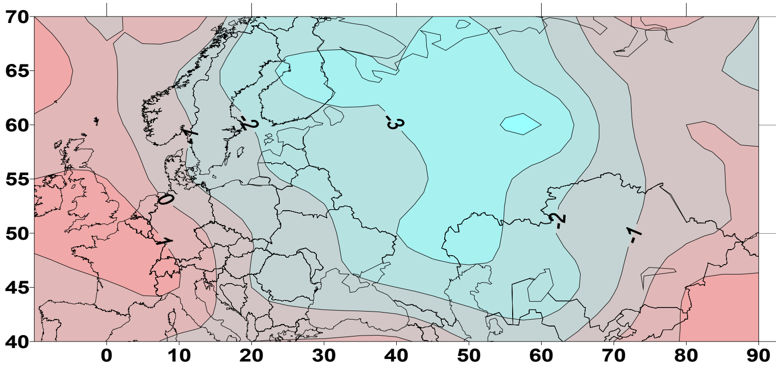
V Forum, Moscow, October 2013

THE DETERMINISTIC FORECASTS OF AIR TEMPERATURE

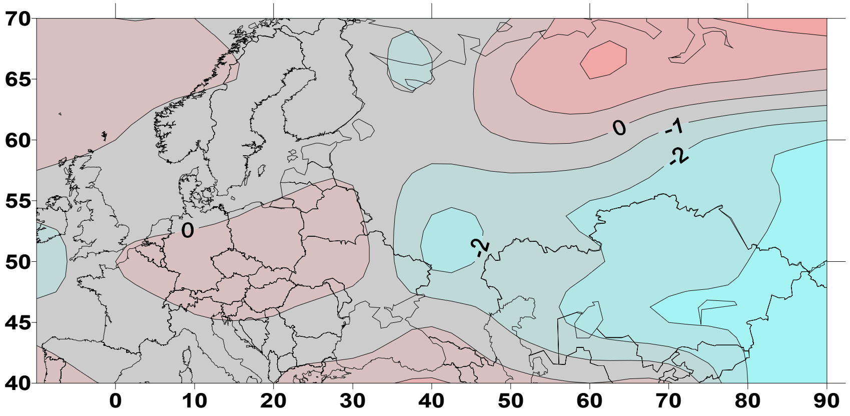
December 2013



February 2014



January 2014



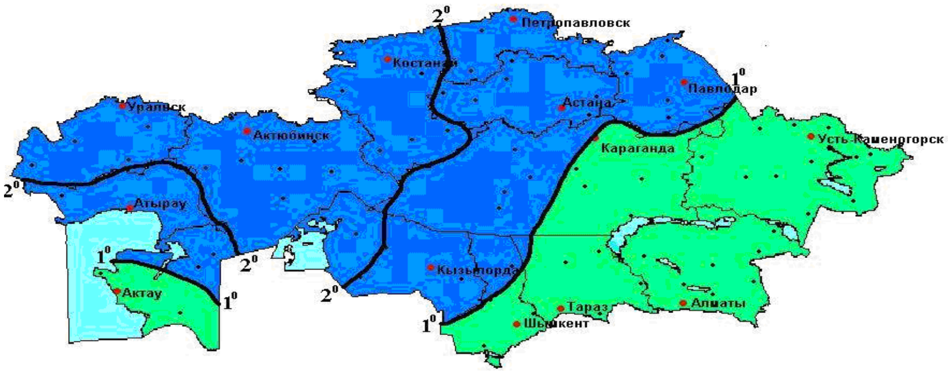
Department of climate research and long-range weather forecast of Ukrainian Hydrometeorological Institute of National Academy of Sciences of Ukraine State Hydrometeorological Service of the Ministry of Ukraine of Emergencies

Forecast issued
in October 2013

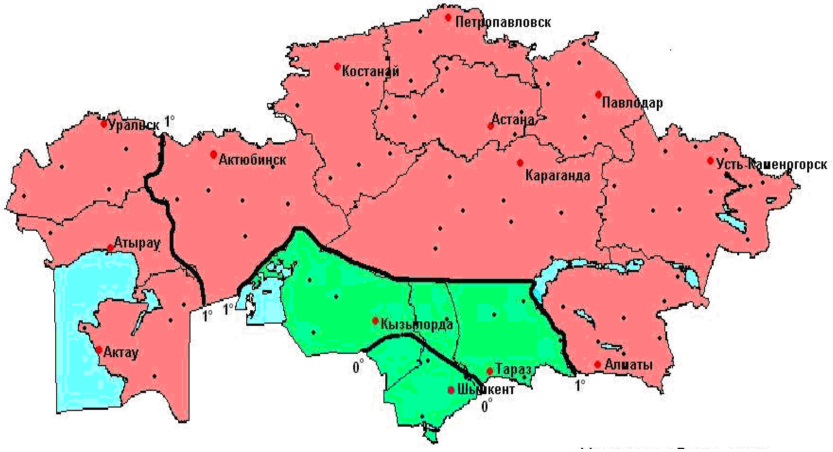
NORTH EURASIA CLIMATE CENTRE

THE DETERMINISTIC FORECASTS OF AIR TEMPERATURE

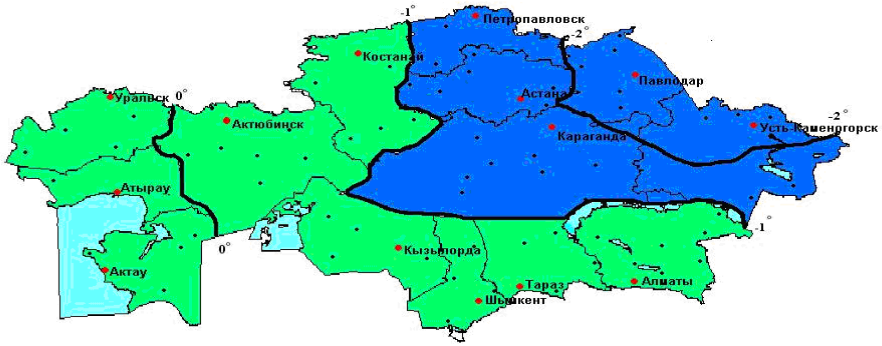
December 2013



February 2014



January 2014



Kazakhstan

Above normal	Near normal	Below normal
🟥	🟩	🟦

Forecast issued
in October 2013

TEMPERATURE

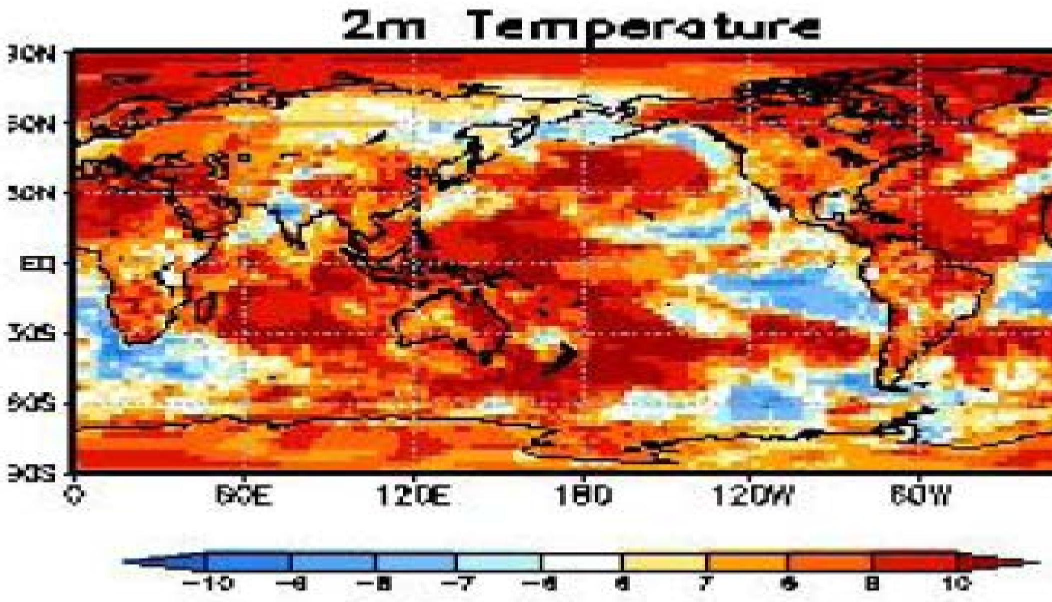
MODELs:

- GPC_Seoul
- Beijing
- CPTEC
- ECMWF
- Melbourne
- Montreal
- Moscow
- Toulouse
- Tokyo
- Washington

LC MMELRF-WMO Lead Centre for MME LRF

Consistency map

November 2013 – January 2014



where, the positive numbers mean the number of models, that predict positive anomaly and vice versa.

TEMPERATURE

LC MMELRF-WMO Lead Centre for MME LRF

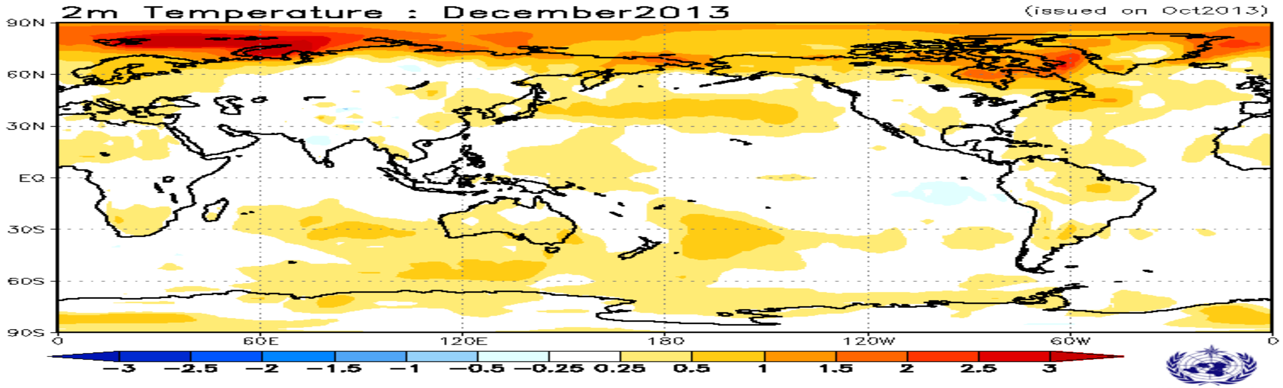
MODELs:

- Beijing
- CPTEC
- ECMWF
- Exeter
- Melbourne
- Montreal
- Moscow
- Pretoria
- Seoul
- Toulouse
- Tokyo
- ashington

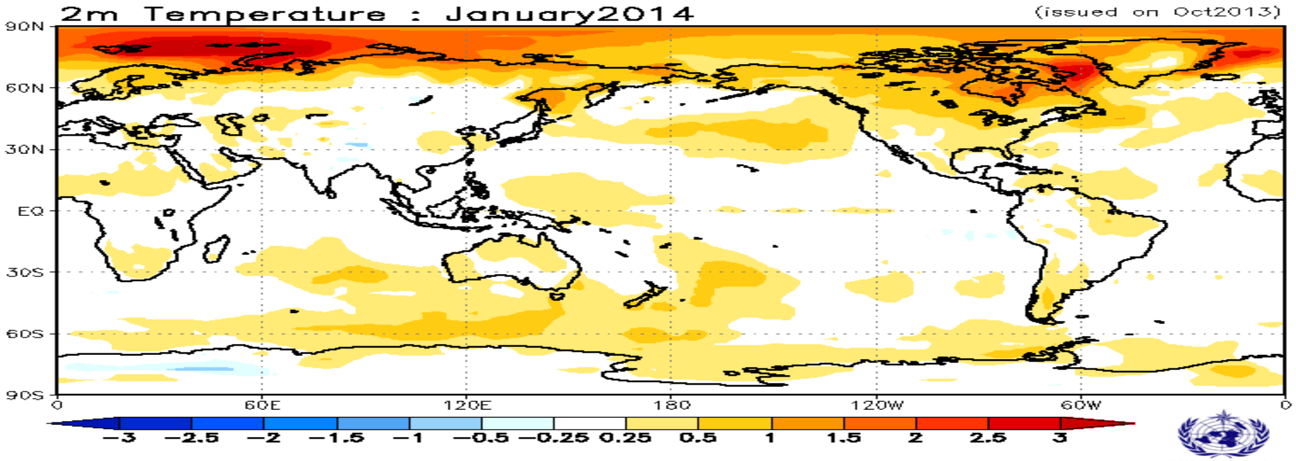
Forecast issued in
October 2013

Simple composite map

December 2013



January 2014

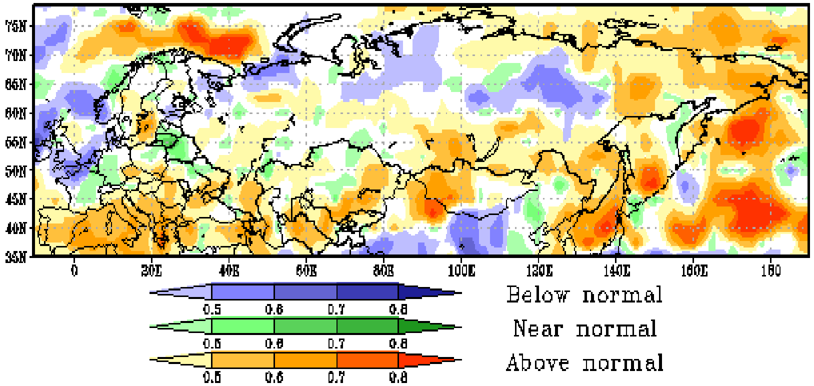


THE PROBABILISTIC FORECASTS OF PRECIPITATION

December 2013 – January 2014

HMC

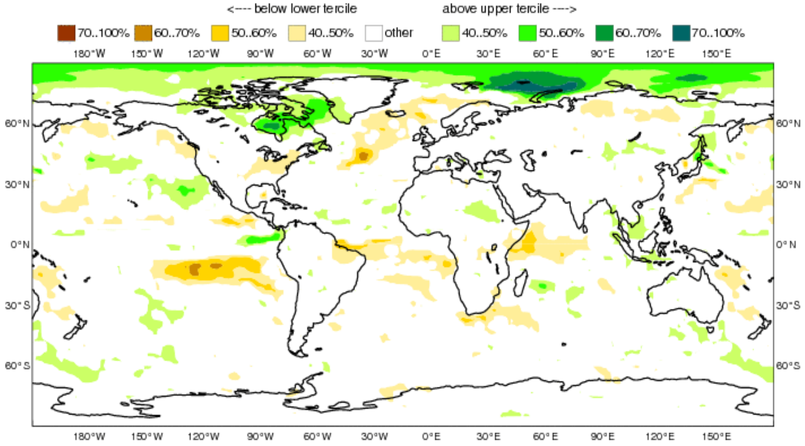
Composite probabilities of categorical forecast outcomes for
for Precipitation seasonal anomalies. Producer: HMC
Forecast period: December_January_February_2013



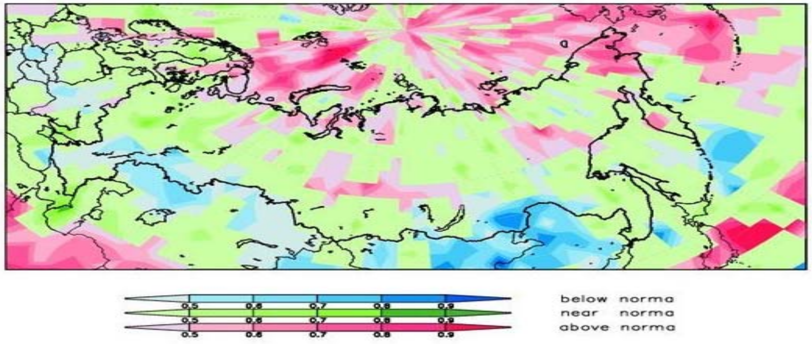
EUROSIP multi-model seasonal forecast
Prob(most likely category of precipitation)
Forecast start reference is 01/10/13
Unweighted mean

ECMWF/Met Office/Meteo-France/NCEP
DJF 2013/14

EUROSIP

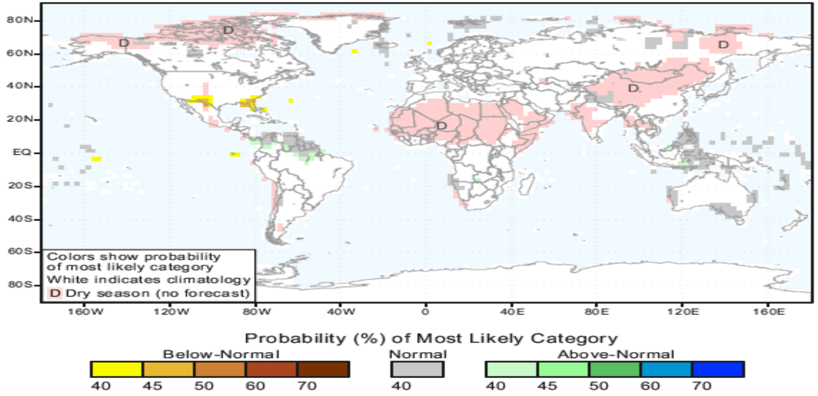


MGO



IRI

IRI Multi-Model Probability Forecast for Precipitation
for December-January-February 2014, Issued October 2013



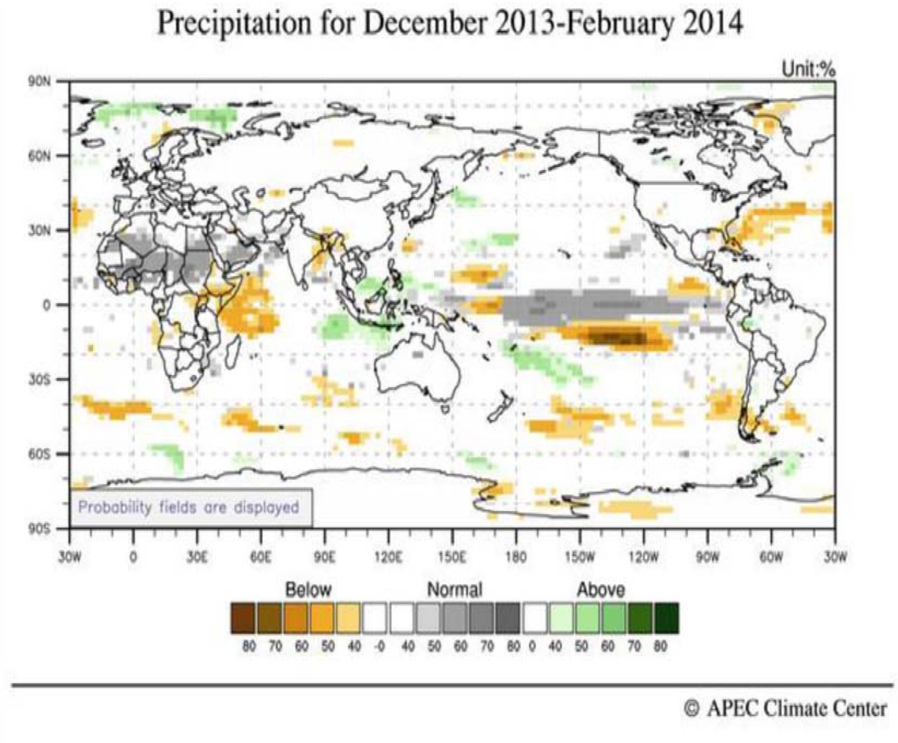
Forecast issued
in October 2013

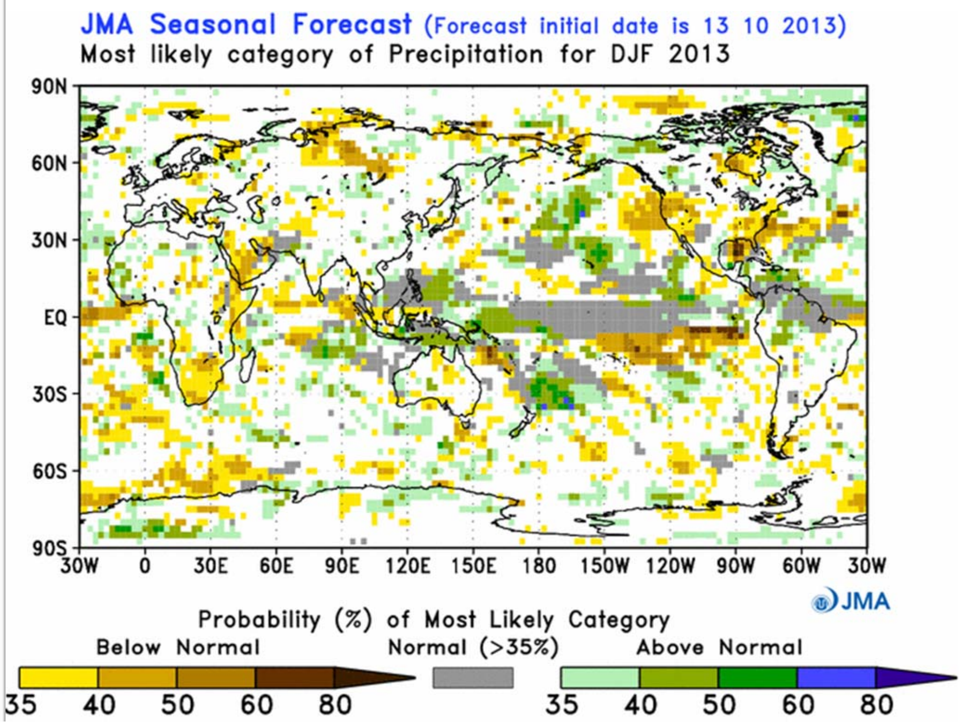
THE PROBABILISTIC FORECASTS OF PRECIPITATION

December 2013-February 2014

APCC

TOKYO CLIMATE CENTRE





Forecast issued in August 2013

The forecast was performed with initial conditions: 13Oct2013

PRECIPITATION

MODELs:

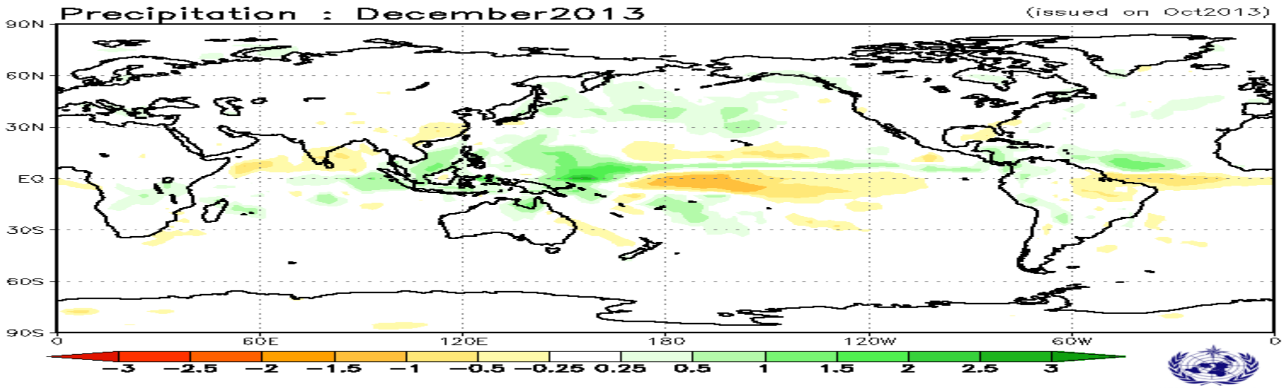
- Beijing
- CPTEC
- ECMWF
- Exeter
- Melbourne
- Montreal
- Moscow
- Pretoria
- Seoul
- Toulouse
- Tokyo
- Washington

LC MMELRF-WMO Lead Centre for MME LRF

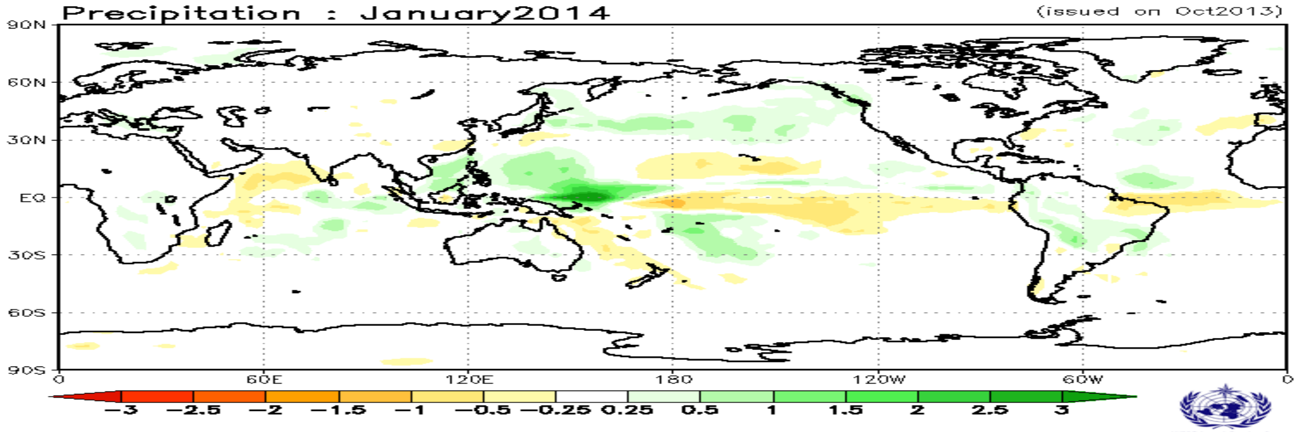
Forecast issued in
October 2013

Simple composite map

December 2013



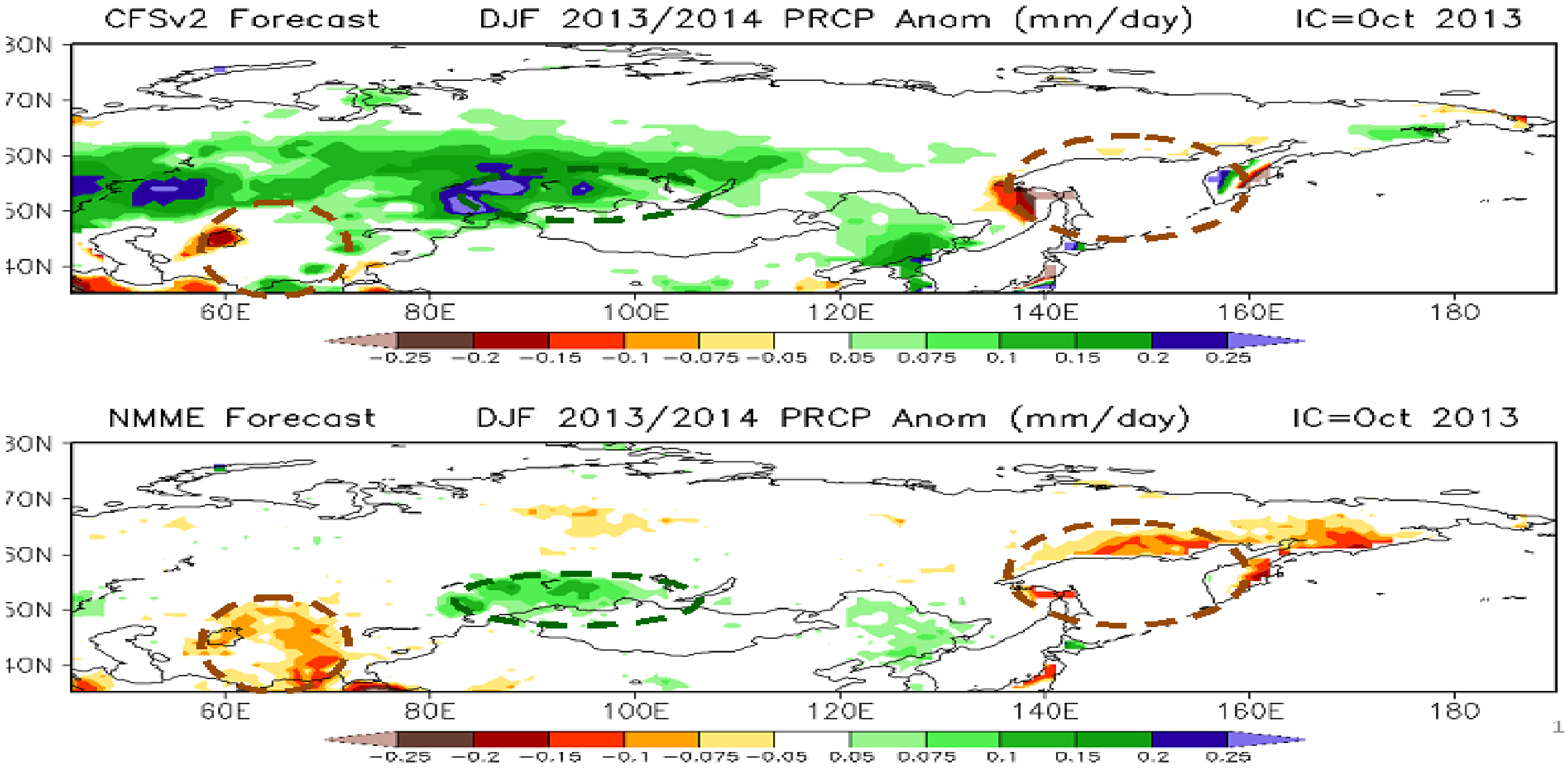
January 2014



DETERMINISTIC FORECASTS OF PRECIPITATION

CLIMATE PREDICTION CENTRE
NATIONAL WEATHER SERVICE of USA

December 2013-February 2014



Forecast issued in
October 2013

http://www.cpc.ncep.noaa.gov/products/CFSv2/CFSv2seasonal.shtml

PRECIPITATION

LC MMELRF-WMO Lead Centre for MME LRF

Consistency map

November 2013 – January 2014

MODELs:

- GPC_Seoul
- Beijing
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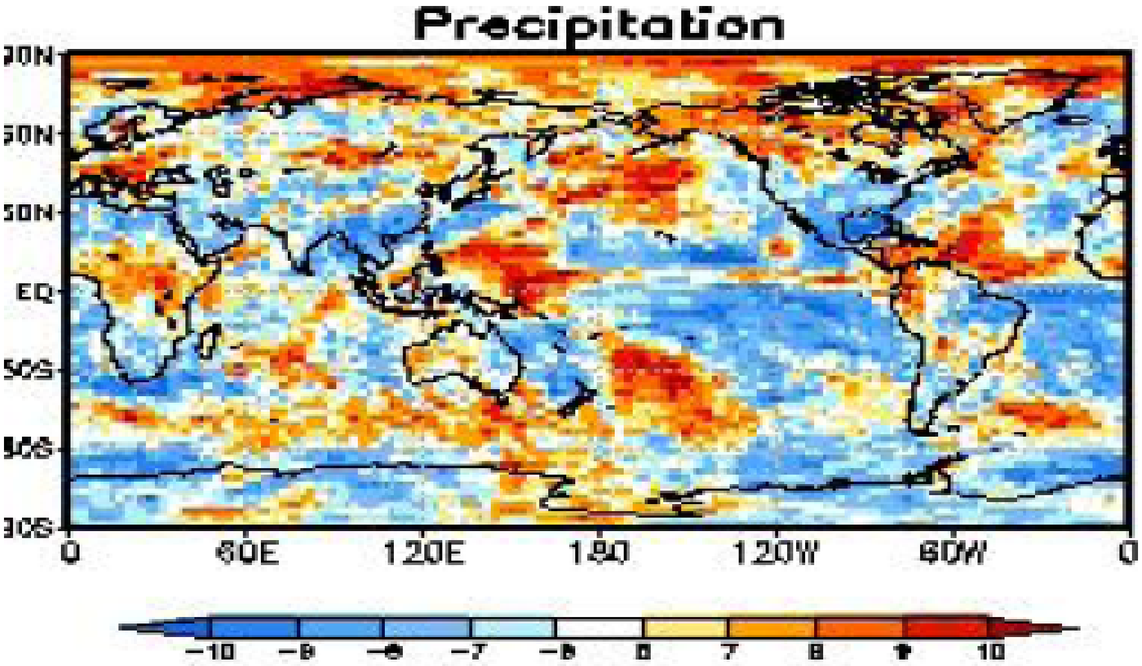

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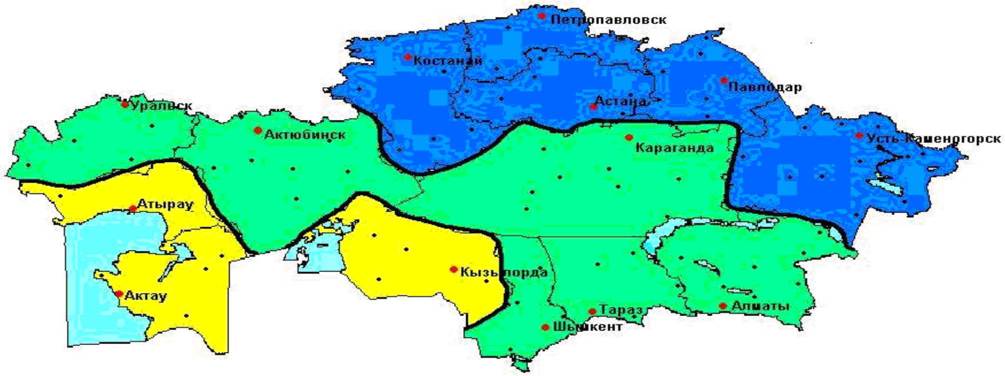
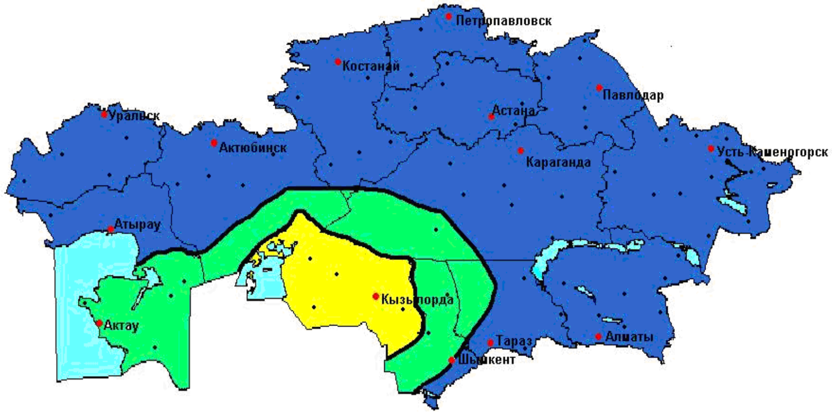
THE FORECASTS OF PRECIPITATION

December 2013



February 2014



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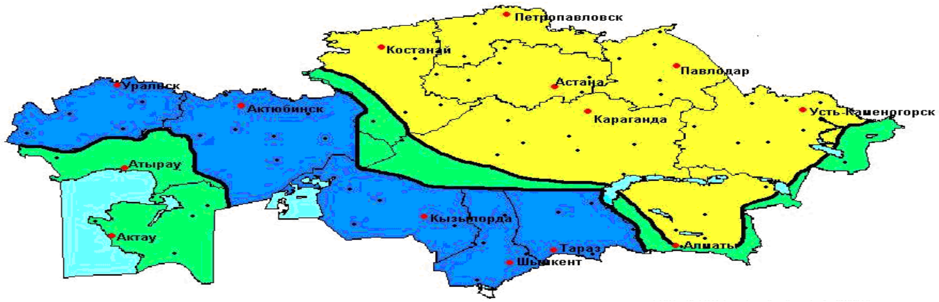


Kazakhstan

Above normal (>120%) 🟦

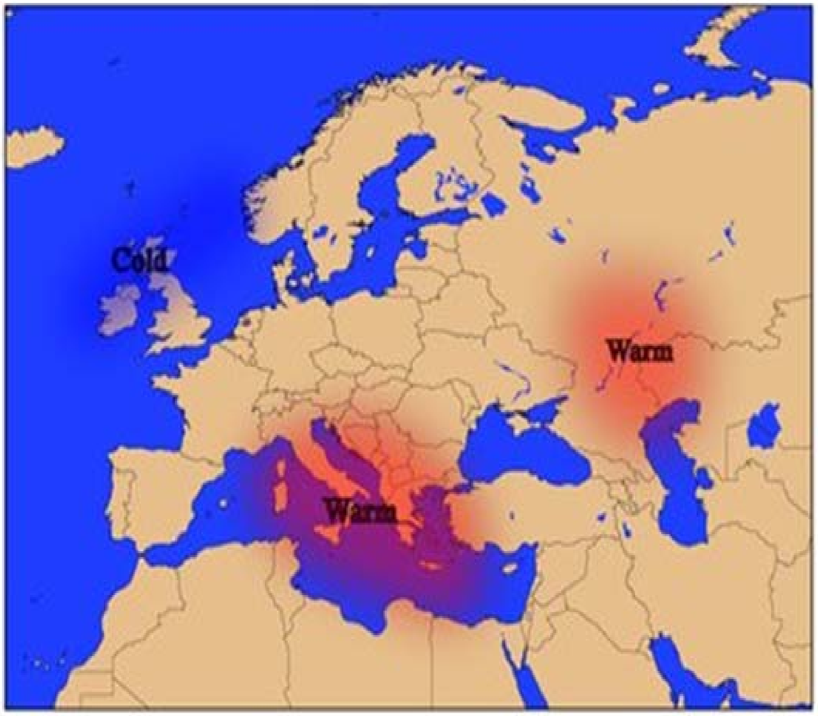
Near normal(80-120%) 🟩

Below normal (<80%) 🟨

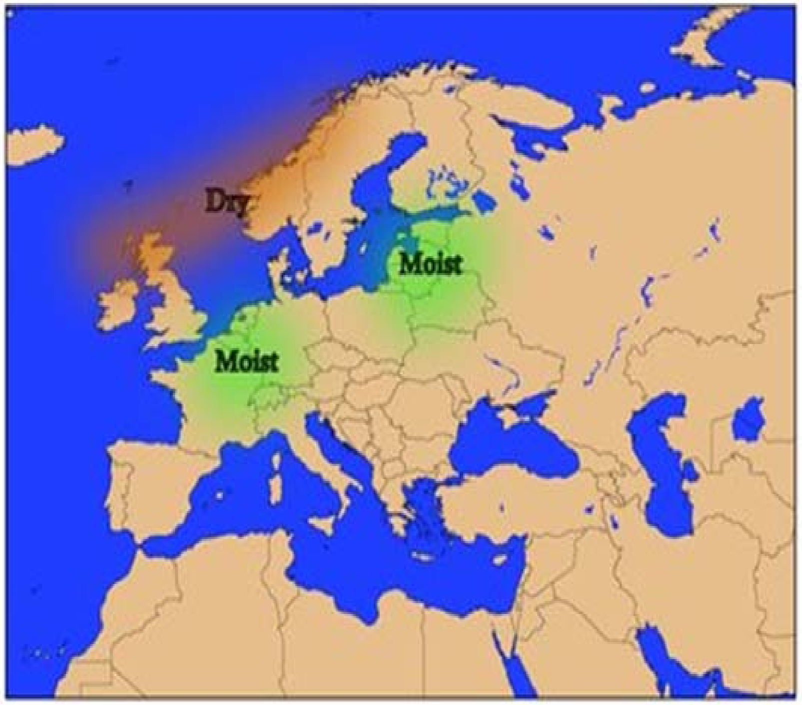
**Forecast issued
in October 2013**

THE FORECASTS
OF TEMPERATURE (on the left) and PRECIPITATION (on the right)
The World Climate Service. Outlook.

World Climate Service Temperature Anomaly Outlook (Nov-Dec-Jan)



World Climate Service Precipitation Anomaly Outlook (Nov-Dec-Jan)



November 2013-January 2014

The outlook is based on the forecasts of ECMWF, CFS U.S National Weather Service and analogs.

These maps depict the summarized forecast for North America and Europe. The fuzzy colored regions indicate the temperature and precipitation anomalies (depature from normal) that are considered most likely. Specifically, the probability is believed to be approximately 50 percent that the temperature or precipitation will be at least 0.5 standard deviations from normal in the direction indicated.

THE FORECASTS OF AIR TEMPERATURE

REGIONS	METEOROLOGICAL CENTERS		
	BELOW NORMAL	NORMAL	ABOVE NORMAL
WESTERN EUROPE	HMC (north), TCC (south-west)	HMC (Great Britain, centre and south-west)	APCC (north), IRI, HMC (Portugal, Spain, Italy, Austria, south of France), CPC (north and east), MO, MGO (north)
EUROPEAN RUSSIA	HMC (except for the south)	HMC (south), MGO (south)	IRI (except for north-east), EuroSIP (north and north-east), CPC, MO, MGO (except for south)
TRASCAUCASIA			EuroSIP, IRI, HMC, MO
ASIA MINOR			EuroSIP, HMC (east)
CENTRAL ASIA	HMC (west and north-east of Kazakhstan), TCC (west and north-west)	MGO (except for north of Kazakhstan)	EuroSIP (south), IRI (except for north, centre and east of Kazakhstan), HMC (Uzbekistan, Tajikistan, Turkmenistan, Mongolia), CPC (Mongolia, north and east of Kazakhstan), MO (west of Kazakhstan), MGO (north of Kazakhstan)
URAL and SIBERIA	HMC, TCC (south and east)		EuroSIP (north), CPC (centre and south), MO (Ural and Western Siberia), MGO
FAR EAST	APCC (Transbaikalia), HMC (except for north-east and north-west), CPC (north-east), TCC (south-east, north-east)		EuroSIP (north and north-east), IRI (except for north-east), HMC(north-east and north-west), CPC (south), MO, MGO (south)

THE FORECASTS OF PRECIPITATION

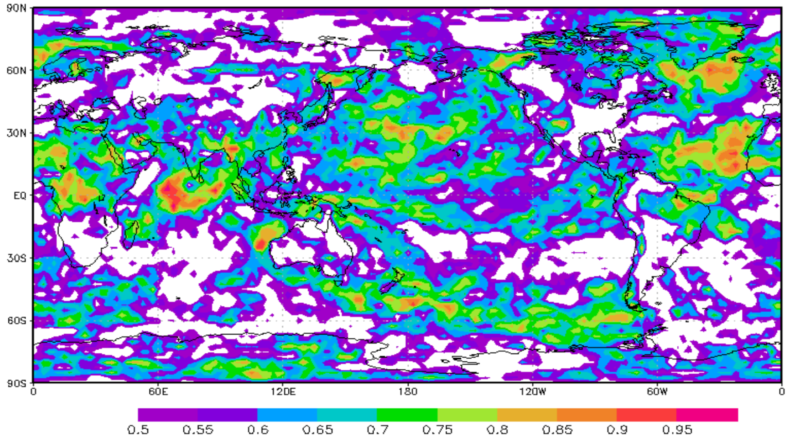
REGIONS	METEOROLOGICAL CENTERS		
	BELOW NORMAL	NORMAL	ABOVE NORMALВыше нормы
WESTERN EUROPE	TCC(south-east, Baltic States),	MGO	HMC (south)
EUROPEAN RUSSIA	TCC (north-west and south-east), HMC (north)	MGO	TCC (centre and north-east), HMC (south-east)
TRASCAUCASIA		MGO	HMC
ASIA MINOR	TCC (south)		TCC (north), HMC, MGO
CENTRAL ASIA	IRI (Mongolia), TCC (Kyrgyzstan, Tajikistan), MO (Kazakhstan), MGO (north of Kazakhstan)		EuroSIP (Mongolia), TCC(west of Turkmenistan, Mongolia), HMC
URAL and SIBERIA	EuroSIP (south of Taimyr), TCC (north and centre), HMC (north)	MGO (except for south of Eastern Siberia)	TCC (south and north-east of Eastern Siberia), HMC (south), MO (south of Eastern Siberia), south of Eastern Siberia)
FAR EAST	EuroSIP (north-west of Yakutia), IRI (south and north of Yakutia), HMC(west), TCC (north)	MGO (except for north-east)	EuroSIP (north-east of Yakutia, Sakhalin), HMC (except for west of Yakutia), TCC (Kamchatka), MO (south and north-eat of Yakutia), MGO (north-east)

TABLE OF CONTENTS

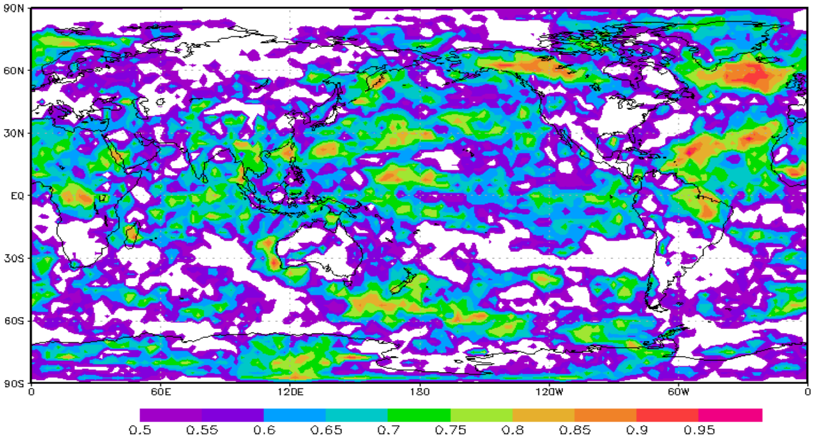
FORECAST VERIFICATION. TEMPERATURE

SL-AV, HMC

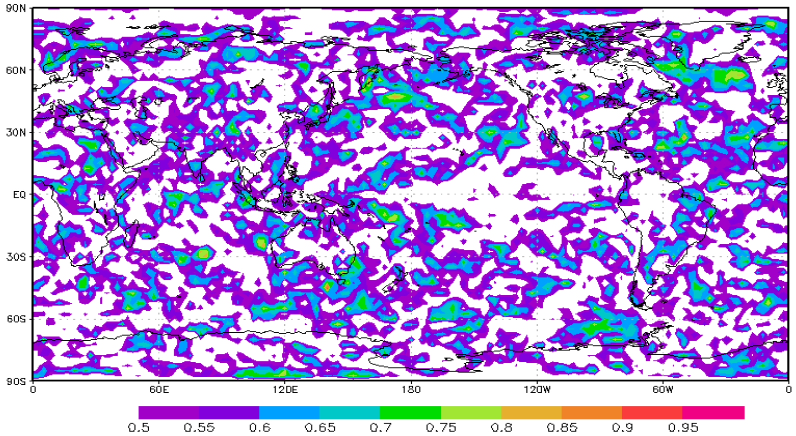
ROC_B



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.

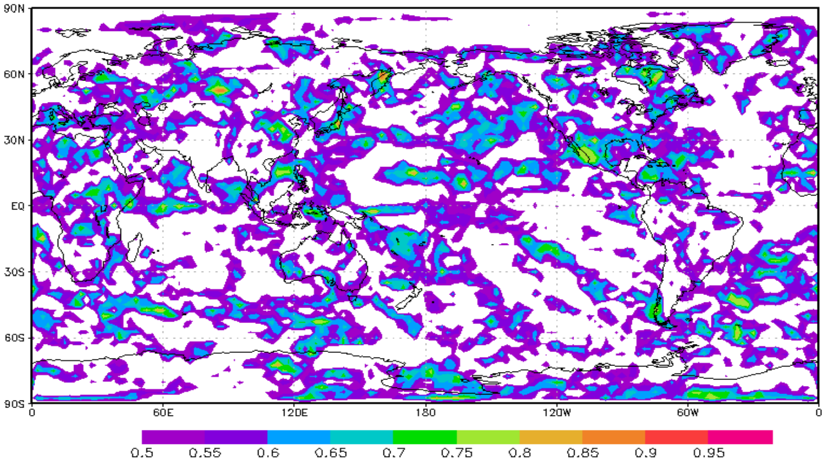
Guidance: Standardised Verification System for Long-Range Forecasts, SVSLRF, 2002. New Attachment II-8 to the *Manual on the GDPFS* (WMO-No. 485), Volume I.

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

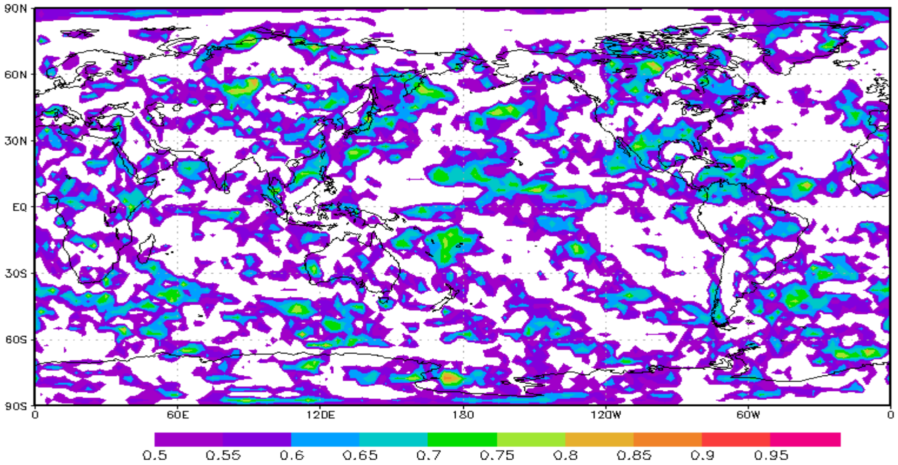
FORECAST VERIFICATION. PRECIPITATION

SL-AV, HMC

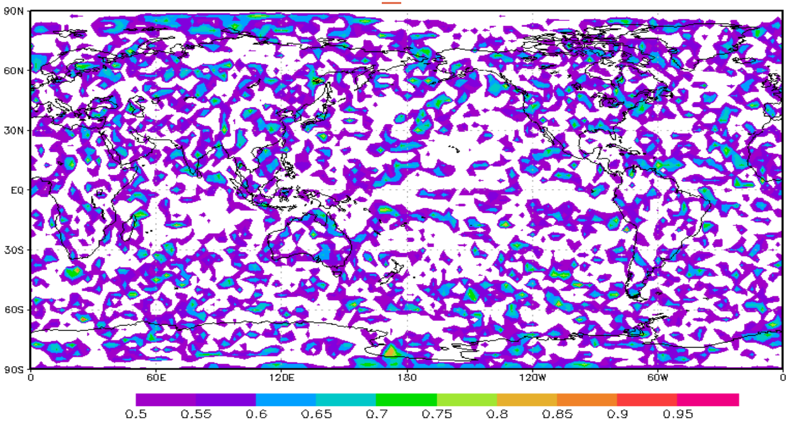
ROC_B



ROC_A



ROC_N



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SUMMARY

- Most of the ENSO prediction models indicate a continuation of neutral ENSO through 2013 and the first quarter of 2014. A long-lasting mean disagreement between statistical and dynamical models (statistical leaning cooler, dynamical warmer) has diminished. The average forecast of all models indicates a gradual warming tendency during the first half of 2014. The probabilities for La Nina, neutral and El Nino conditions (using -0.5C and 0.5C thresholds) over the coming DJF season are: 7%, 91% и 2 %.
- Most of the centers predict significant SST anomalies in the North Pacific Ocean connected with the negative 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. Some centers predict the negative phases of NAO and EA fluctuations at the beginning of the winter. But the significant positive SST anomalies near the Gulf Stream and NEZ 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.
- The winter season of 2013-2014 is expected warmer than normal over most of Northern Eurasia according to the most of models. The most significant positive temperature anomalies are predicted by the CPC in the Arctic, but in January - in the center of the European territory of Russia, in Kazakhstan, in the south of Siberia and in Mongolia.
- The cold scenario prevails in the forecasts of the HMC. The main cold wave is expected in February in Scandinavia and in northwest of the European Russia. The forecasts of the TCC also show the prevalence of negative anomalies over most of Northern Eurasia.
- There are a lot of contradictions and uncertainties in the forecasts of precipitation. The precise signal is marked only at the beginning of the winter in the Barents sea and in the south of Eastern Siberia where exceeding precipitation is expected.

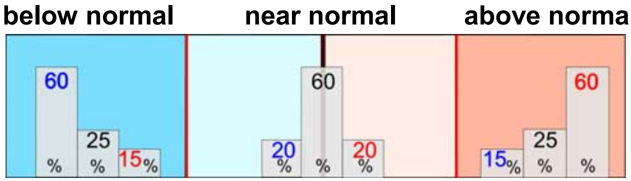
- *The Bulletin information is of advisory character and must be applied to particular regions taking into account the predictability of meteorological processes, regional climate, and quality of state-of-the-art atmosphere and ocean general circulation models.*

TEMPERATURE

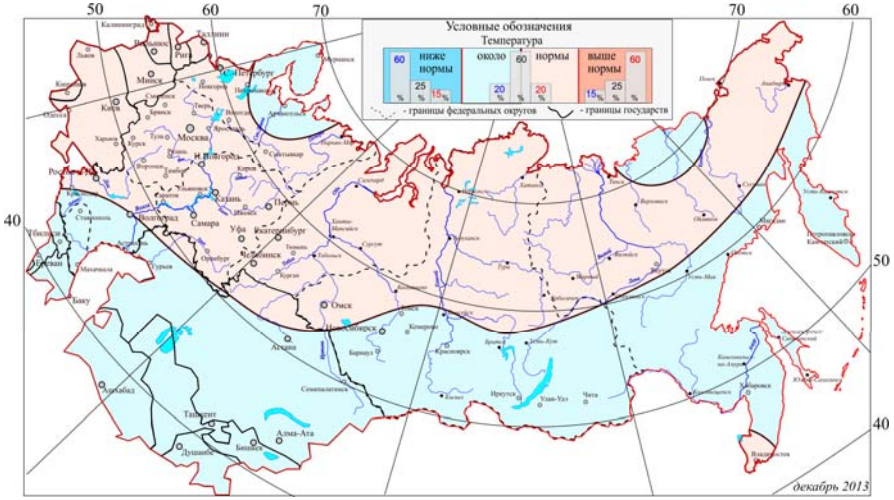
Forecast issued in September 2013

HIDROMETEOROLOGICAL CENTRE OF RUSSIA: ensemble of statistical forecasts
(HMC, MGO, Arctic and Antarctic Research Institute)

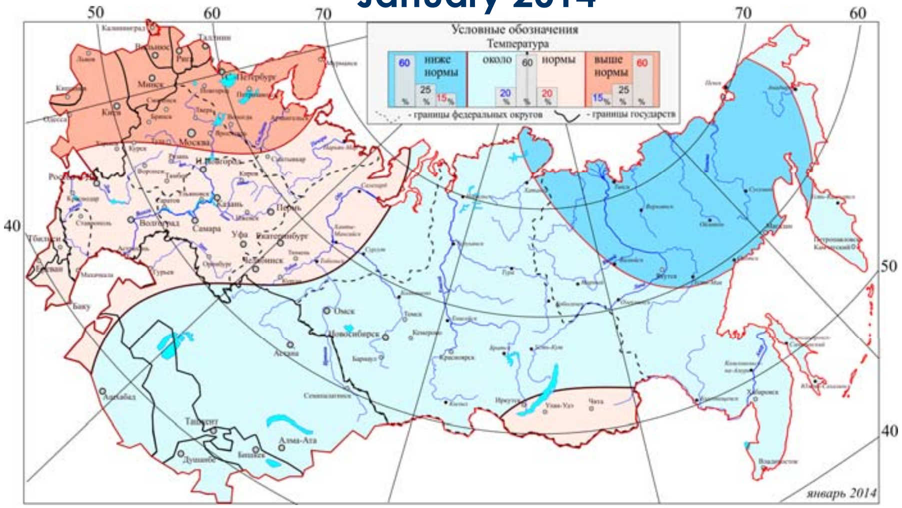
the probability distribution of the forecast for each gradation



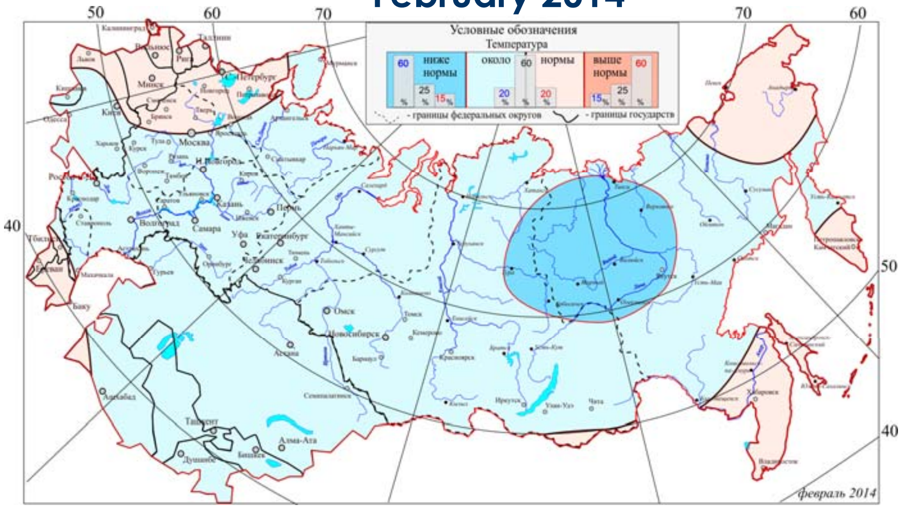
December 2013



January 2014

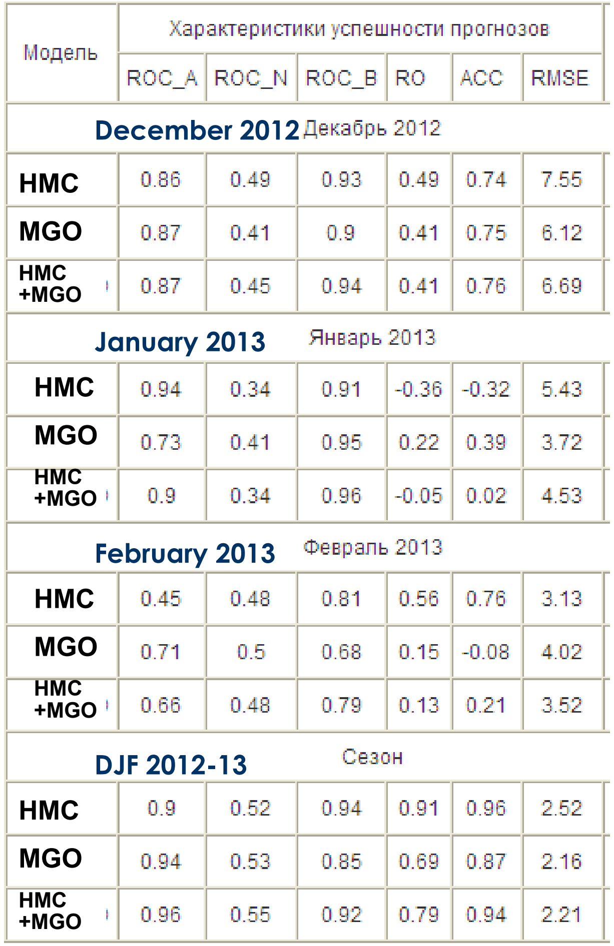


February 2014



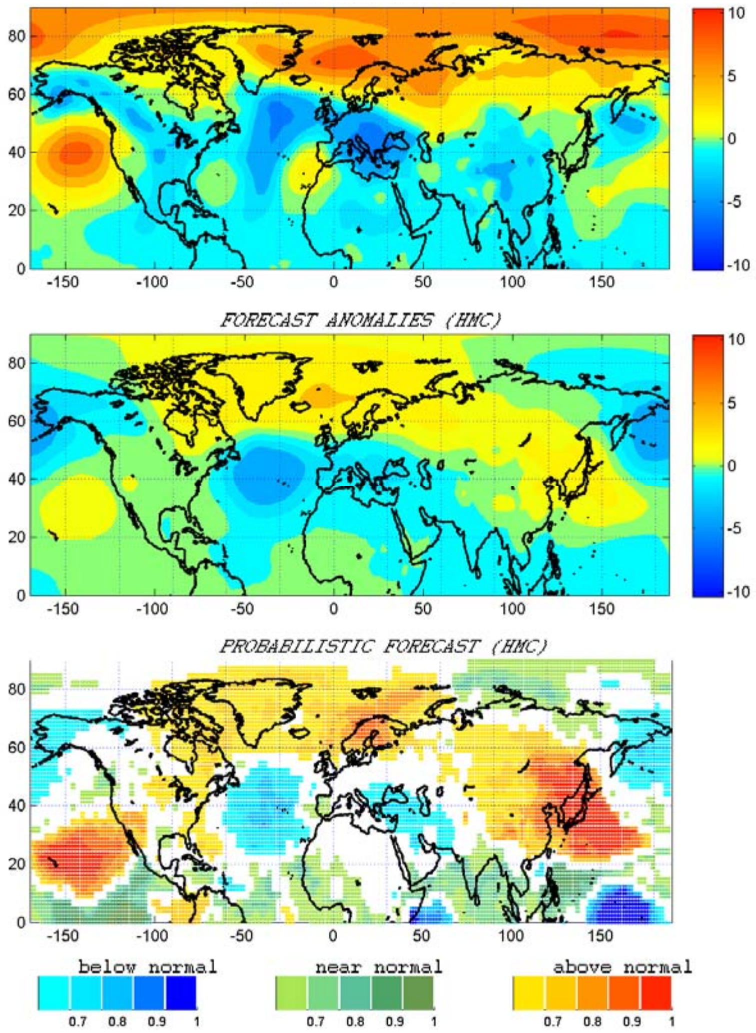
Verification

Forecast quality DJF 2012-13
SLP (European Part)



Модель	Характеристики успешности прогнозов					
	ROC_A	ROC_N	ROC_B	RO	ACC	RMSE
December 2012 Декабрь 2012						
HMC	0.86	0.49	0.93	0.49	0.74	7.55
MGO	0.87	0.41	0.9	0.41	0.75	6.12
HMC +MGO	0.87	0.45	0.94	0.41	0.76	6.69
January 2013 Январь 2013						
HMC	0.94	0.34	0.91	-0.36	-0.32	5.43
MGO	0.73	0.41	0.95	0.22	0.39	3.72
HMC +MGO	0.9	0.34	0.96	-0.05	0.02	4.53
February 2013 Февраль 2013						
HMC	0.45	0.48	0.81	0.56	0.76	3.13
MGO	0.71	0.5	0.68	0.15	-0.08	4.02
HMC +MGO	0.66	0.48	0.79	0.13	0.21	3.52
DJF 2012-13 Сезон						
HMC	0.9	0.52	0.94	0.91	0.96	2.52
MGO	0.94	0.53	0.85	0.69	0.87	2.16
HMC +MGO	0.96	0.55	0.92	0.79	0.94	2.21

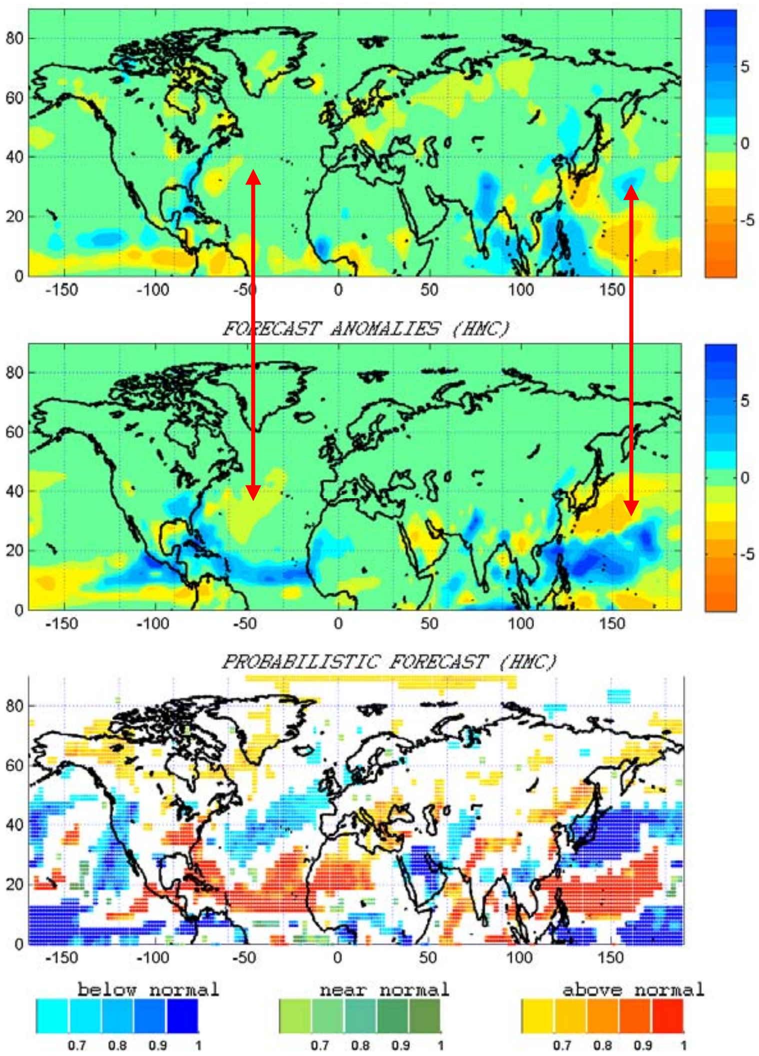
SLP. Observed anomalies, forecast anomalies and probabilistic forecast maps December-February 2012-2013



Verification

Observed anomalies, forecast anomalies and probabilistic forecast maps Jun-August 2013

Precipitation



Temperature 2m