



GPC Exeter forecast for winter 2013-2014

Sources of predictability

- ENSO (seasonal)
- QBO (seasonal)
- ATLANTIC SST (seasonal)
- SEA ICE (interannual)
- SNOW (seasonal)
- VOLCANOES (interannual)
- SOLAR (interannual)

Sources of predictability

- ENSO (seasonal)
- QBO (seasonal)
- ATLANTIC SST (seasonal)
- SEA ICE (interannual)
- SNOW (seasonal)
- VOLCANOES (interannual) – not expected to contribute this year
- SOLAR (interannual) – not expected to contribute this year

Sources of predictability

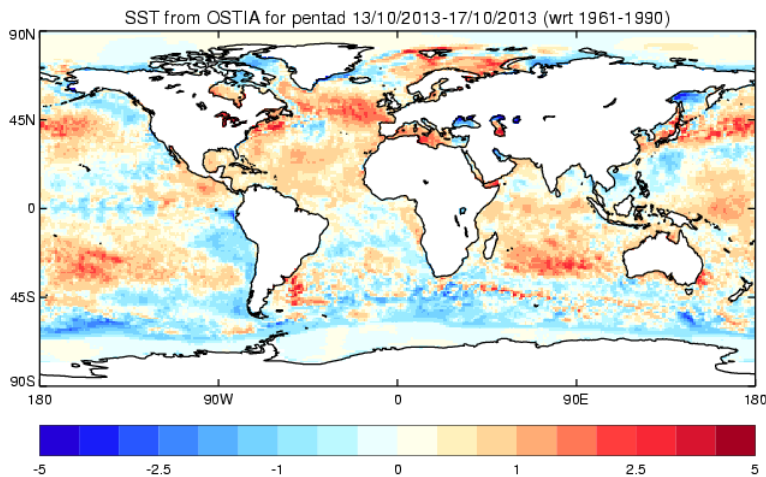
- **ENSO** (seasonal) – moderate El Niño → negative NAO late winter
 - observations, models
- **QBO** (seasonal) – westerly phase → positive NAO early winter
 - observations, models (to a certain extent)
- **ATLANTIC SST** (seasonal) – tripole in May SST → DJF NAO
 - observations, models
- **SEA ICE** (interannual) – low September sea-ice → negative DJF NAO
 - observations, models ; not yet well established
- **SNOW** (seasonal) – above-average Eurasian October snow cover → negative AO
 - observations (no consensus), not in models

Tropical Factors

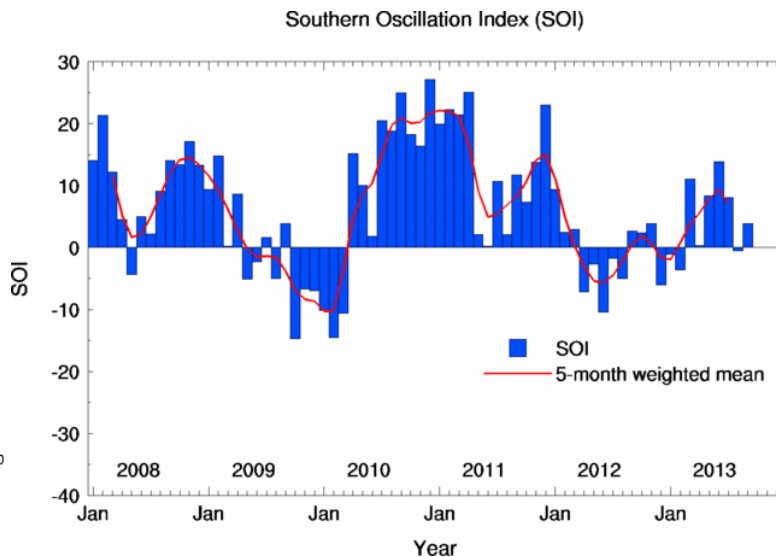


ENSO

13-17 Oct

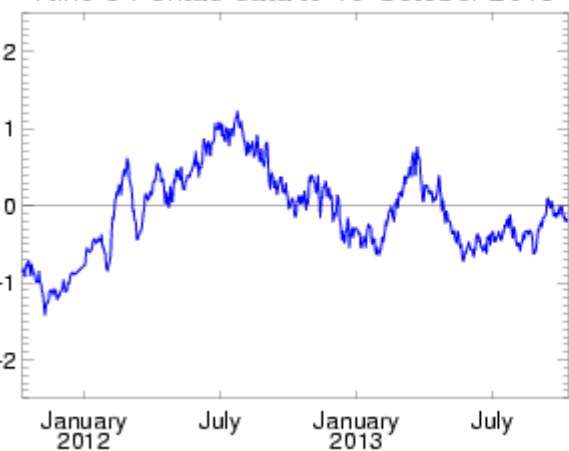


SOI Oct 2013



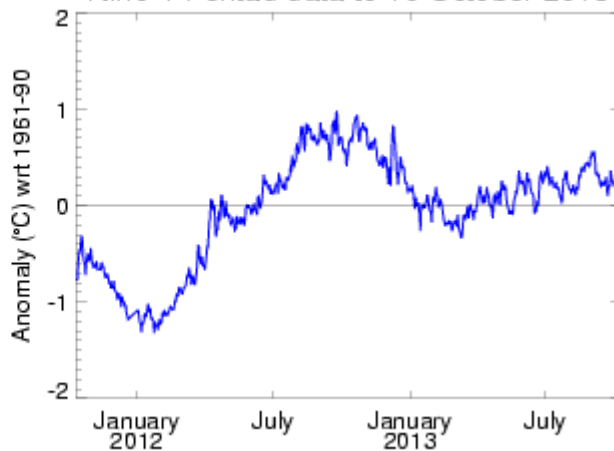
10 Oct Niño3

Niño 3 Pentad data to 10 October 2013



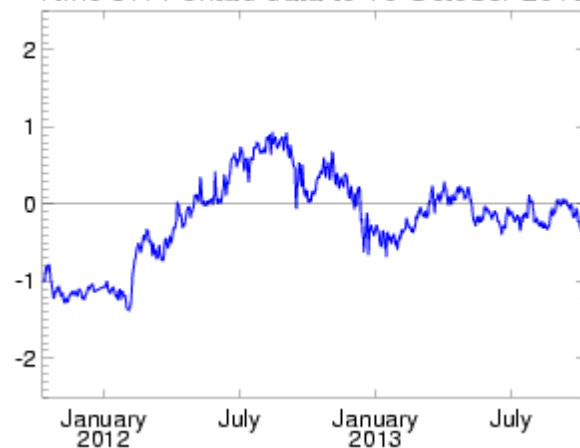
Niño4

Niño 4 Pentad data to 10 October 2013



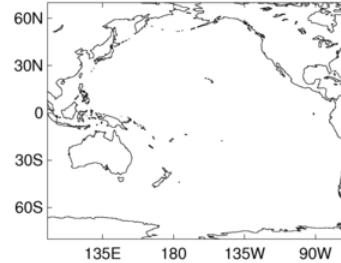
Niño3.4

Niño 3.4 Pentad data to 10 October 2013

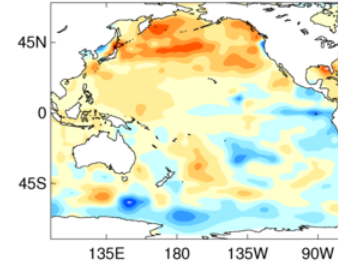


Latest Sub-Surface Images Tropical Pacific *September*

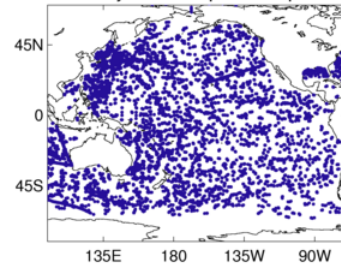
HadISST temp anom (1971-2000) Sep 2013



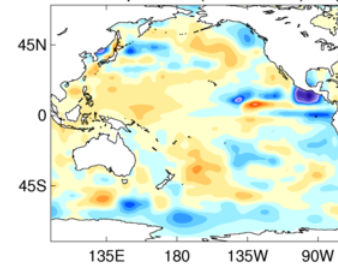
0m-30m temp anom (1971-2000) Sep 2013



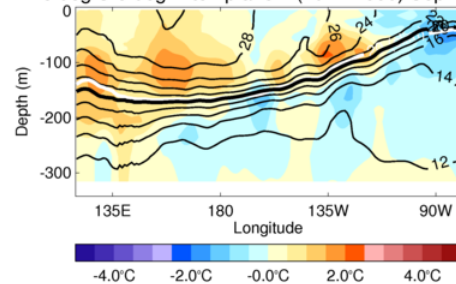
Positions of non-rejected temperature profiles Sep 2013



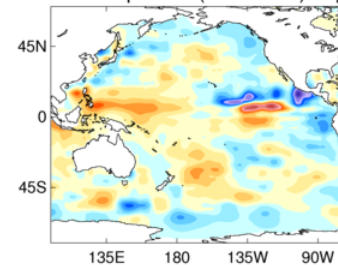
30m-61m temp anom (1971-2000) Sep 2013



5 deg S-5 deg N temp anom (1971-2000) Sep 2013



61m-93m temp anom (1971-2000) Sep 2013



ENSO Sub-surface data

17-21 Oct

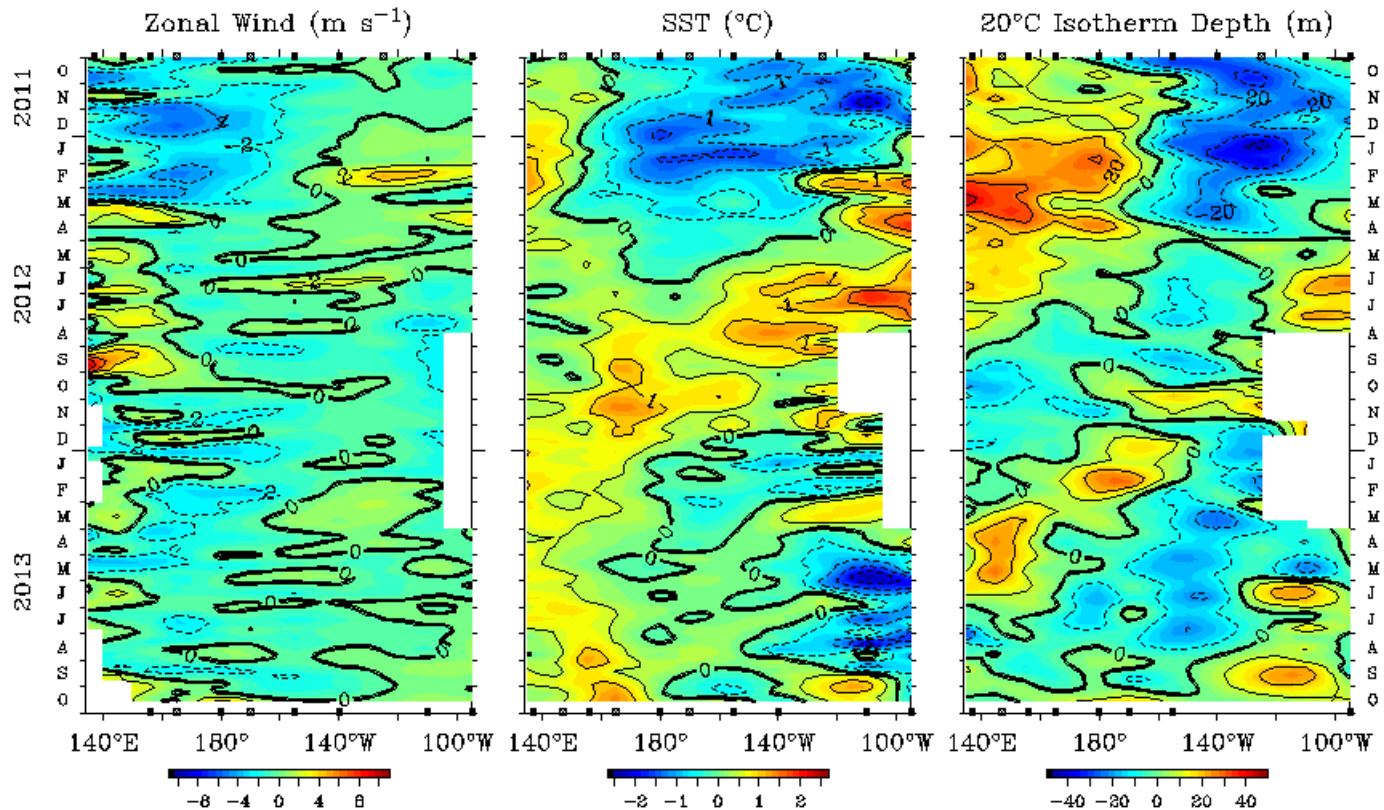
U Wind

SST

20 deg
isotherm
anom

Five Day Zonal Wind, SST, and 20°C Isotherm Depth Anomalies 2°S to 2°N Average

Time



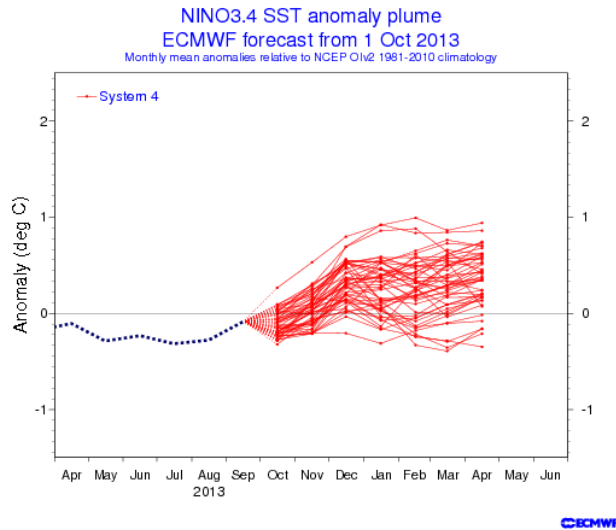
Nino3.4 forecasts Oct 2013- Mar 2014

(baseline: 1981-2010)

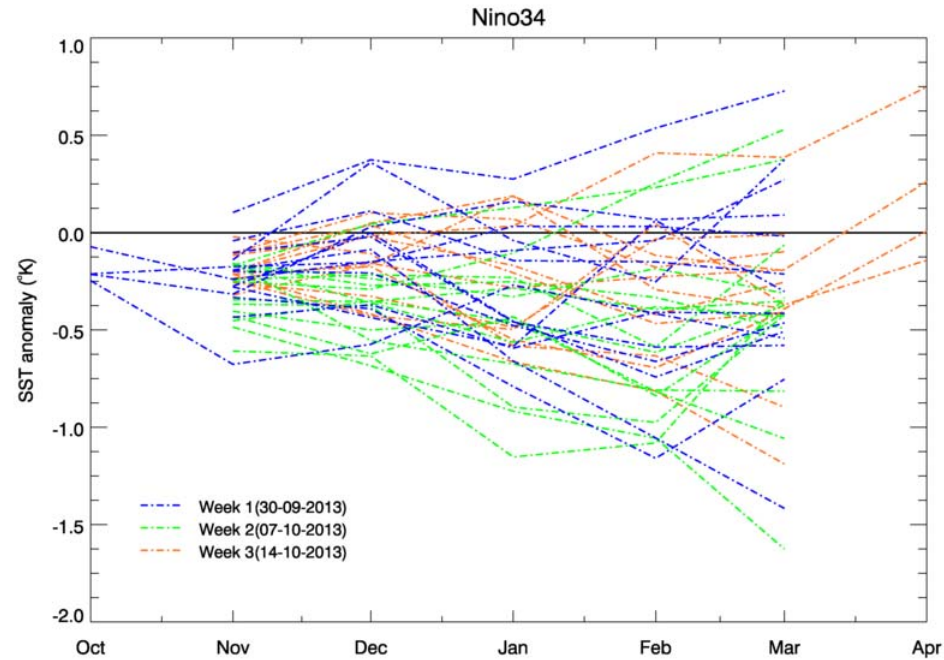
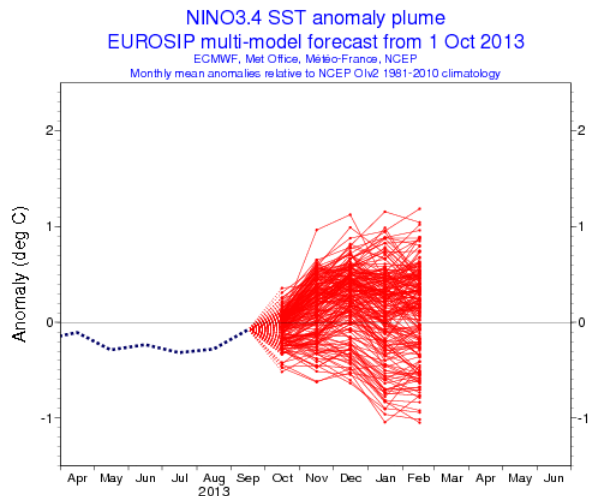
GloSea5

(initial conditions: 30 Sep-20 Oct
baseline: 1996-2009)

ECMWF

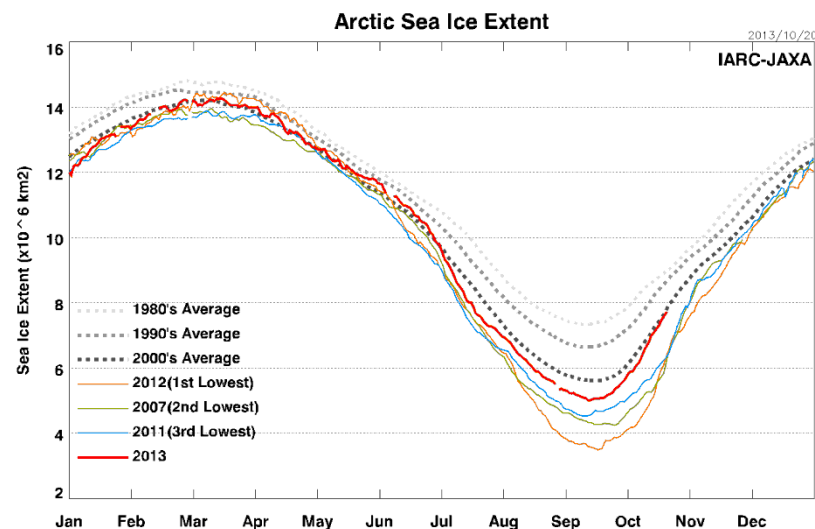
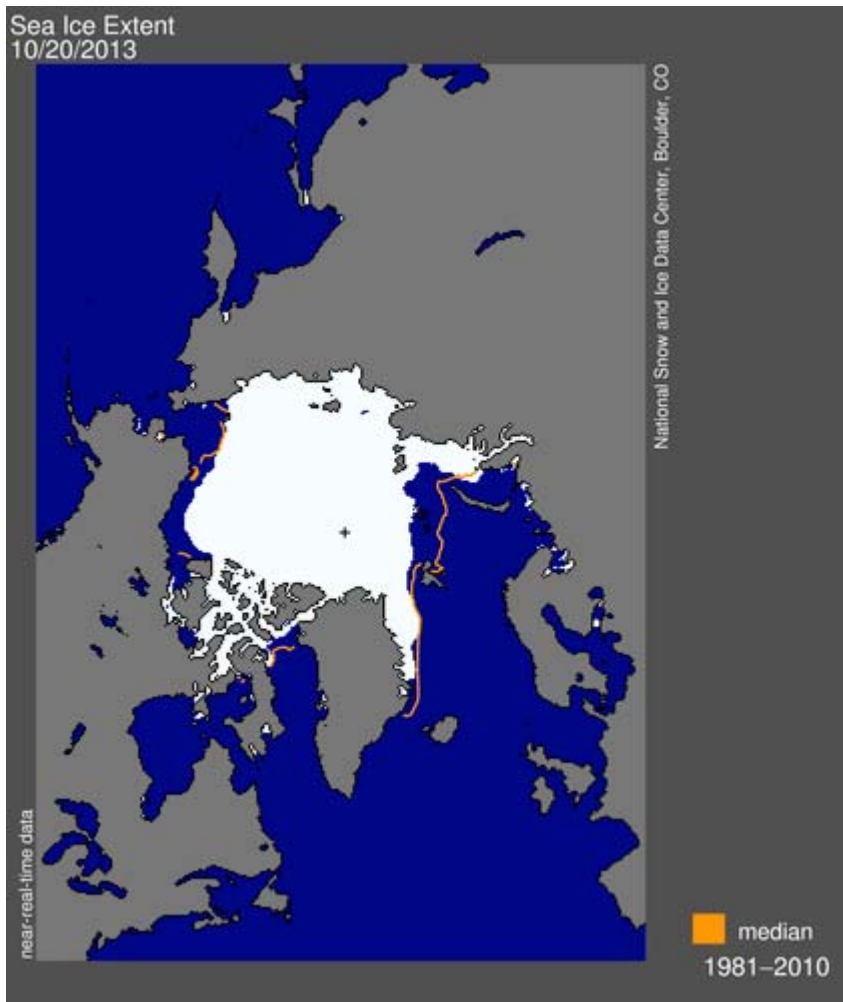


Euro-SIP

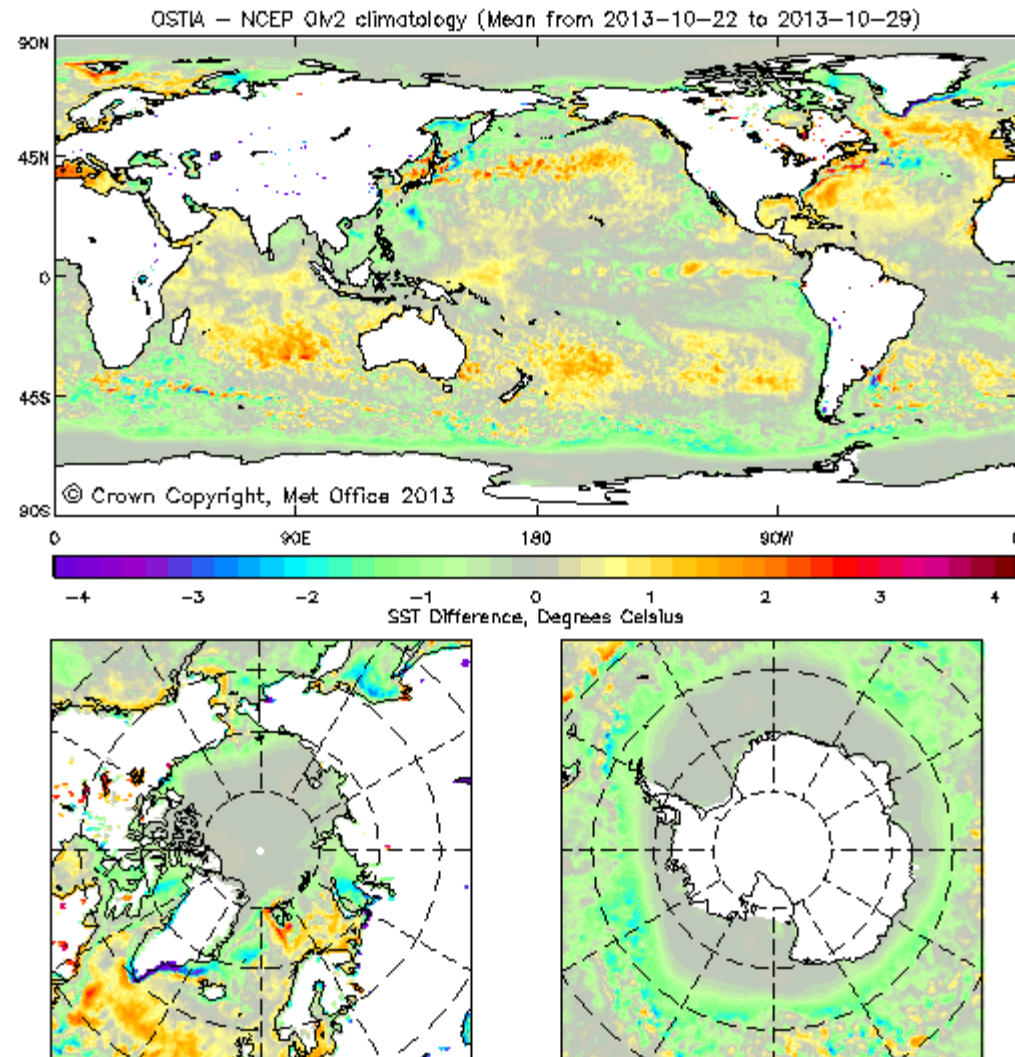


Extra-tropical NH factors

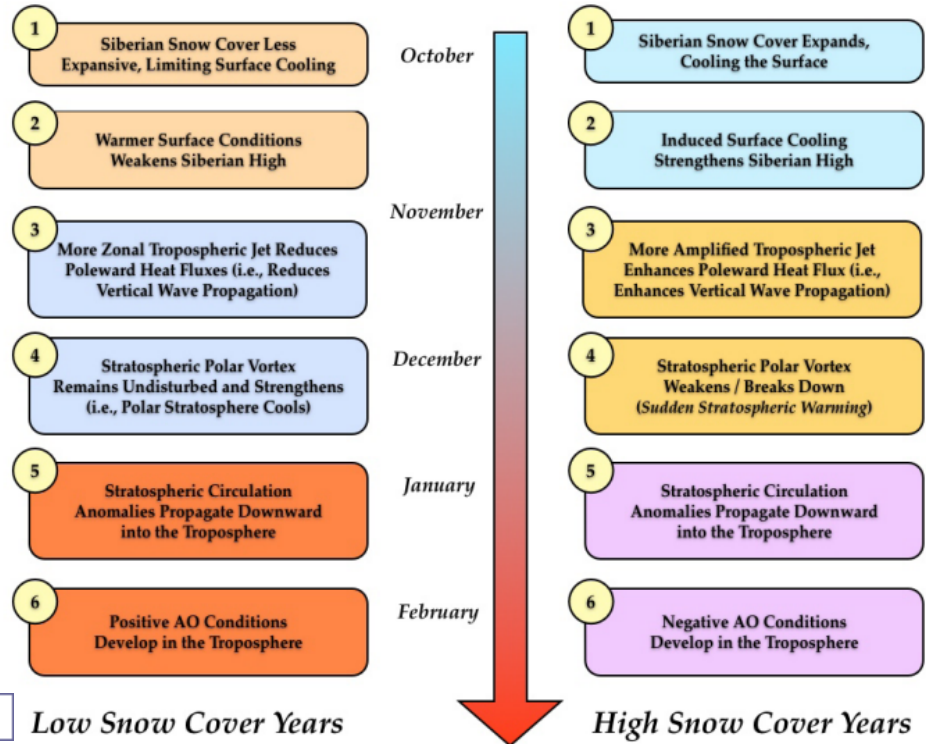
Arctic Sea Ice Cover – to 20 Oct



North Atlantic sea-surface temperature



Current Eurasian snow cover

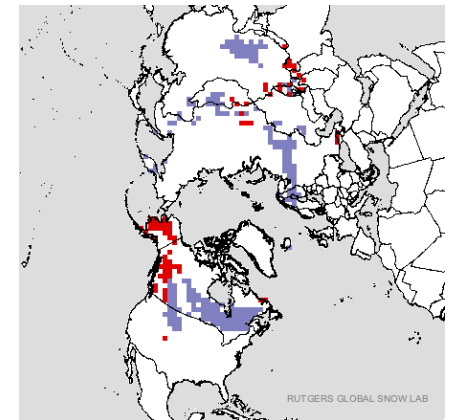
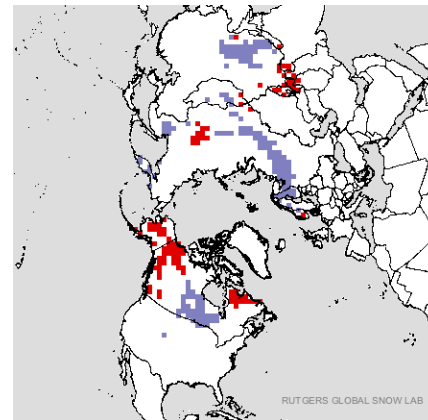
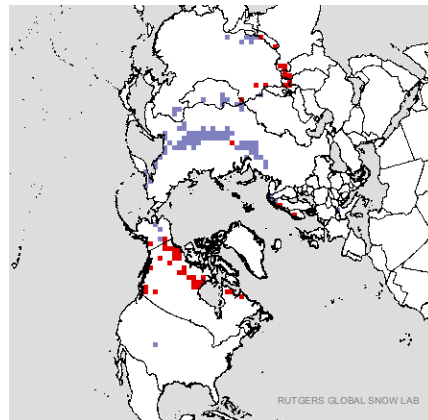
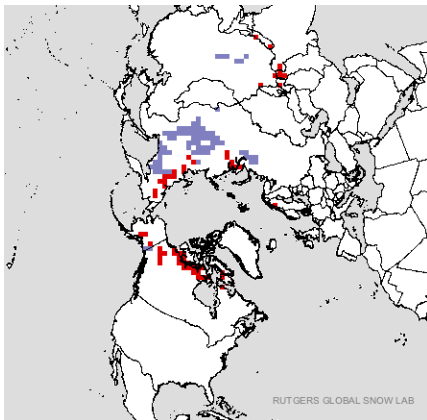


1 Oct

11 Oct

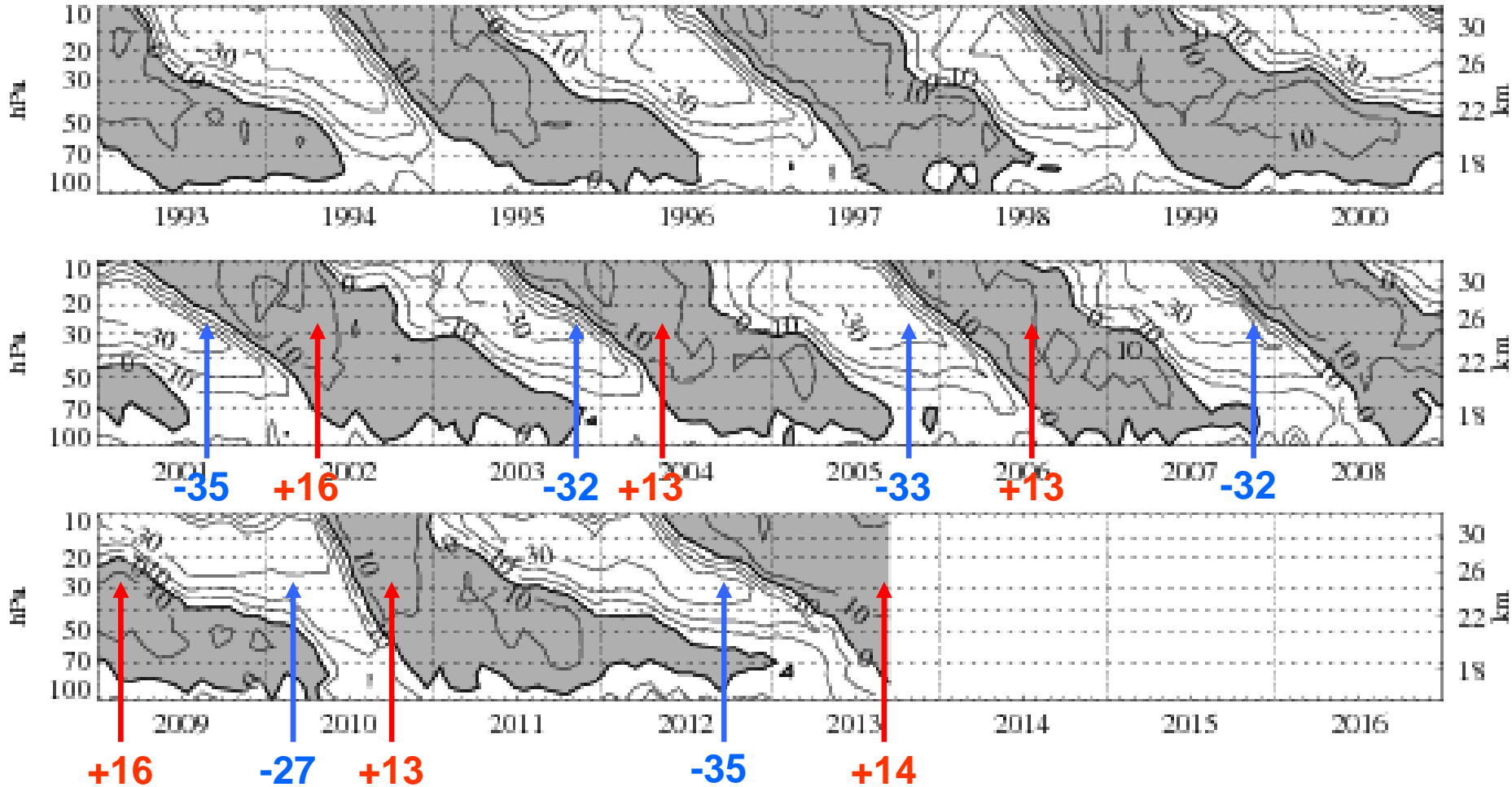
21 Oct

28 Oct



Stratosphere – QBO

Singapore \bar{u} (m s^{-1})

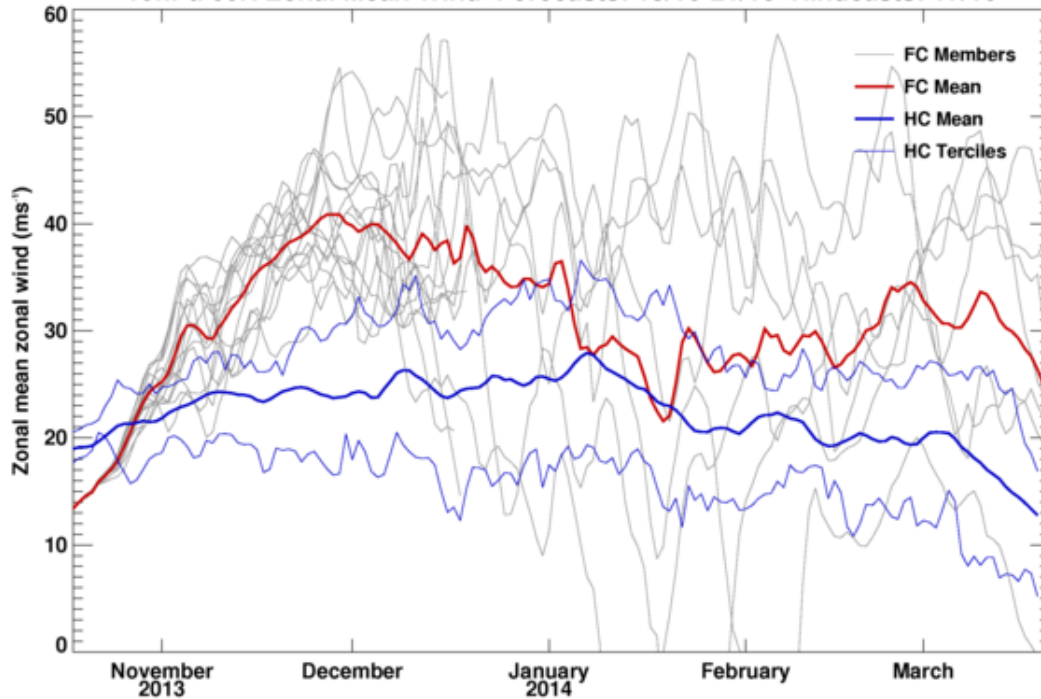




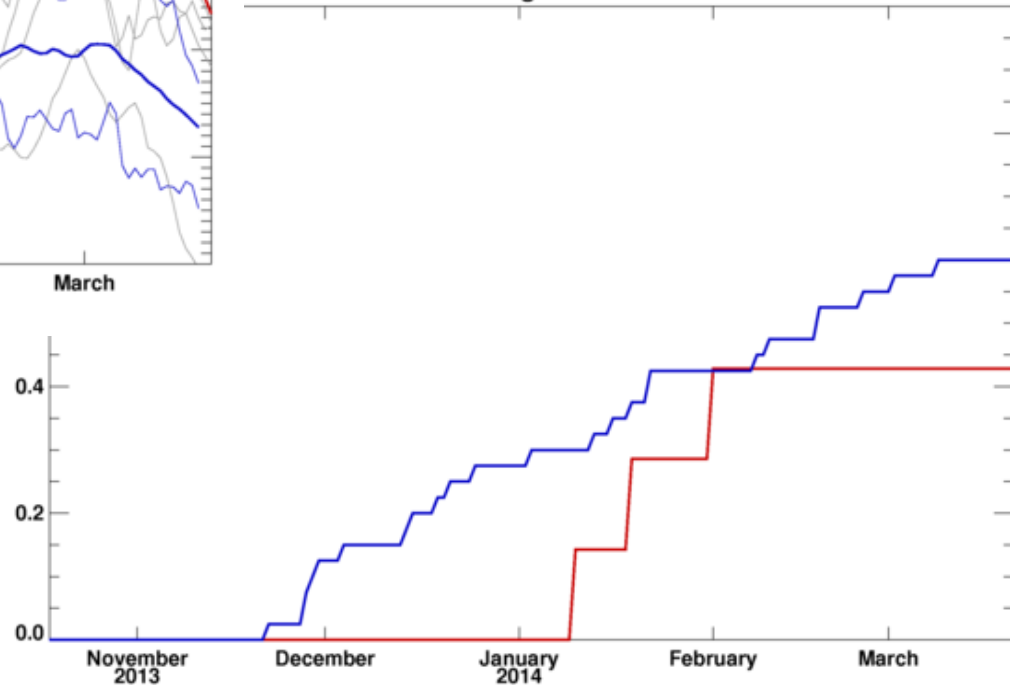
Stratosphere

Met Office
Hadley Centre

10hPa 60N Zonal Mean Wind Forecasts: 18/10-21/10 Hindcasts: 17/10

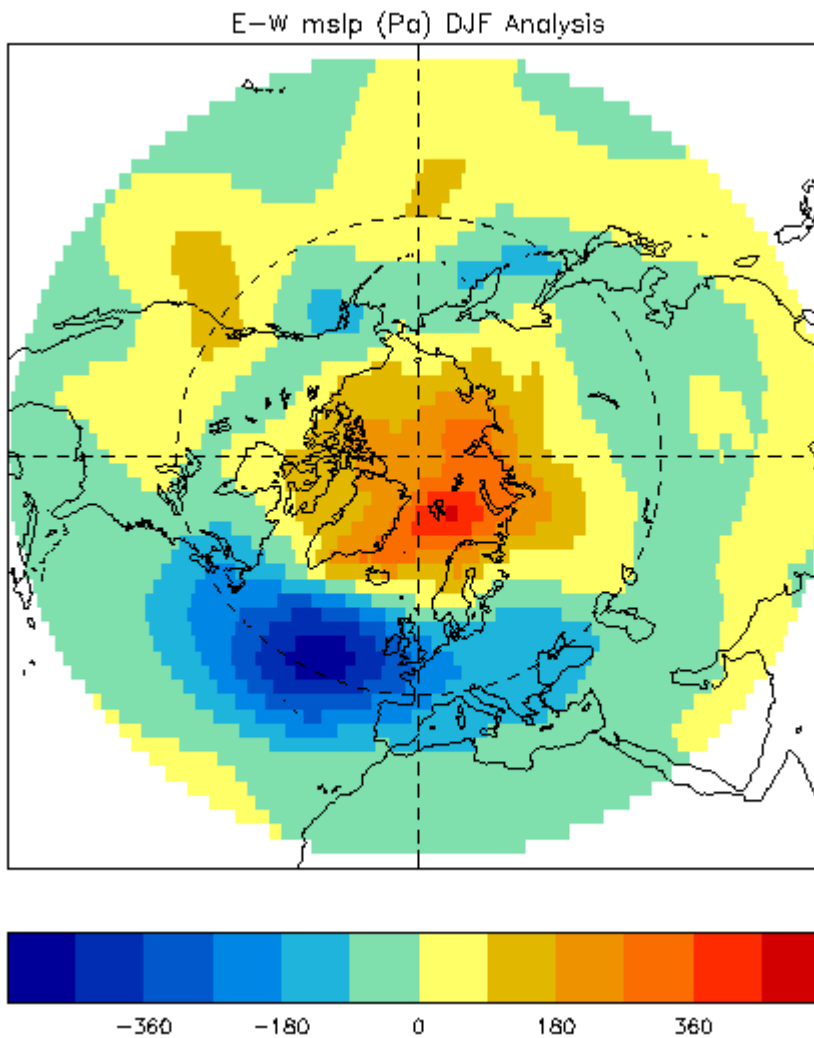


Warming fraction



QBO Influence

Easterly phase – Westerly phase MSLP



Summary – sources of predictability

- **ENSO** – neutral; no contribution expected this year
- **QBO** – westerly phase → positive NAO early winter
- **ATLANTIC SST** – May SST → DJF NAO: + 0.5 stdev
- **SEA ICE** – relatively low September sea-ice → weakly favours negative DJF NAO
- **SNOW** – above-average Eurasian October snow cover? → favours negative AO late winter?

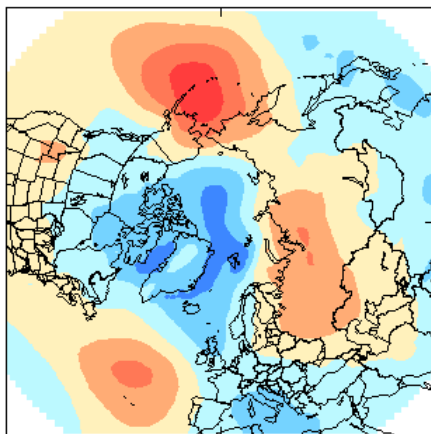
November-December-January Forecast

GloSea5 initialised 30 Sep-20 Oct

Ensemble mean PMSL NDJ 1981-2010 Climate

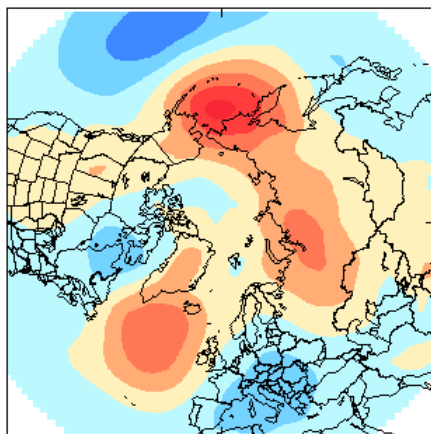
GloSea 5 (41 members)

GloSea5 : Ensemble mean anomaly : mean sea level pressure : Nov/Dec/Jan



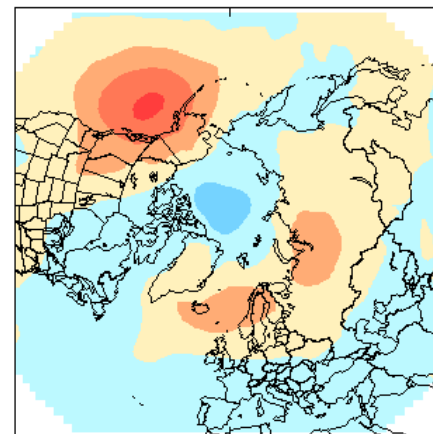
Met France

Meteo France : Ensemble mean anomaly : mean sea level pressure : Nov/Dec/Jan



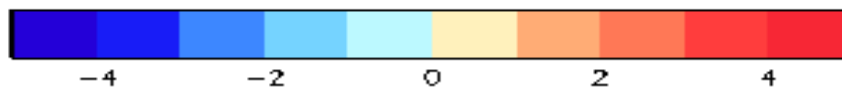
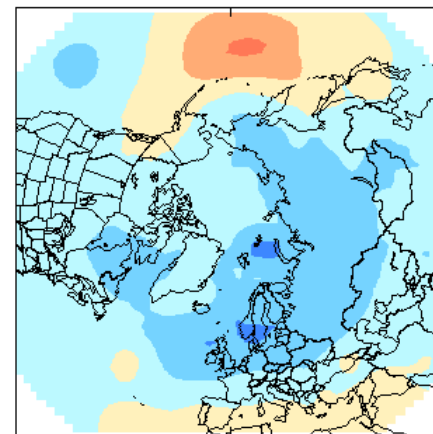
ECMWF

ECMWF : Ensemble mean anomaly : mean sea level pressure : Nov/Dec/Jan



NCEP

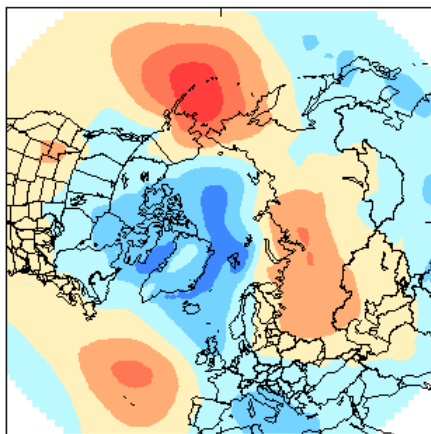
NCEP : Ensemble mean anomaly : mean sea level pressure : Nov/Dec/Jan



Ensemble mean PMSL NDJ 1981-2010 Climate

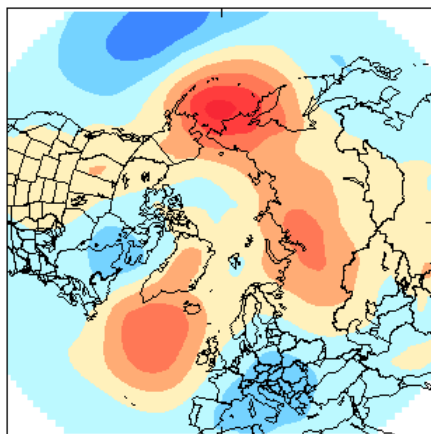
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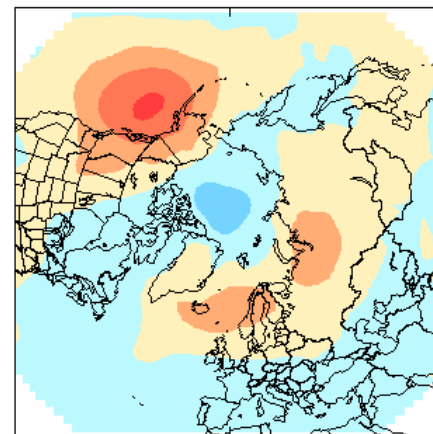
Met France

Meteo France : Ensemble mean anomaly : mean sea level pressure : Nov/Dec/Jan



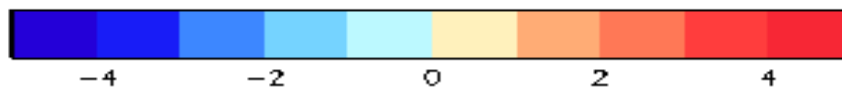
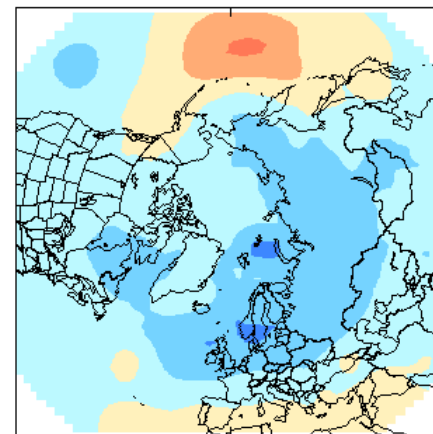
ECMWF

ECMWF : Ensemble mean anomaly : mean sea level pressure : Nov/Dec/Jan



NCEP

NCEP : Ensemble mean anomaly : mean sea level pressure : Nov/Dec/Jan



PMSL anom by month 1981-2010 average



GloSea 5

ECWMF

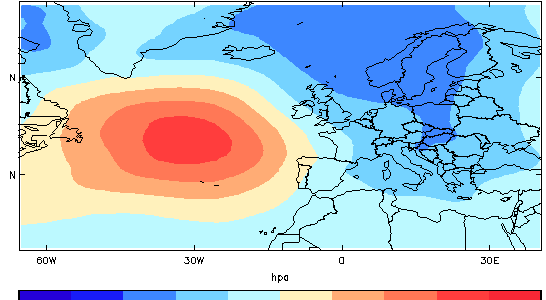
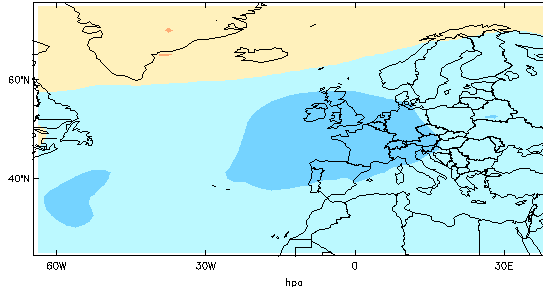
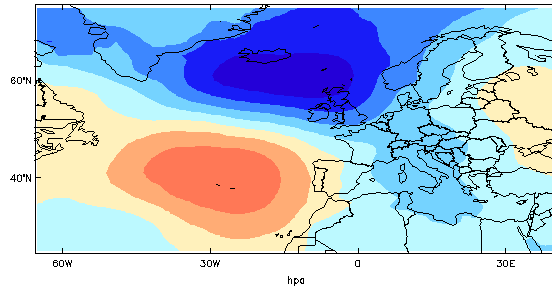
Met France

GloSea5 : Ensemble mean anomaly : mean sea level pressure : Nov

ECMWF : Ensemble mean anomaly : mean sea level pressure : Nov

Meteo France : Ensemble mean anomaly : mean sea level pressure : Nov

Nov

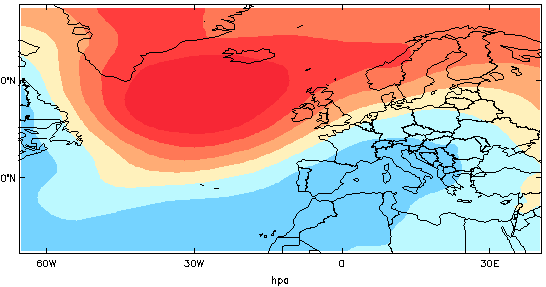
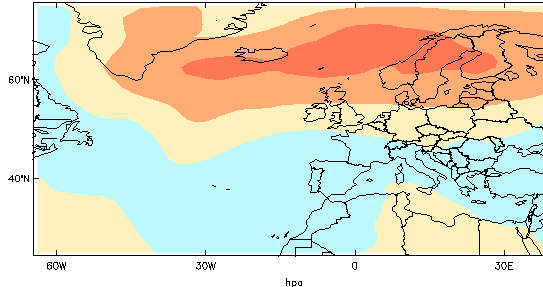
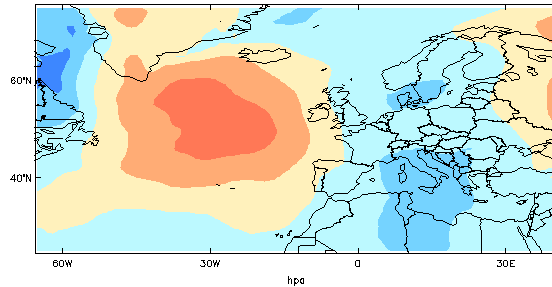


GloSea5 : Ensemble mean anomaly : mean sea level pressure : Dec

ECMWF : Ensemble mean anomaly : mean sea level pressure : Dec

Meteo France : Ensemble mean anomaly : mean sea level pressure : Dec

Dec

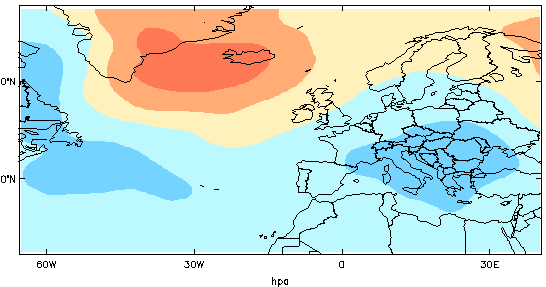
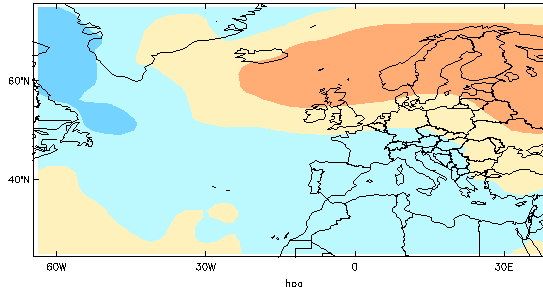
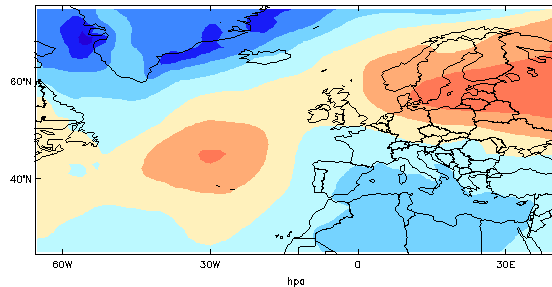


GloSea5 : Ensemble mean anomaly : mean sea level pressure : Jan

ECMWF : Ensemble mean anomaly : mean sea level pressure : Jan

Meteo France : Ensemble mean anomaly : mean sea level pressure : Jan

Jan



GPC output NDJ PMSL anom



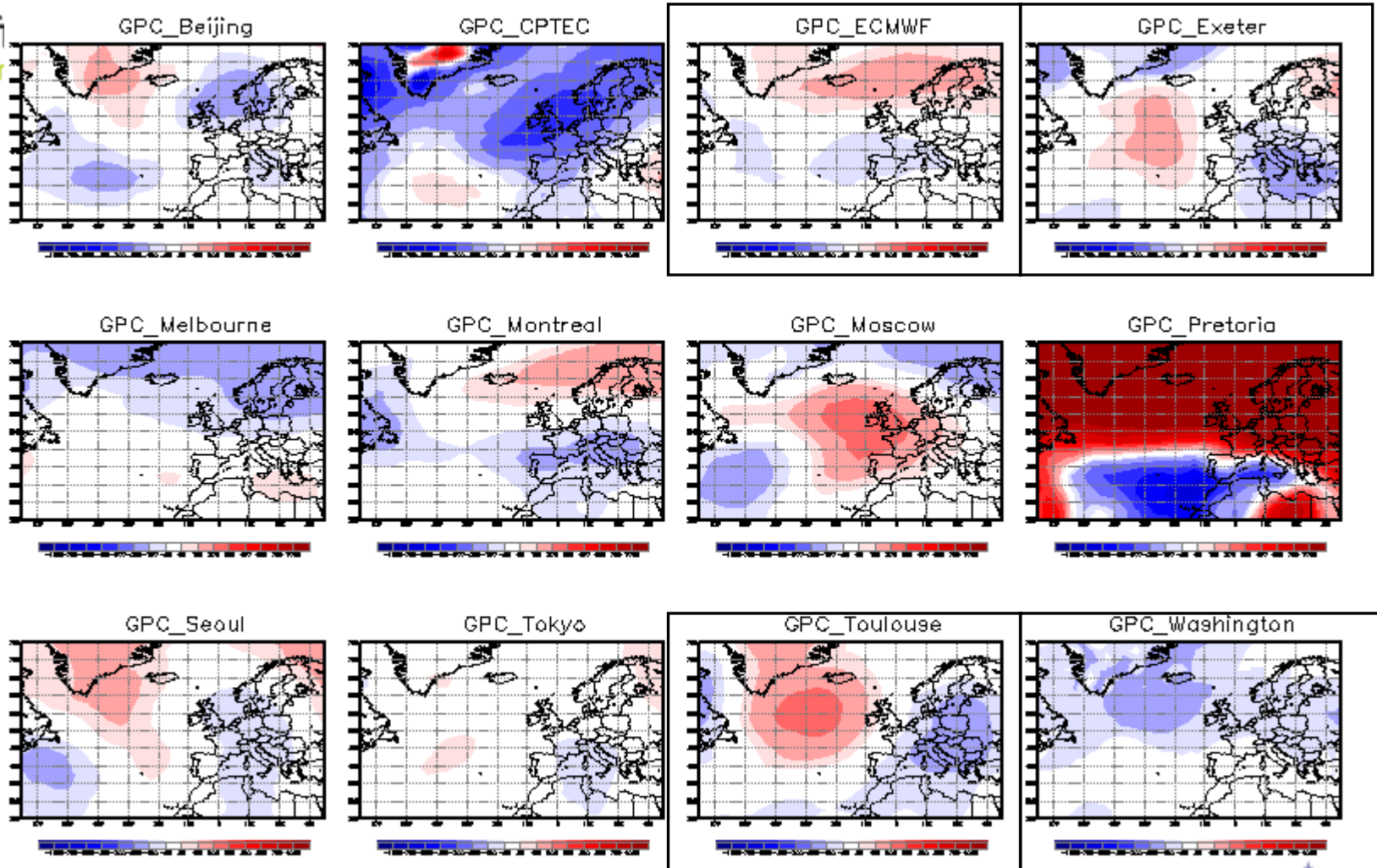
lat=25 75
lon=-65 35

Mean Sea Level Pressure : NDJ2013

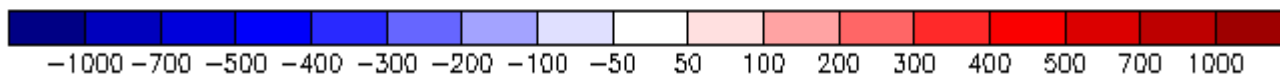
(issued on Oct2013)

[Unit: Pa]

Met Off
Hadley Cer



J/F O/N T/V V/V L/V T/V 0 T/V L/V V/V



Pa

Ensemble mean PMSL 1981-2010 climate

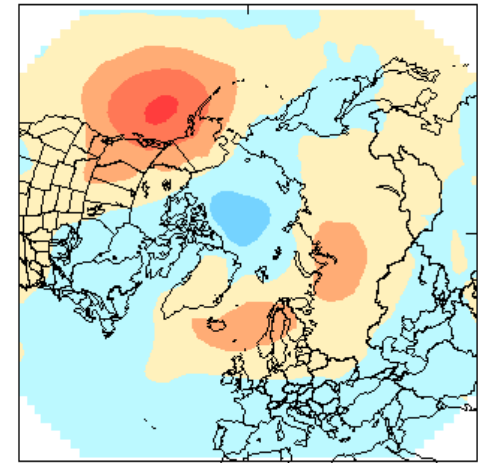
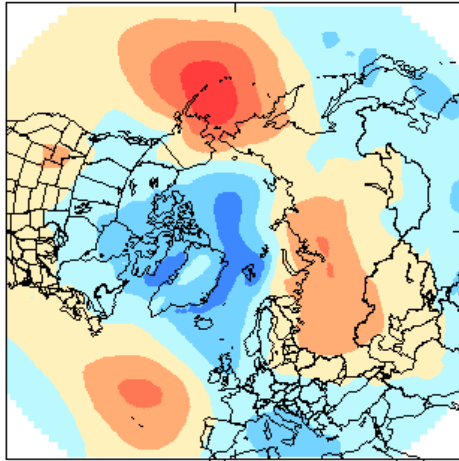
GloSea 5

ECMWF

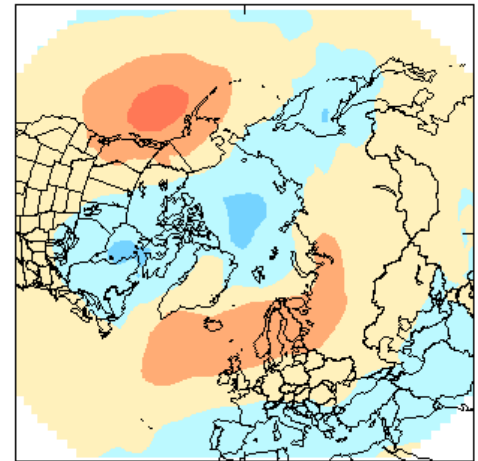
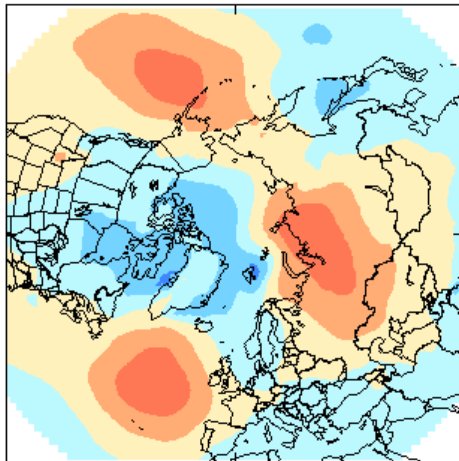
GloSea5 : Ensemble mean anomaly : mean sea level pressure : Nov/Dec/Jan

ECMWF : Ensemble mean anomaly : mean sea level pressure : Nov/Dec/Jan

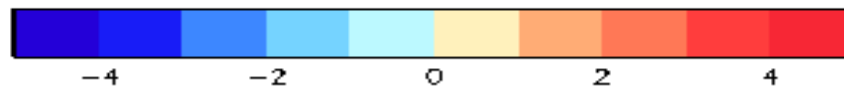
NDJ



DJF



npa





Met Office

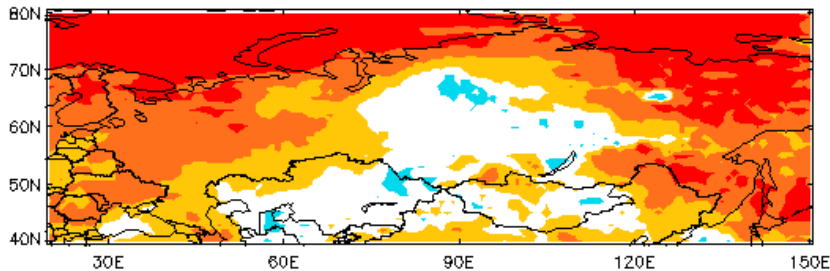
GloSea5

ECMWF

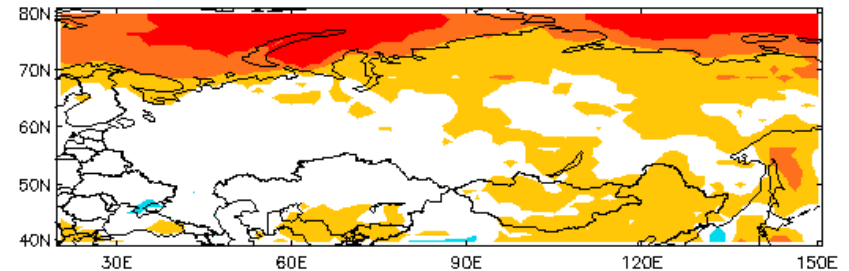
2m temperature tercile probabilities Nov-Jan

Eurasia : 1981-2010 climate

Above GloSea5 : Probability of tercile categories Nov/Dec/Jan
Issued Oct 2013
above-normal 2m temperature 2013 1981-2010 climate

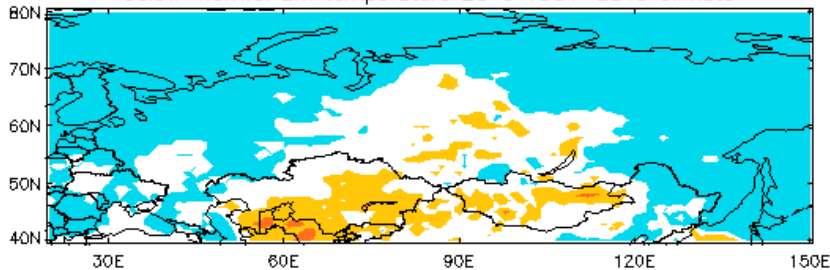


ECMWF : Probability of tercile categories Nov/Dec/Jan
Issued Oct 2013
above-normal 2m temperature 2013 1981-2010 climate

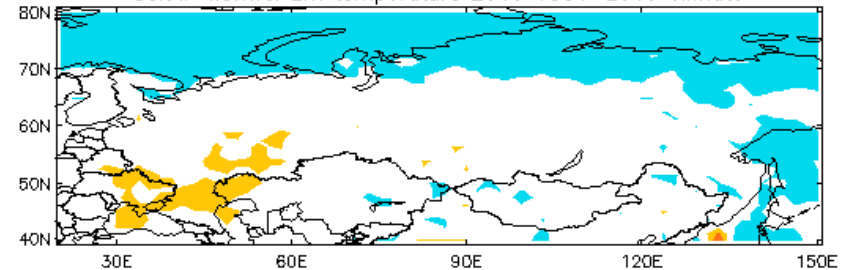


Below

below-normal 2m temperature 2013 1981-2010 climate



below-normal 2m temperature 2013 1981-2010 climate

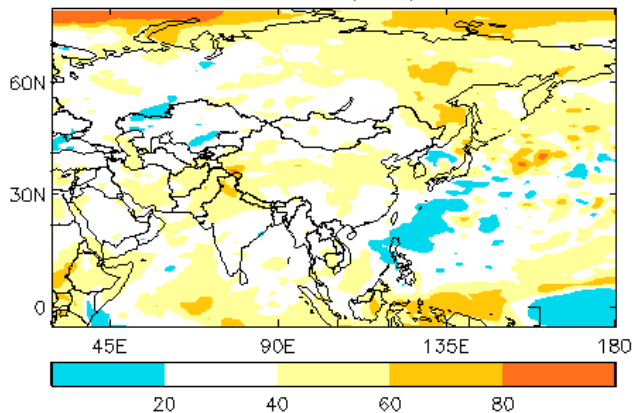


Precipitation tercile probabilities Nov-Jan

Eurasia : 1981-2010 climate

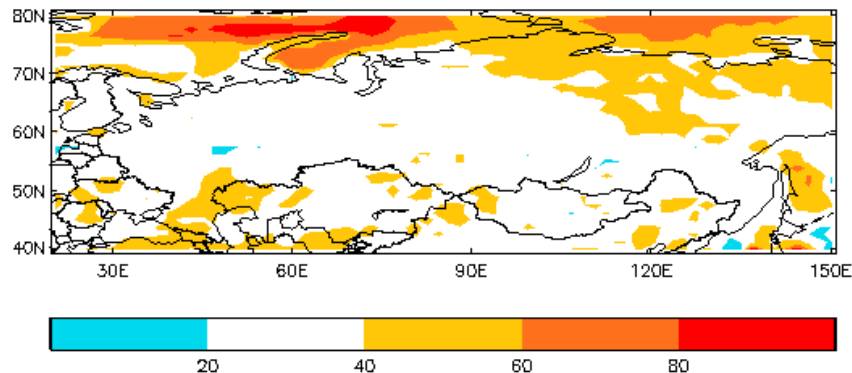
GloSea5

Probability of tercile categories Nov/Dec/Jan Issued Oct 2013
above-normal precipitation



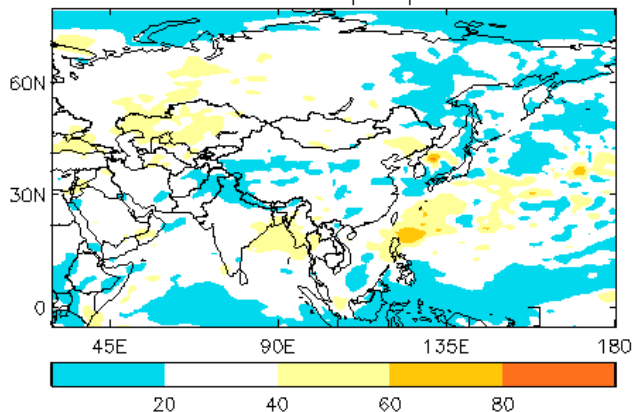
ECMWF

ECMWF : Probability of tercile categories Nov/Dec/Jan
Issued Oct 2013
above-normal precipitation 2013 1981-2010 climate

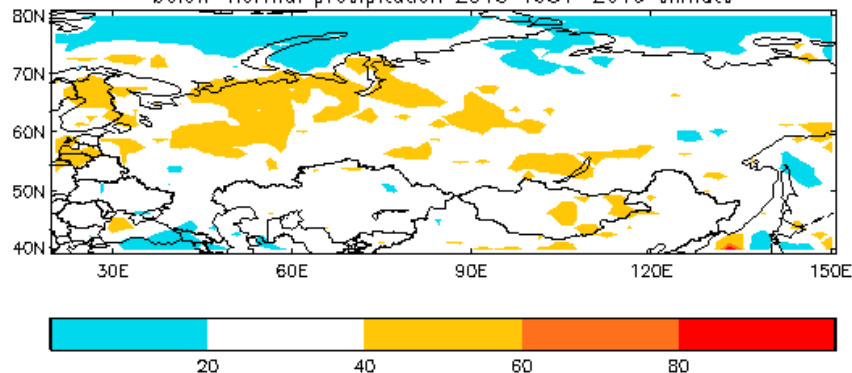


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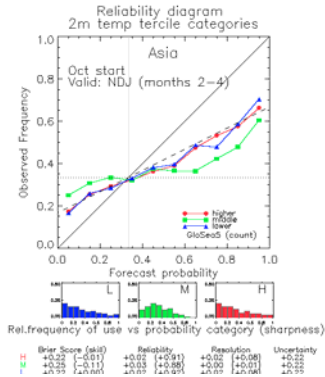
below-normal precipitation



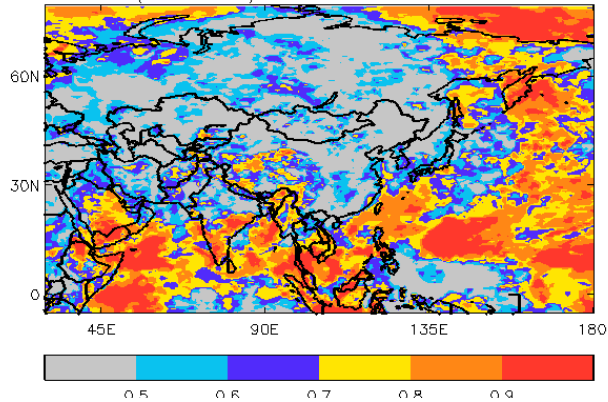
below-normal precipitation 2013 1981-2010 climate



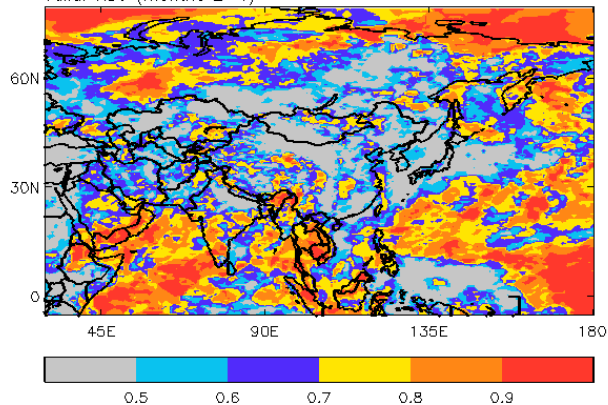
temperature



GloSea5 : ERAI 1996-2009
2m temp in upper tercile category
Start: Oct
Valid: NDJ (months 2-4)

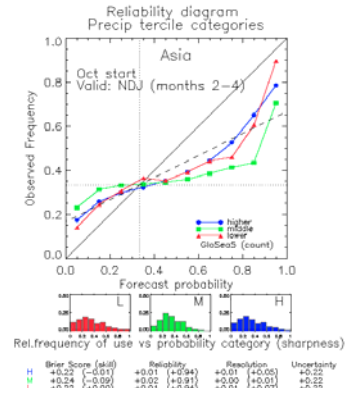


GloSea5 : ERAI 1996-2009
2m temp in lower tercile category
Start: Oct
Valid: NDJ (months 2-4)

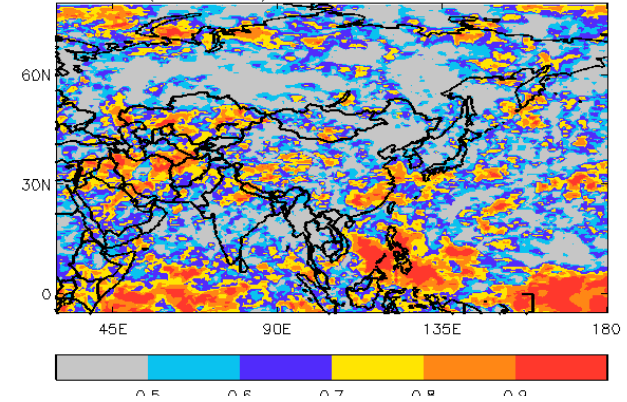


NDJ

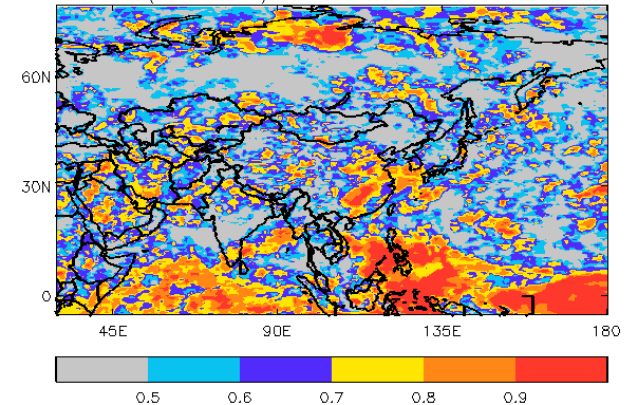
precipitation



GloSea5 : GPCP 1996-2009
Precip in upper tercile category
Start: Oct
Valid: NDJ (months 2-4)



GloSea5 : GPCP 1996-2009
Precip in lower tercile category
Start: Oct
Valid: NDJ (months 2-4)



Above

Below

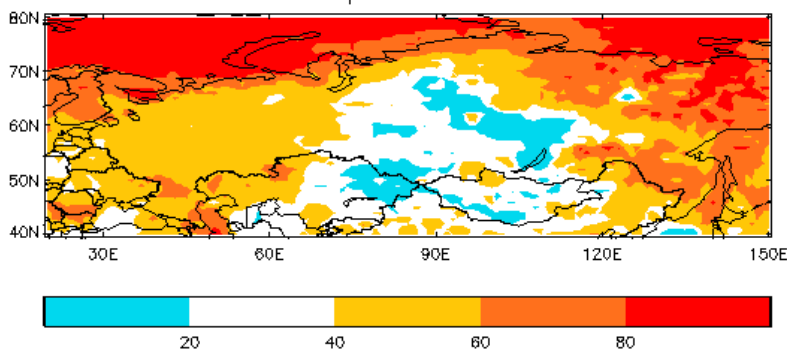
2m temperature tercile probabilities Dec-Feb Eurasia : 1981-2010 climate

GloSea5

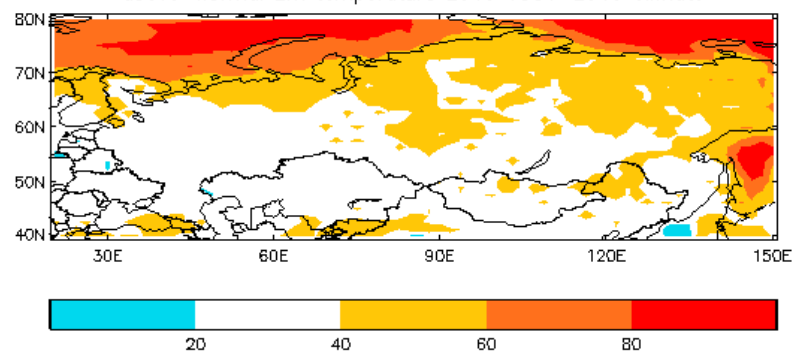
ECMWF

Above

GloSea5 : Probability of tercile categories Dec/Jan/Feb
Issued Oct 2013
above-normal 2m temperature 2013 1981-2010 climate

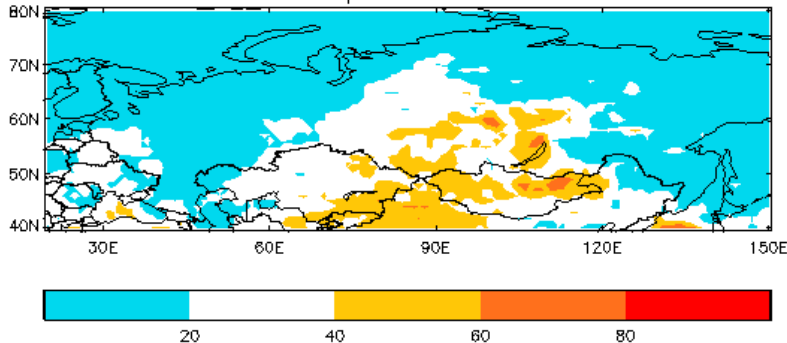


ECMWF : Probability of tercile categories Dec/Jan/Feb
Issued Oct 2013
above-normal 2m temperature 2013 1981-2010 climate

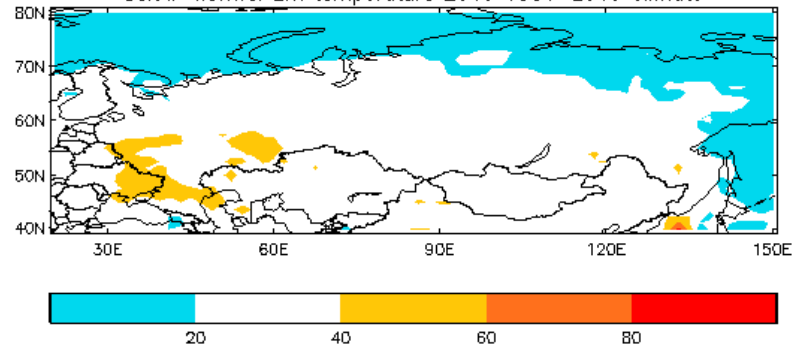


Below

below-normal 2m temperature 2013 1981-2010 climate



below-normal 2m temperature 2013 1981-2010 climate





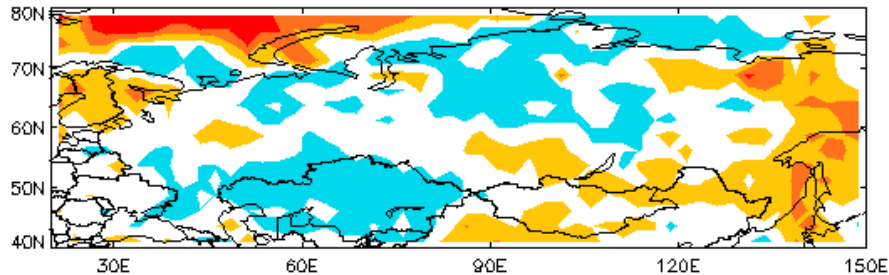
Met Office

GloSea5

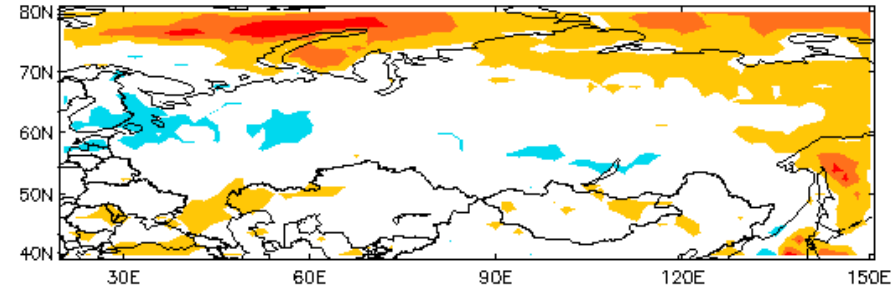
Precipitation tercile probabilities Dec-Feb Eurasia : 1981-2010 climate

ECMWF

Above GloSea5 : Probability of tercile categories Dec/Jan/Feb
Issued Oct 2013
above-normal precipitation 2013 1981-2010 climate

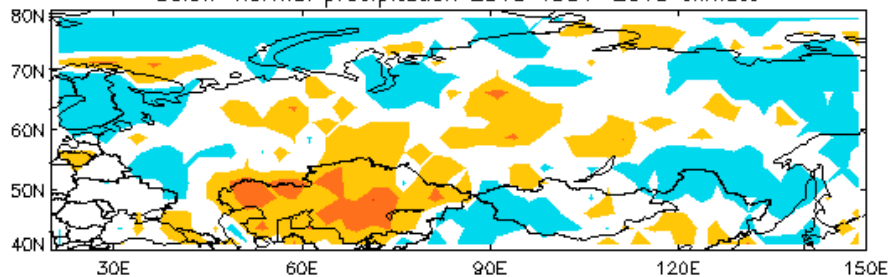


ECMWF : Probability of tercile categories Dec/Jan/Feb
Issued Oct 2013
above-normal precipitation 2013 1981-2010 climate

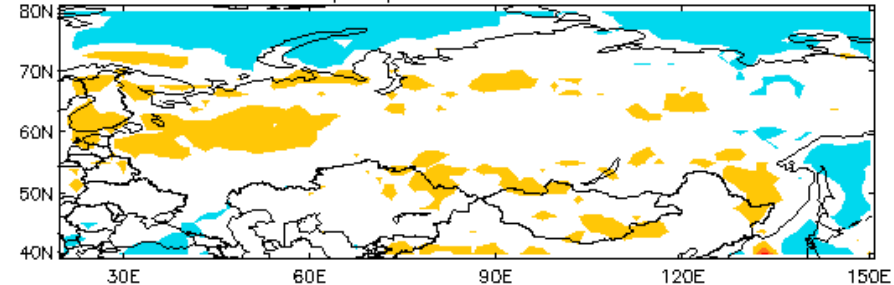


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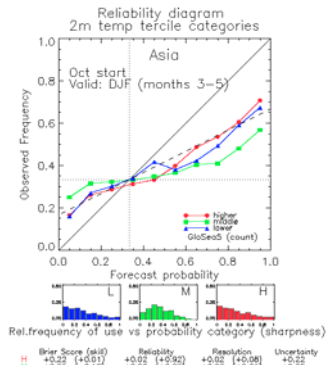
below-normal precipitation 2013 1981-2010 climate



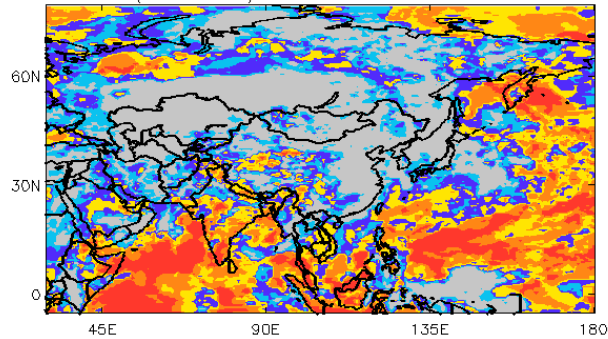
below-normal precipitation 2013 1981-2010 climate



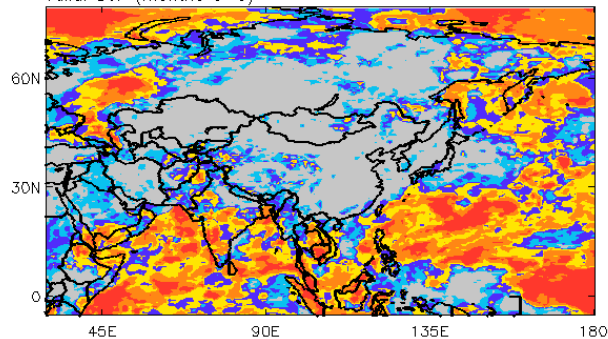
temperature



GloSea5 : ERAI 1996–2009
2m temp in upper tercile category
Start: Oct
Valid: DJF (months 3–5)



GloSea5 : ERAI 1996–2009
2m temp in lower tercile category
Start: Oct
Valid: DJF (months 3–5)

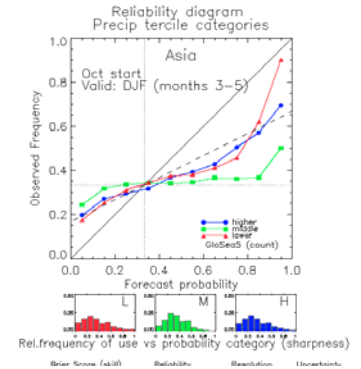


DJF

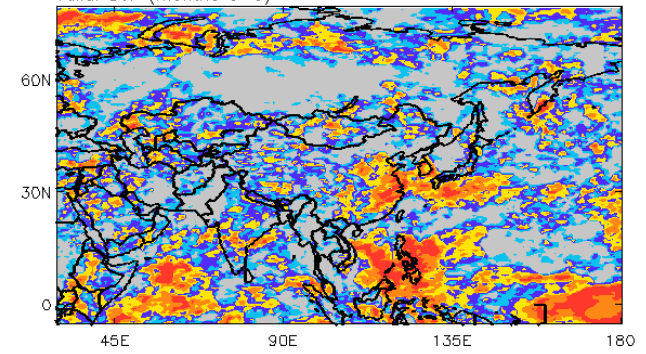
Above

Below

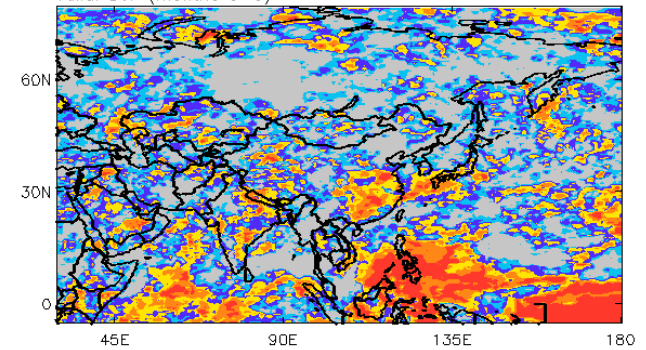
precipitation



GloSea5 : GPCP 1996–2009
Precip in upper tercile category
Start: Oct
Valid: DJF (months 3–5)



GloSea5 : GPCP 1996–2009
Precip in lower tercile category
Start: Oct
Valid: DJF (months 3–5)



Summary

- the signal from models has changed during October – the forecasts currently available from many GPCs may be out of date
- in Met Office system, predictability of NAO/AO is low from October, but much better from November initial conditions – need to update forecast for winter later in November

Expected influences this year:

- nothing significant from tropics
- weak forcing from oceans, sea ice (and snow?)
- strong influence from the stratosphere (QBO)

Met Office forecast currently favours positive NAO/AO for NDJ and DJF.