Seasonal Outlook for Winter 2013/2014 over East Asia

Wei Gu and Lijuan Chen

Beijing Climate Center, CMA

5 November 2013, Ulaanbaatar, Mongolia
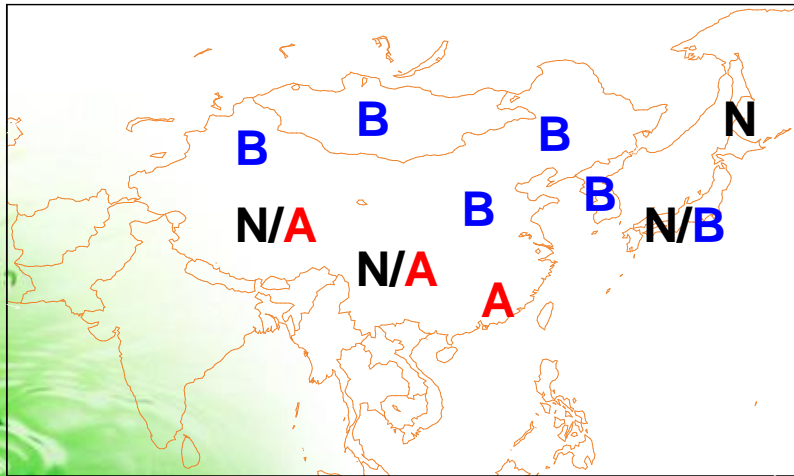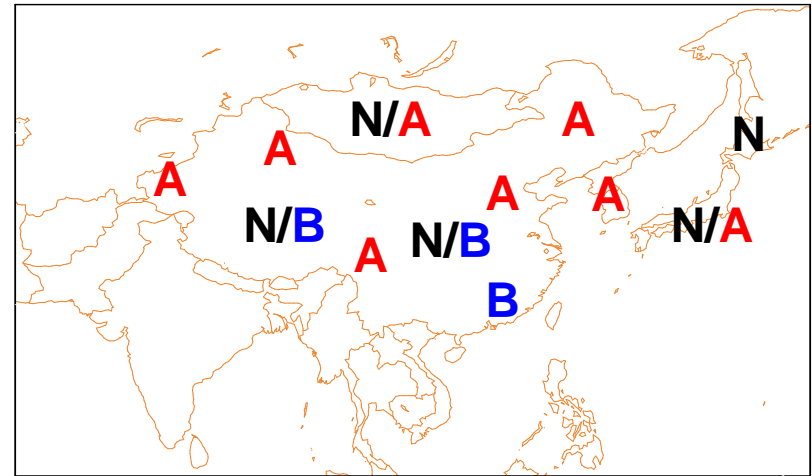
Prediction for winter

EAWM : slightly strong

Temperature

Precipitation

CGCM Model prediction

Slightly Strong EAWM

Interdecadal characteristics

Strong EAWM epoch

Impacts from External factors

North Atlantic SSTA: positive potential height anomaly over Ural Mountain

Tropical "La Nina" pattern: normal to strong EAWM

Arctic sea ice: slightly strong Siberia High

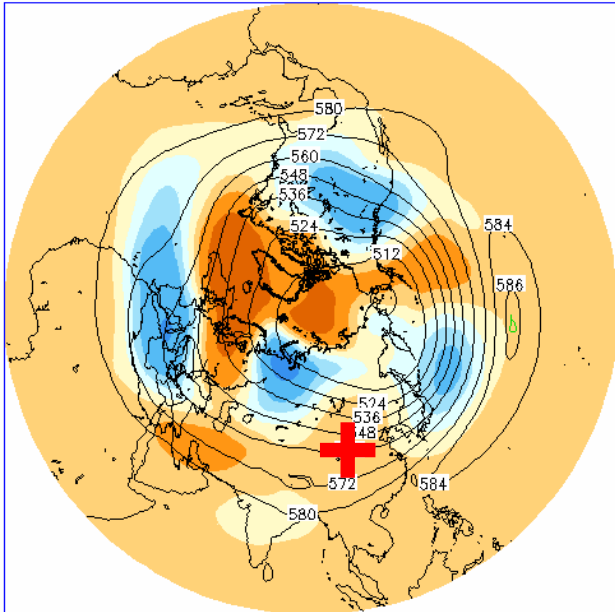Snow cover: negative phase of AO

Outlines

➢ **Prediction from CGCM1.0/BCC**

➢ **Interdecadal characteristic of EAWM and wintertime climate**

➢ **Impacts of current anomalous external forcing (SST & sea ice)**

CGCM1.0/BCC for Atmospheric Circulation in DJF

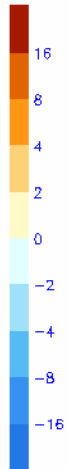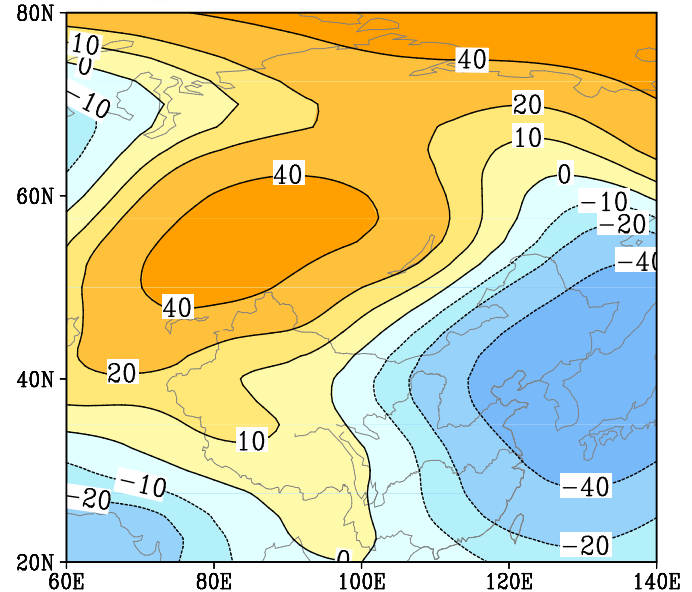**Modified 500hPa**

500hPa height

NCC/BCC Seasonal Forecast   CGCM
Ensemble Mean 500Hpa Height and its Anomaly   For 2013/12−2014/02
Fcst Started Refer Date 2013/10/01   Fcst Produced Date2013/10/22
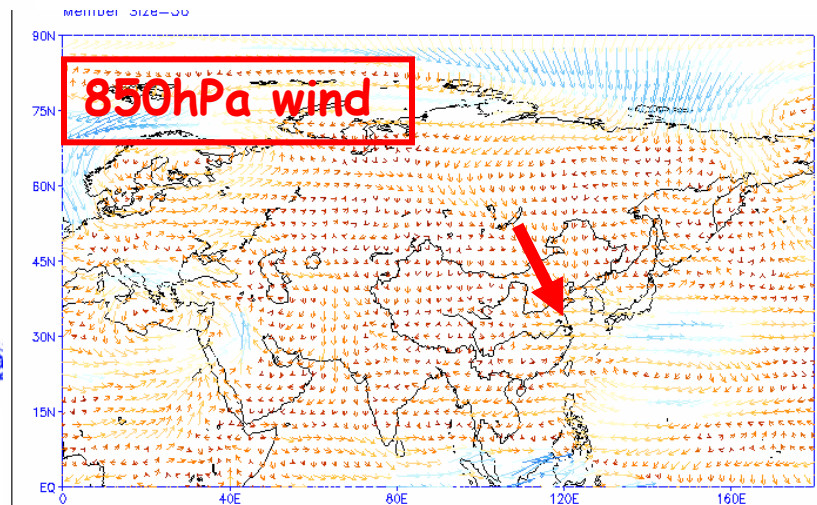Member Size=48

http://ncc.cma.gov.cn(ch)
http://bcc.cma.gov.cn(en)

850hPa wind

http://ncc.cma.gov.cn(ch)
http://www.bcc.cma.gov.cn(en)
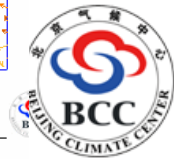
CGCM1.0/BCC for T and R in NDJ/DJF
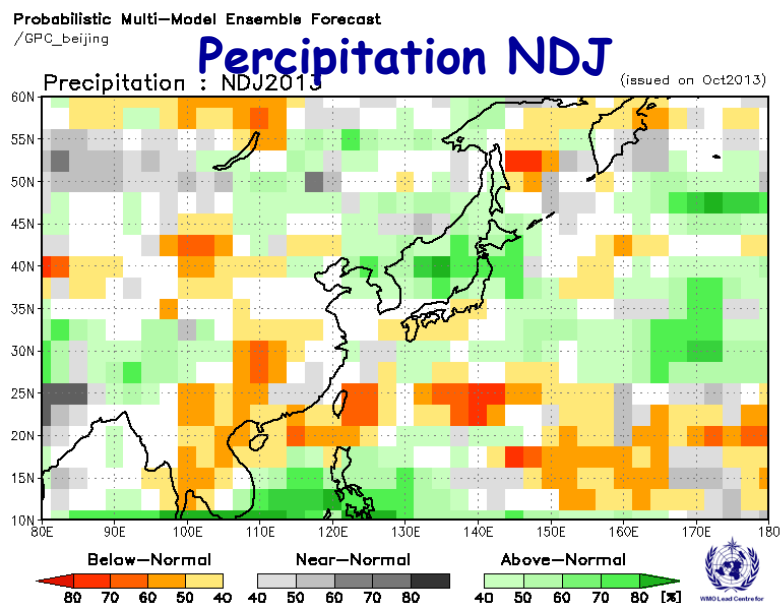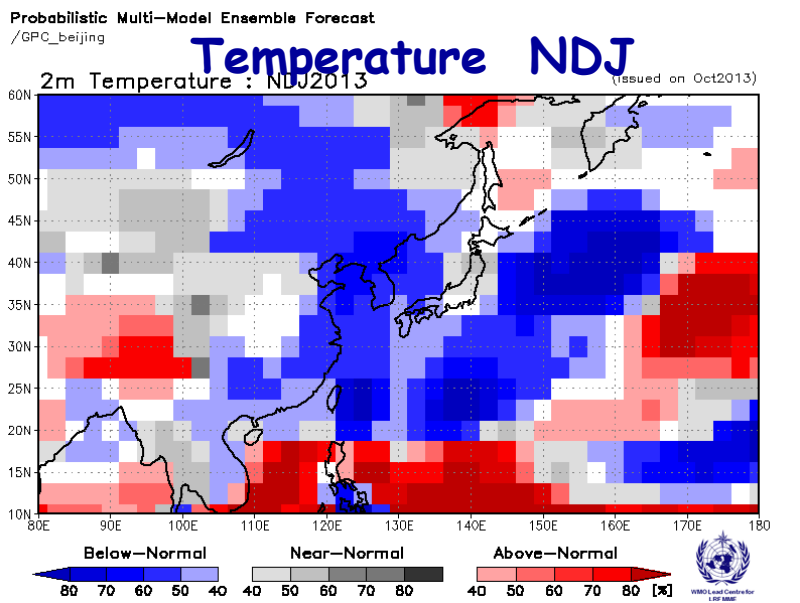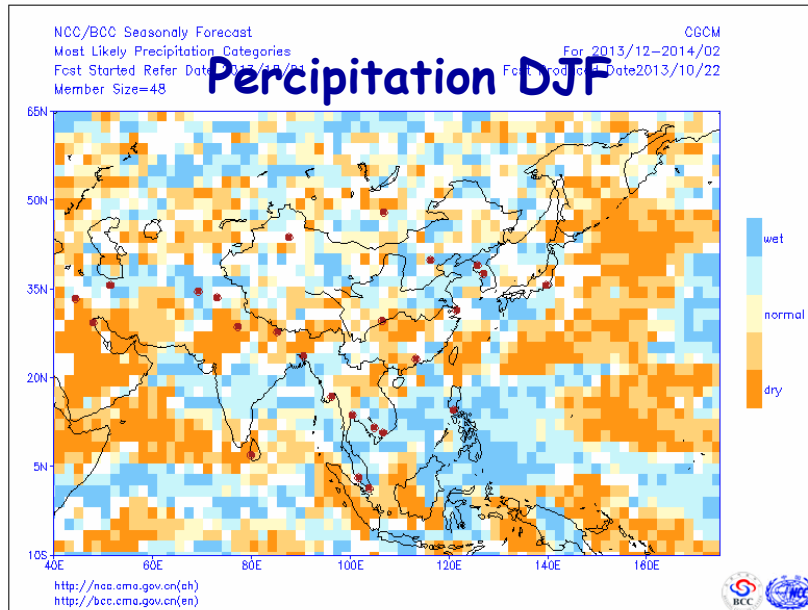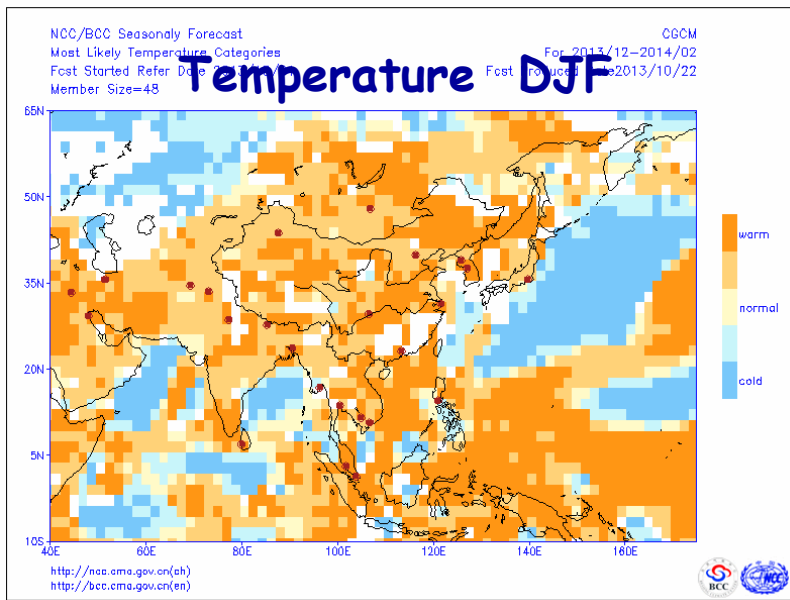
Temperature DJF

Percipitation DJF

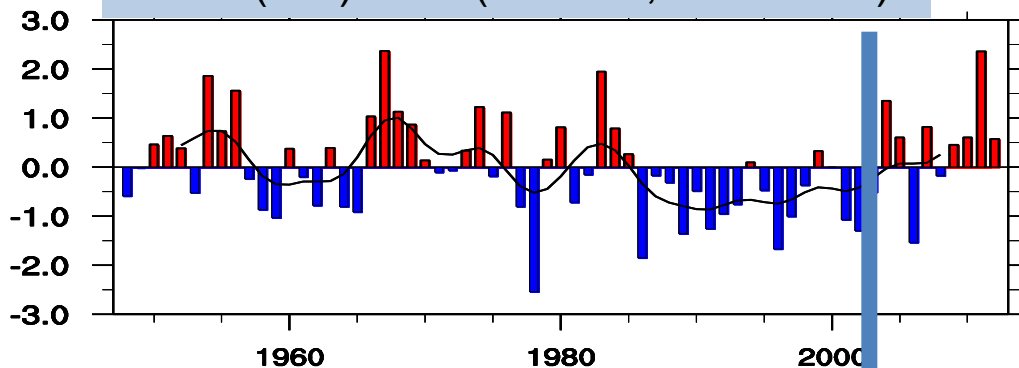Temperature NDJ

Percipitation NDJ

Outlines

➢ **Prediction from CGCM1.0/BCC**

➢ **Interdecadal characteristic of EAWM and wintertime climate**

➢ **Impacts of current anomalous external forcing**
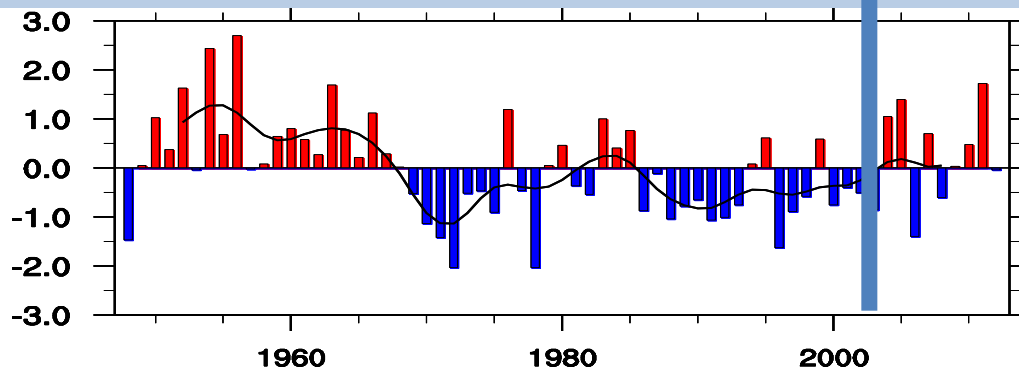
EAWM indices

Index (Wu): SLP(20-70N, 110-160E)

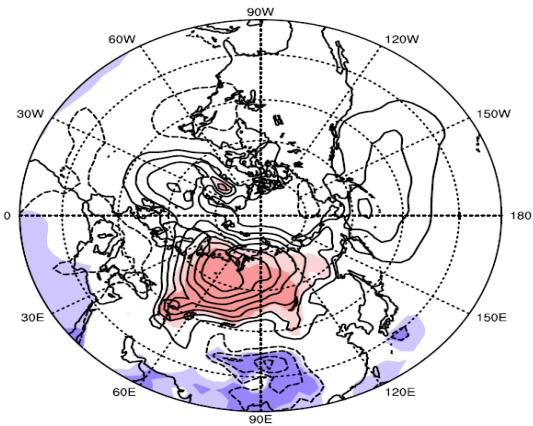Index (Zhu): U500 (25-35N, 80-120E) - (50-60N, 80-120E)

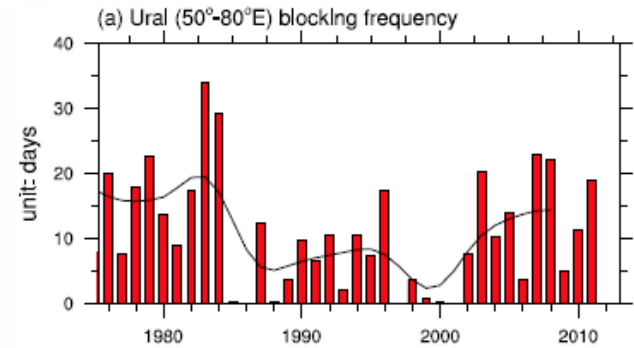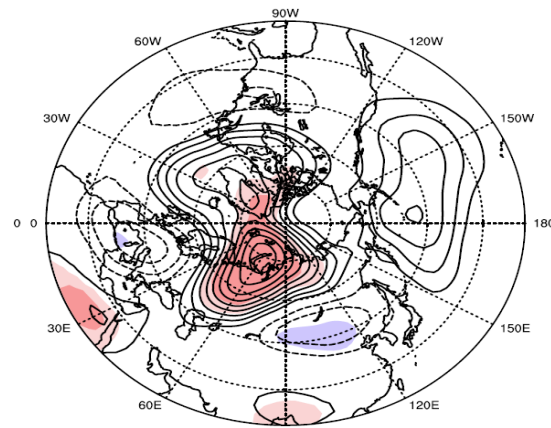Another strong epoch of the EAWM probably starts since 2004.

Circulation composite 2004-2012

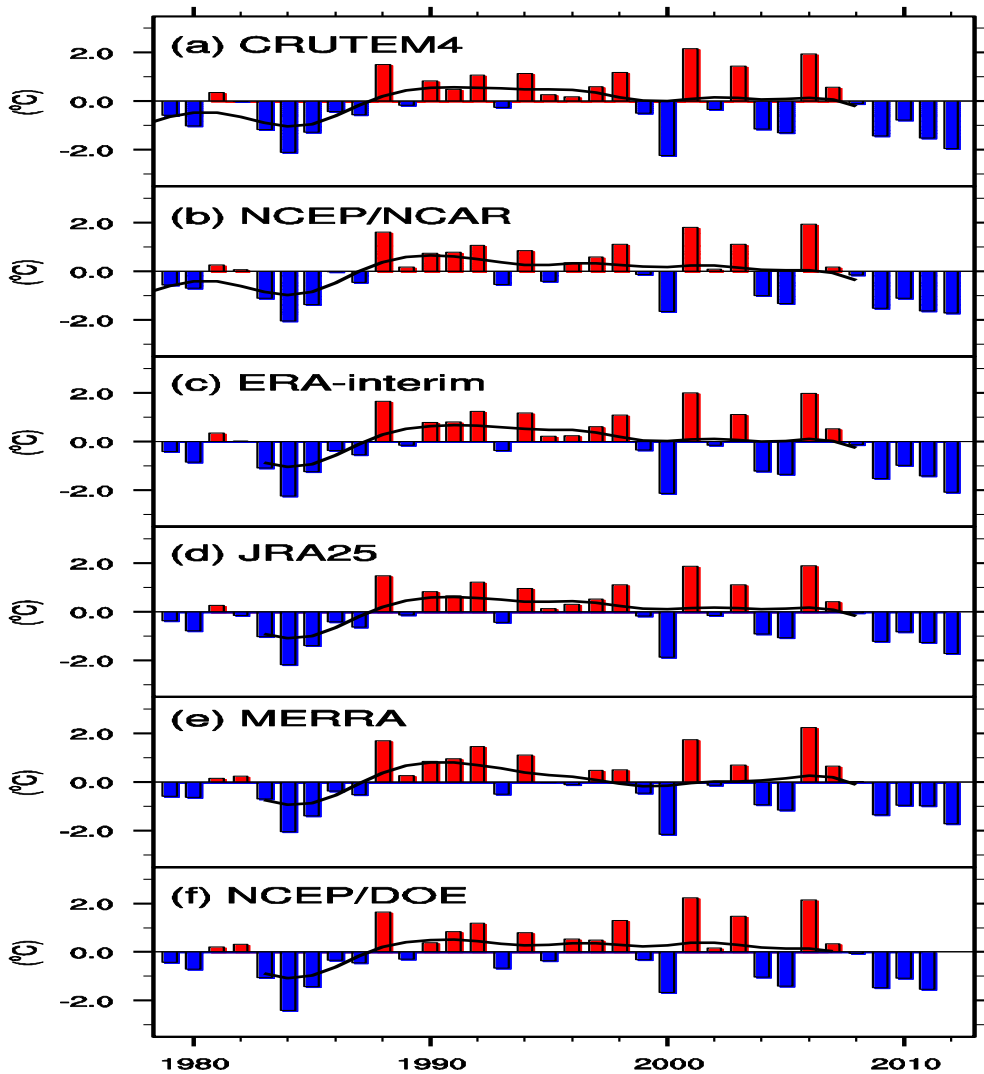## SLP

500H

(a) Ural (50°-80°E) blocking frequency

Stronger Siberian High, lower East Asia trough and enhanced Ural blocking since 2004
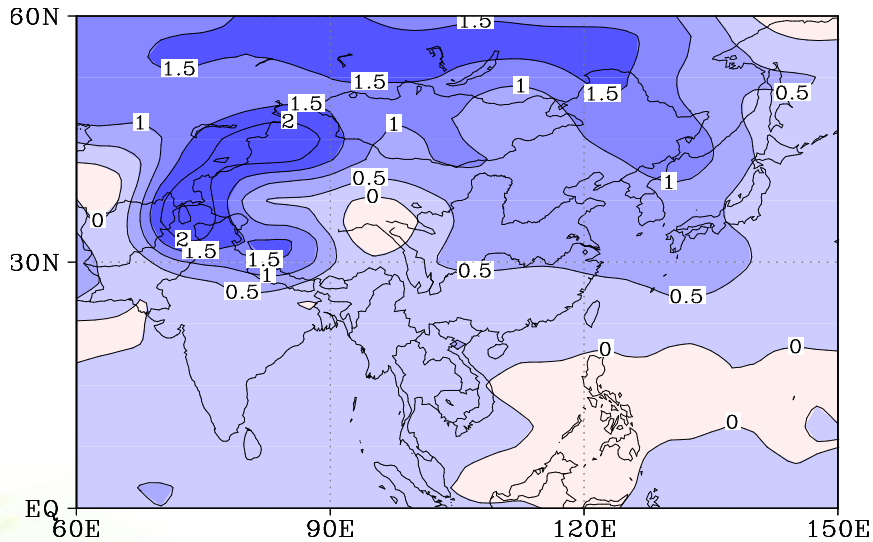
DJF T averaged over East Asia (20-50N ,100-140E)

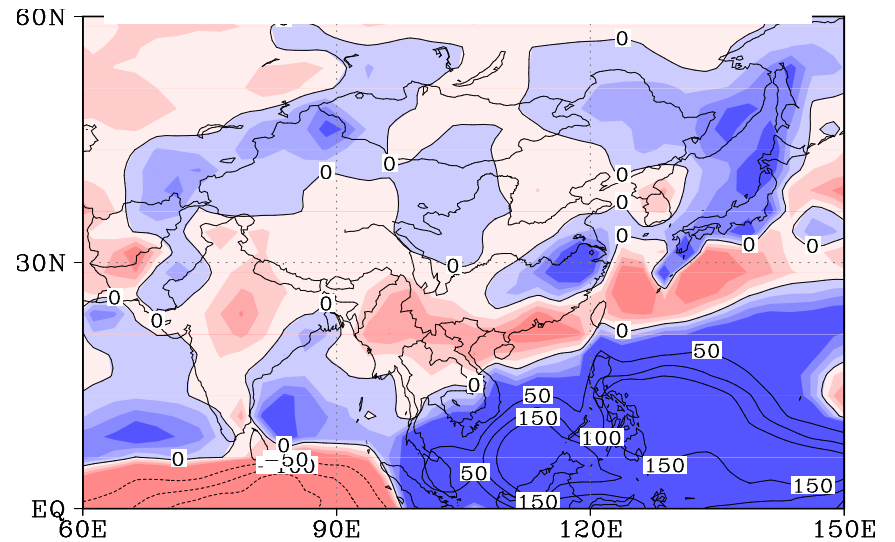
The DJF East Asia turns colder since 2004.

Composite of DJF temperature 2004-2012

Composite of DJF precipitation 2004-2012

Outlines

➢ **Prediction from CGCM1.0/BCC**

➢ **Interdecadal characteristic of EAWM and wintertime climate**

➢ **Impacts of current anomalous external forcing (SST, sea ice and snow)**
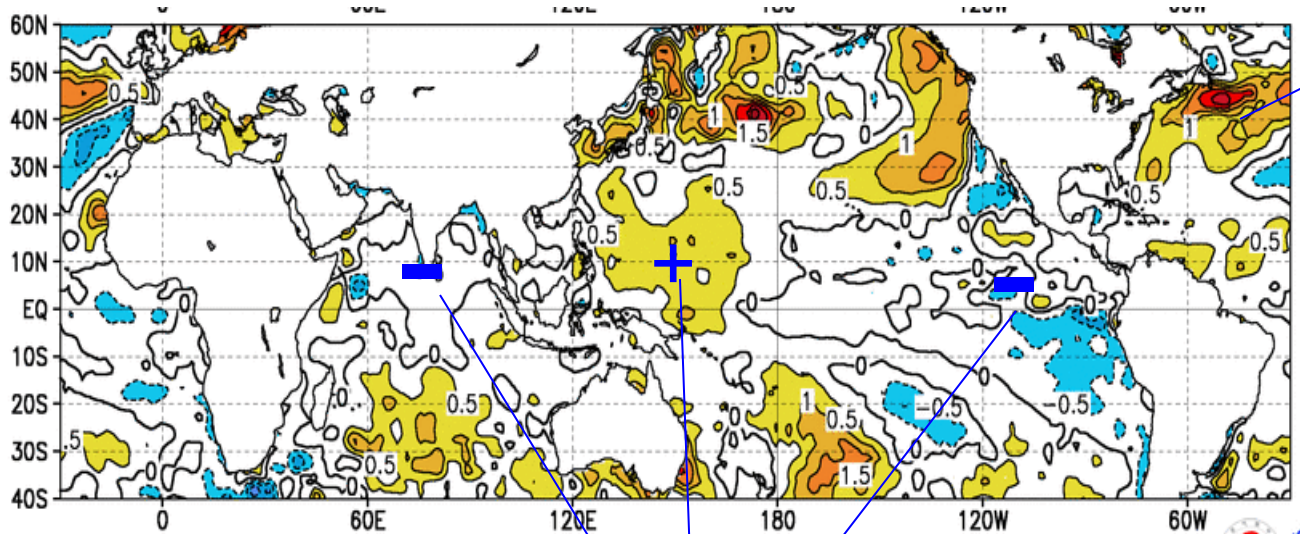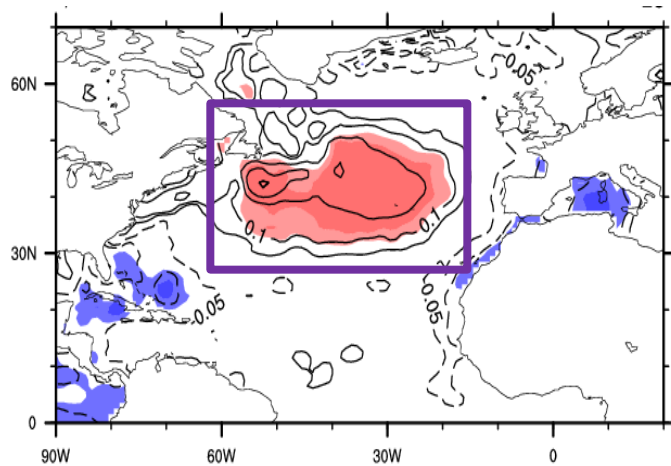
SSTA in Sep 2013

图 4.1 月平均海表温度(上)及距平(下) (°C) 2013.09
Monthly Mean Sea Surface Temperatures (top) and Anomalies (bottom)
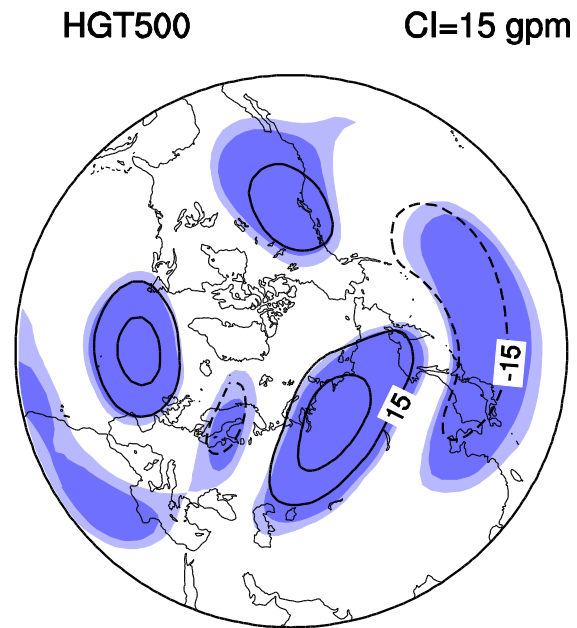Climate Diagnostics and Prediction Division /NCC/CMA

Warm in the North Atlantic

La Nina-like SSTA distribution

HGT500   CI=15 gpm

Corr. Between the SSTA and the EU index

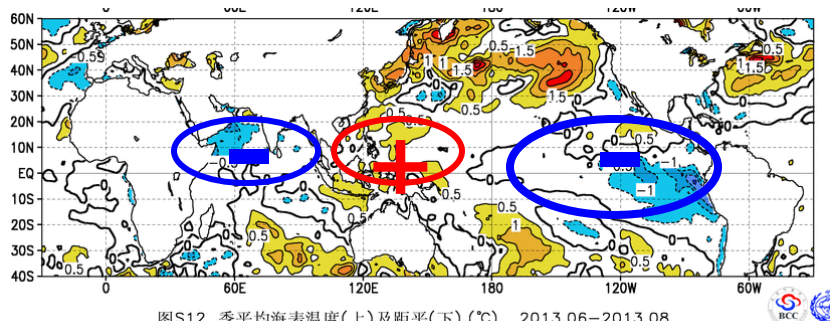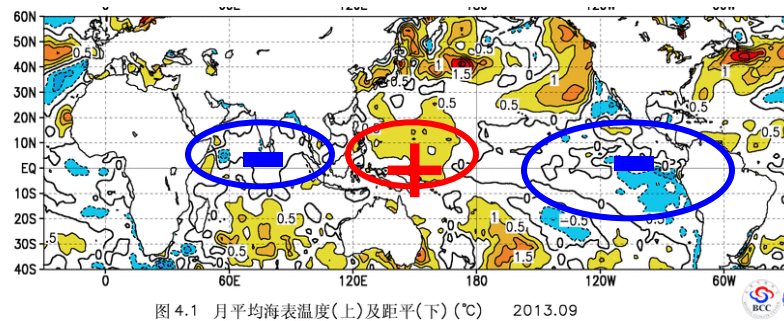The EU pattern

The North Atlantic SSTA can probably excite
an EU pattern, which affects the EAWM.
（Li, 2004; Liu et al., 2013）

summer SSTA, 2013

Sep SSTA, 2013

Regr. of the surface T on the EU index

The warmer North Atlantic SSTA favors a strong EAWM, colder Mongolia, Eastern China, Korea and Japan

Summer SSTA, 2013

September SSTA, 2013

图S12 季平均海表温度(上)及距平(下)(℃) 2013.06−2013.08
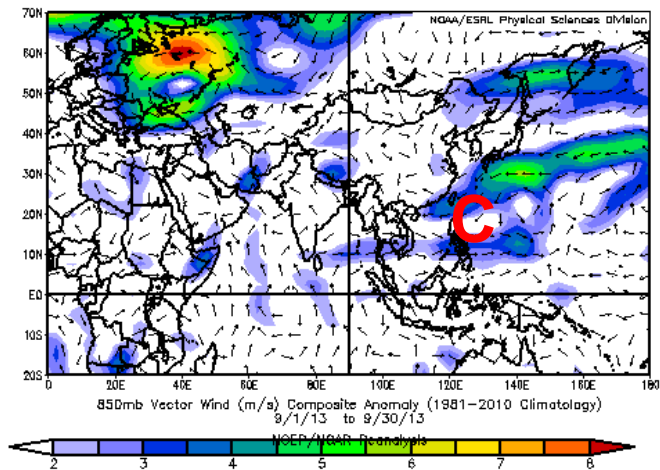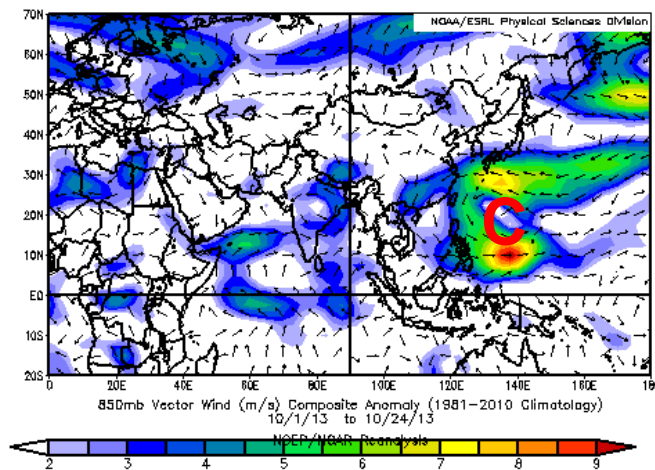Seasonal Mean Sea Surface Temperatures (top) and Anomalies (bottom)

图4.1 月平均海表温度(上)及距平(下)(℃) 2013.09
Monthly Mean Sea Surface Temperatures (top) and Anomalies (bottom)
Climate Diagnostics and Prediction Division /NCC/CMA
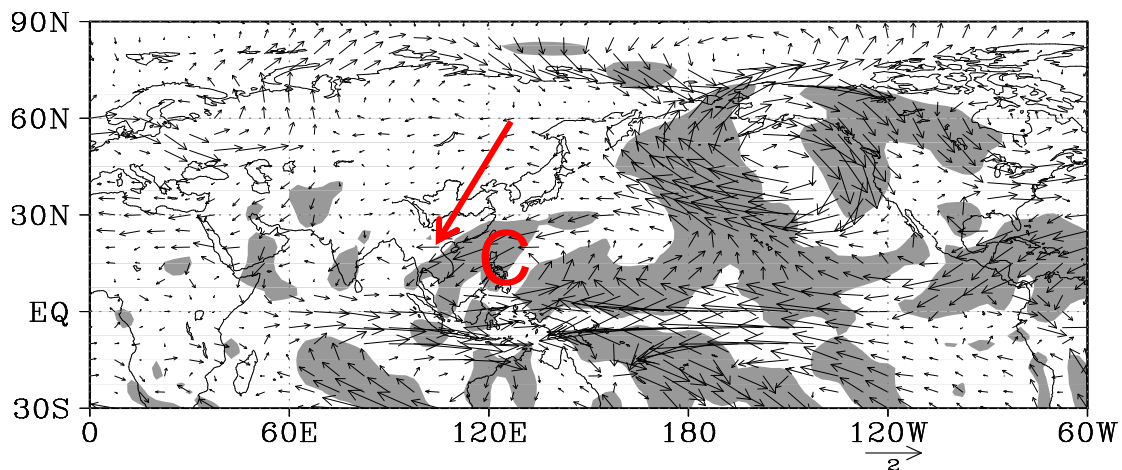
Anomalous 850wnd, Sep 2013
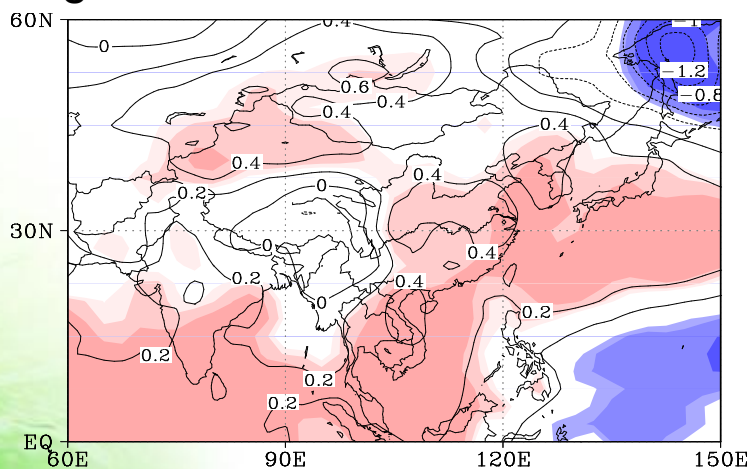
Anomalous 850wnd, Oct 2013

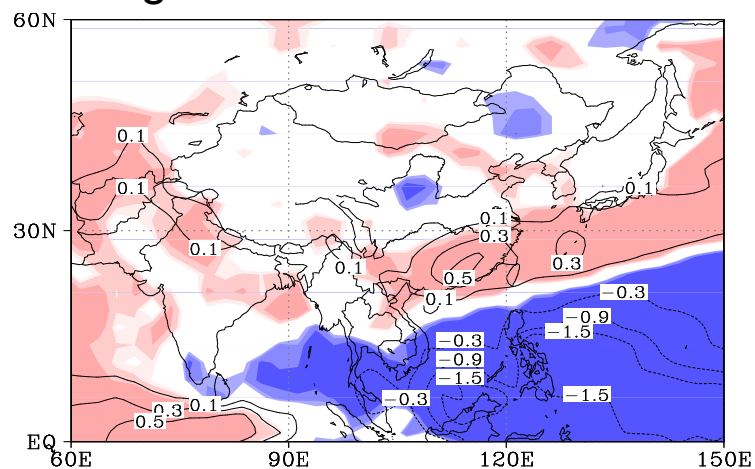La Nina-like atmospheric response in East Asia in Sep and Oct.

Regr. of the DJF 850wnd on the Nino3 index

Regr of DJF T on the Nino3 index

Regr of DJF R on the Nino3 index
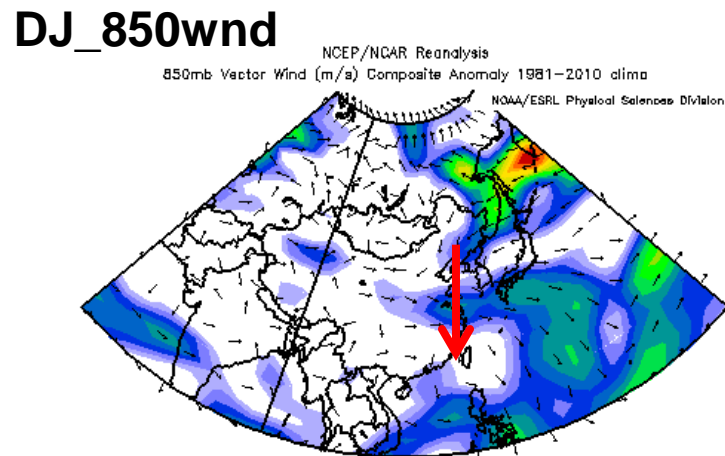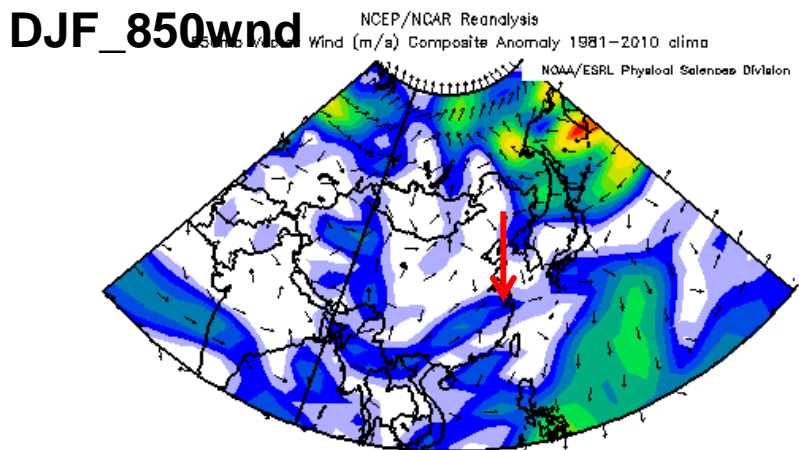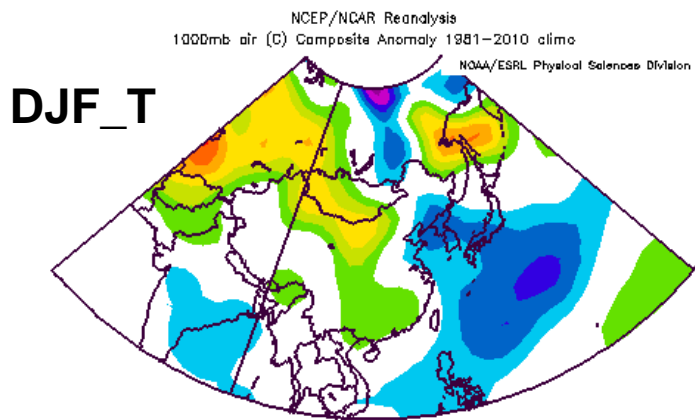

La Nina-related cyclone favors a strong EAWM.

Composite for the winters with neutral (cold) SSTA in the eastern Pacific

DJF_850wnd

DJ_850wnd

DJF_T

DJF_R
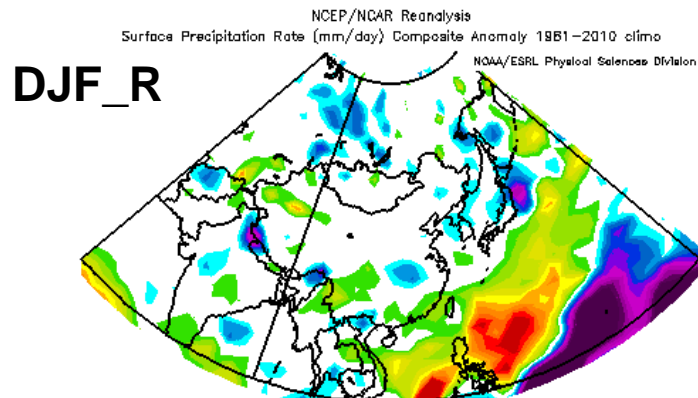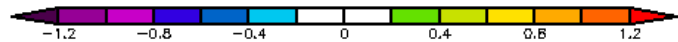
Regr. Of DJF SLP on the ice index

(a)SLP in DJF
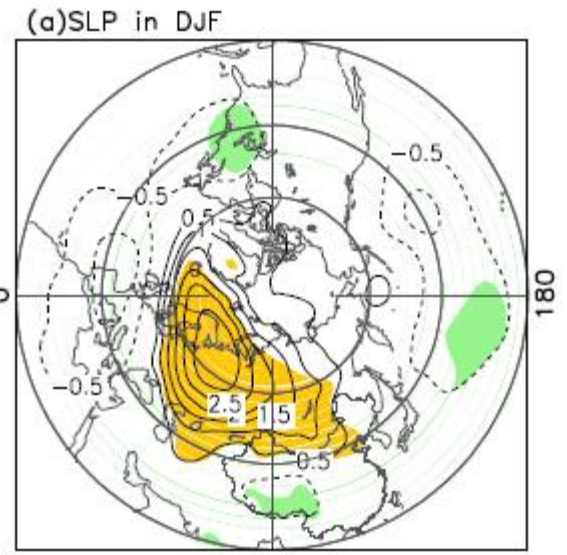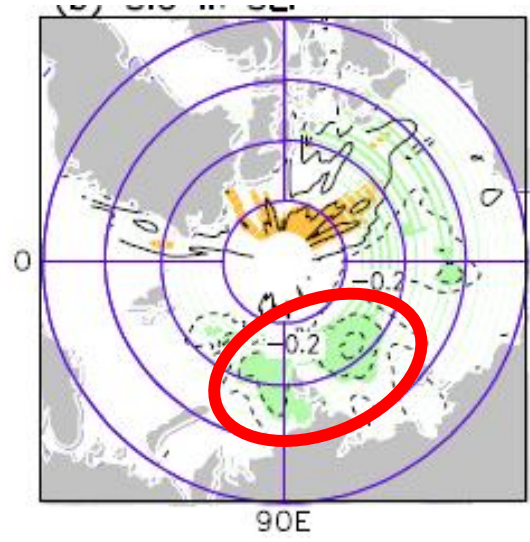
Regr. of DJF T on the ice index
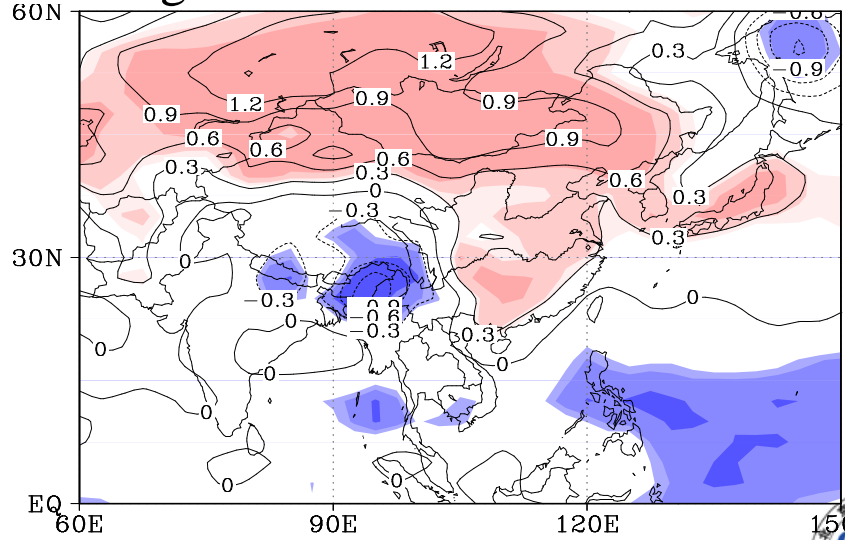
The September sea ice extent in the key area is significantly related to the Siberia High and the temperature in East Asia.
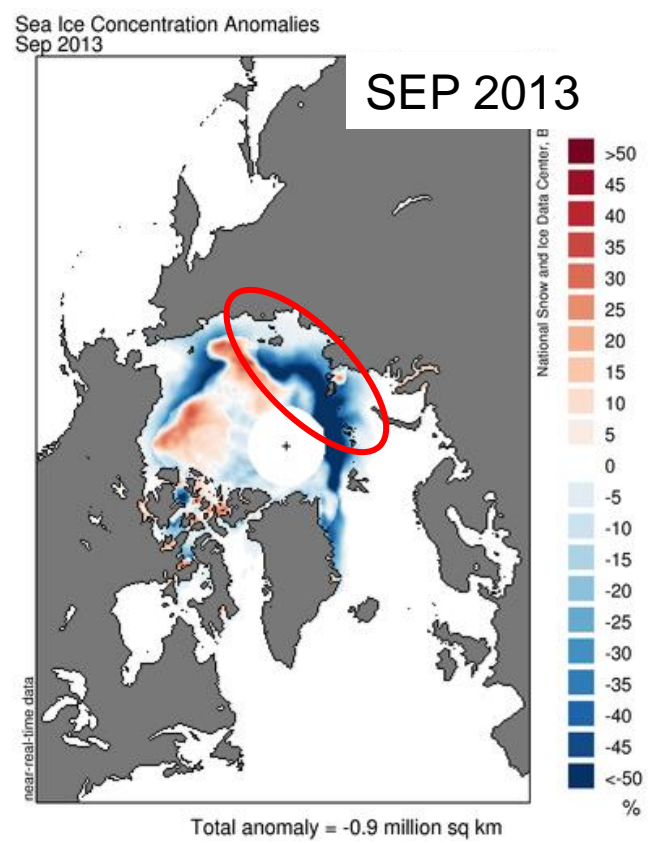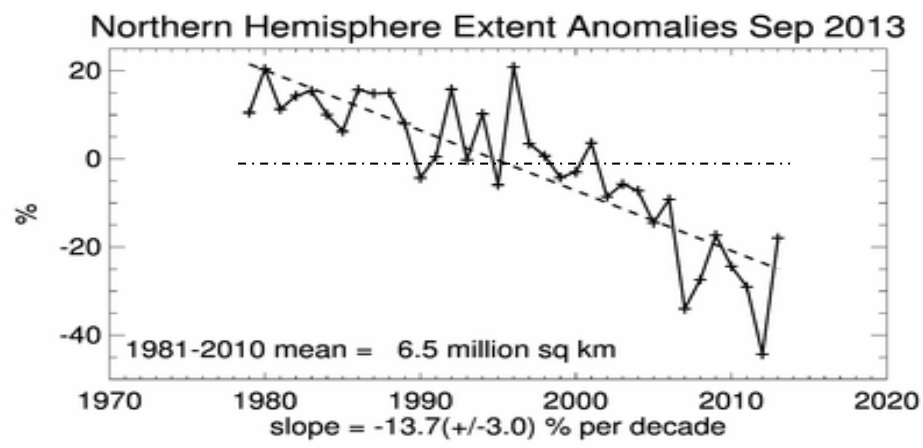(Wu B.Y., et al., 2011)

Northern Hemisphere Extent Anomalies Sep 2013

1981-2010 mean = 6.5 million sq km

slope = -13.7(+/-3.0) % per decade

Sea Ice Concentration Anomalies Sep 2013

SEP 2013

Total anomaly = -0.9 million sq km

The less sea ice in Sep 2013 indicates a strong SH and cold Mongolia, East China, Korea and South Japan.

Corr = -0.42 (95%)

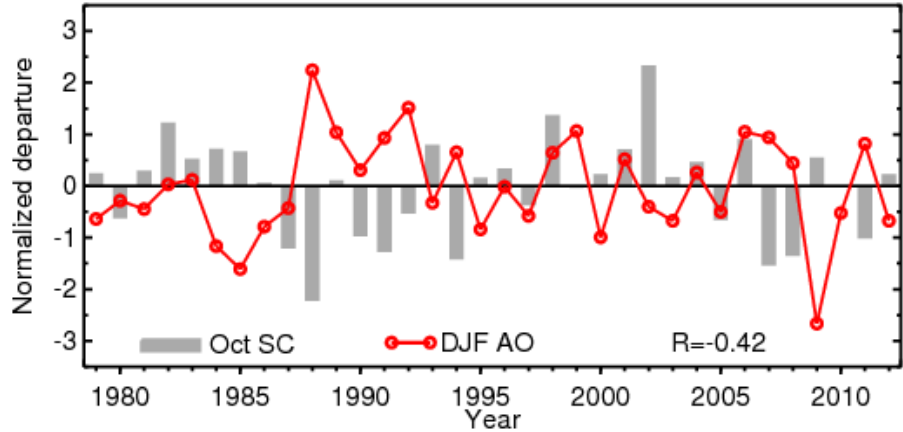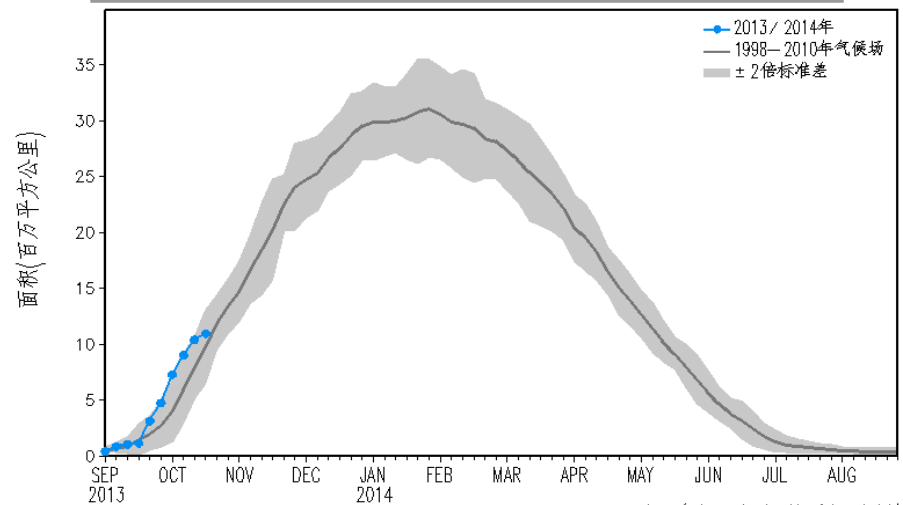## Correlation between DJF T and AO index

Oct Eurasian Snow Cover and DJF AO

Recent evolution of Eurasian SC

Climate Mornitoring Division/NCC/CMA

Anomalous more Eurasian snow cover favors negative phase of AO (Allen and Zender, 2011)

CGCM Model prediction

Slightly Strong EAWM

Interdecadal characteristics

Strong EAWM epoch

Impacts from External factors

North Atlantic SSTA: enhanced Ural blocking
Tropical "La Nina" pattern: normal to strong EAWM

Arctic sea ice: slightly strong Siberia High
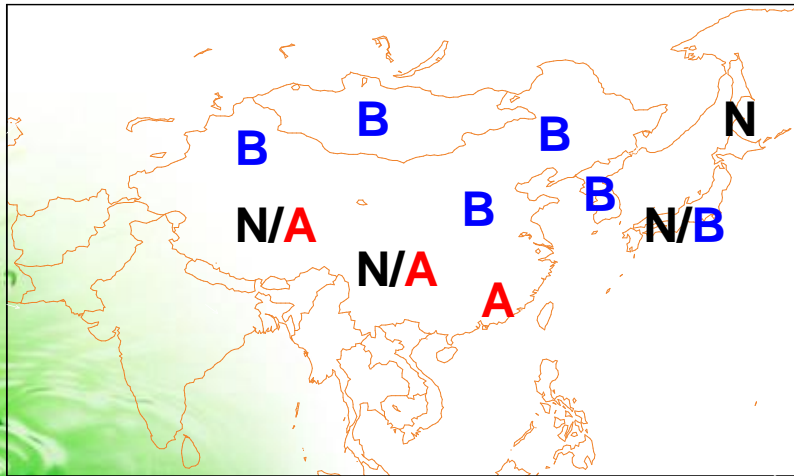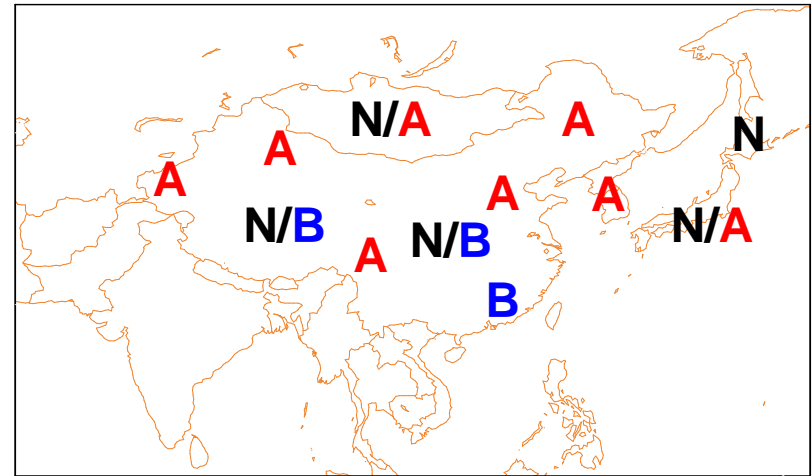
Snow cover: negative phase of AO

Prediction result

EAWM : slightly strong

Temperature

Precipitation

Thanks !