

Climate Outlook for Winter 2017/2018



PARK Jeongwon, LEE Hyunsoo, Gong Yeonji,
KIM Dong-Joon, Jang Haeng-Kwi
(Korea Meteorological Administration)

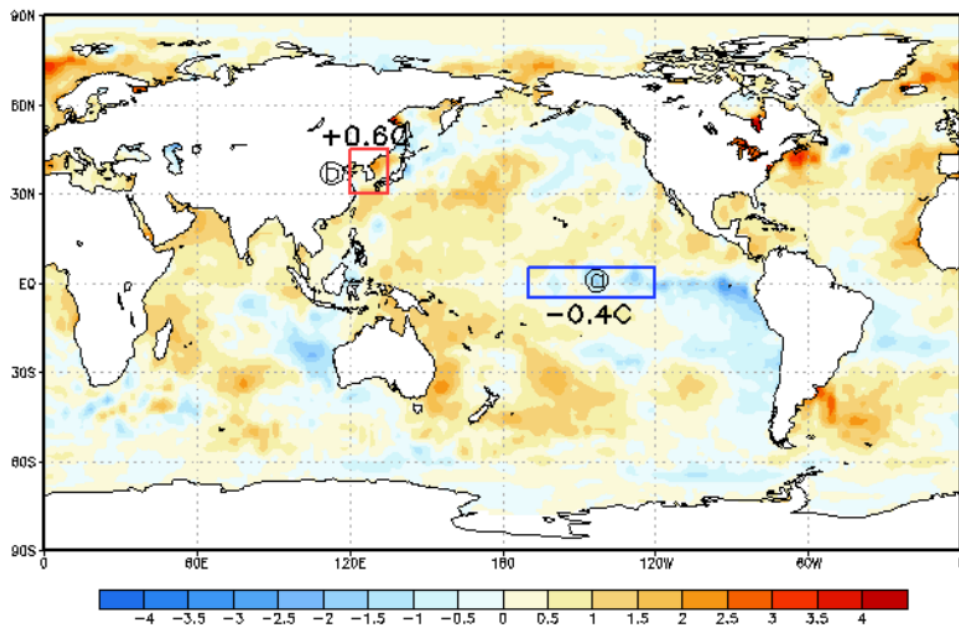


Consideration elements for winter prediction

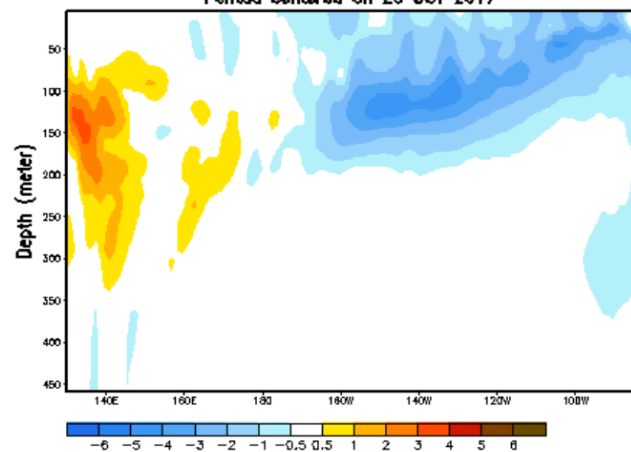
- o ENSO
- o Dynamical model (GloSea5, WMO Lead Center for MME)
- o Impact of ENSO
- o Impact of Sea Ice(Barents / Kara, Laptev, Arctic) and AO
- o Impact of Snowcover
- o Summary

ENSO condition and prediction

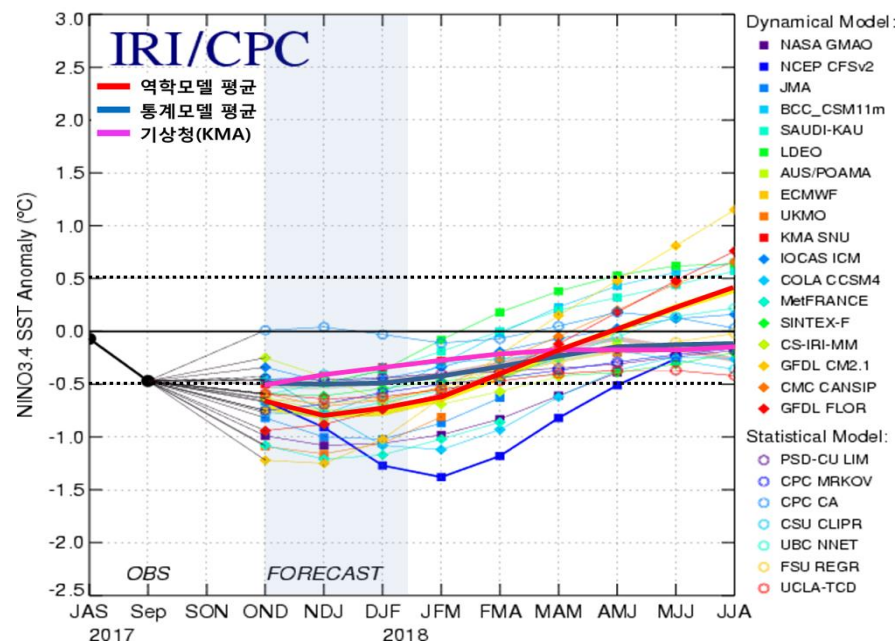
SST weekly anomaly /22 Oct 2017 – 28 Oct 2017



Equatorial Temperature Anomaly (°C)
Pentad centered on 25 OCT 2017



Mid-Oct 2017 Plume of Model ENSO Predictions



Currently, the Niño3.4 region of the tropical Pacific Ocean is likely to be in La Niña thresholds. The majority of international climate outlook models and experts' opinion suggest that La Niña may develop with about 50-55% possibility during the remaining period of 2017 lasting into early 2018. The most likely strength of La Niña, if it prevails, is weak.

500hPa GPH and SST (GloSea5)_10.30

500hPa Geopotential Height (gpm) Anomaly
Contour :FCST(int.60), Shading :Anomaly(FCST-HCST)

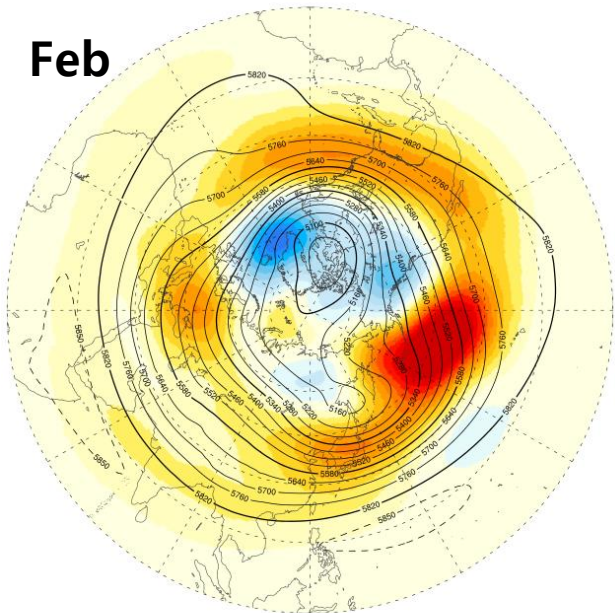
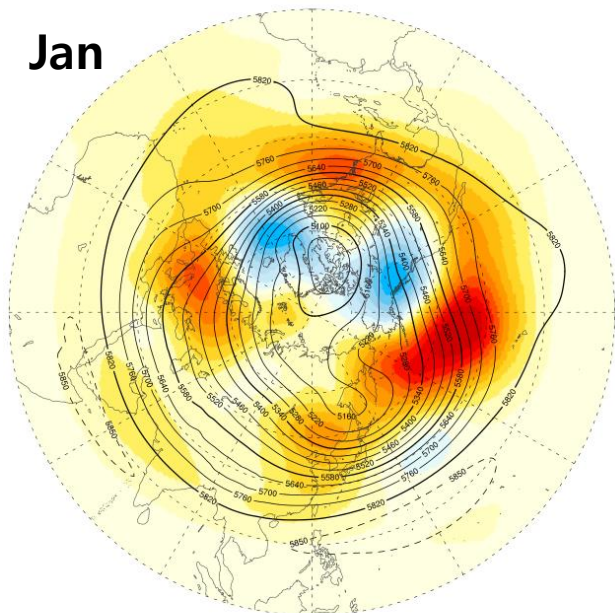
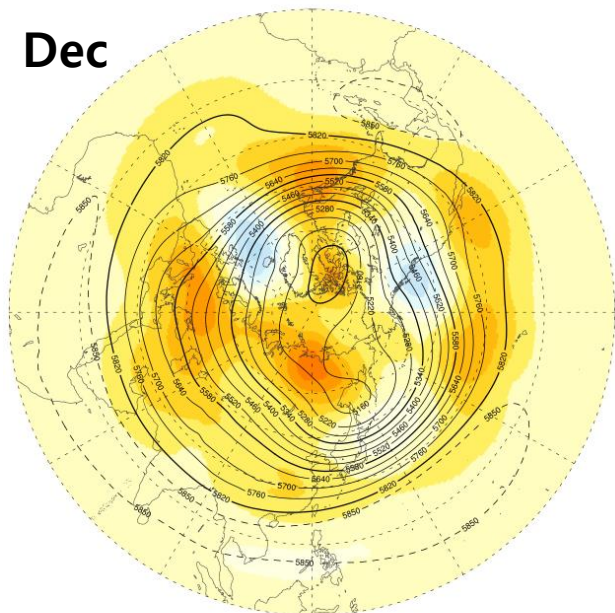
Earth System Research Division/NIMS/KMA
KMA GloSea5GC2 (N216L85, O0.25L70)

500hPa Geopotential Height (gpm) Anomaly
Contour :FCST(int.60), Shading :Anomaly(FCST-HCST)

Earth System Research Division/NIMS/KMA
KMA GloSea5GC2 (N216L85, O0.25L70)

500hPa Geopotential Height (gpm) Anomaly
Contour :FCST(int.60), Shading :Anomaly(FCST-HCST)

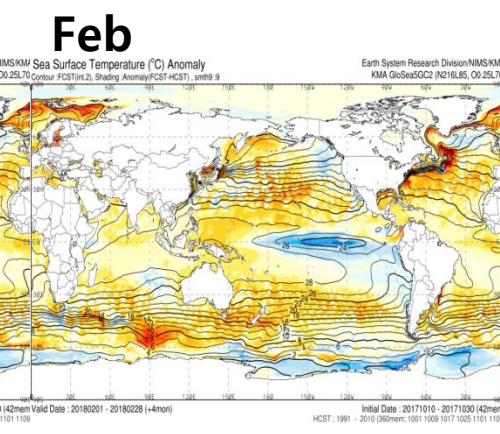
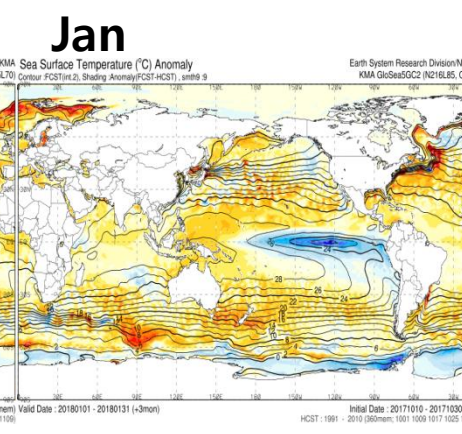
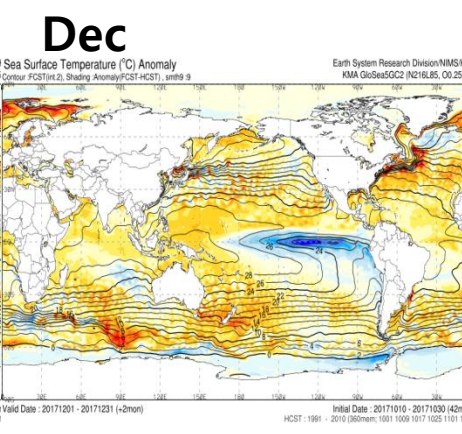
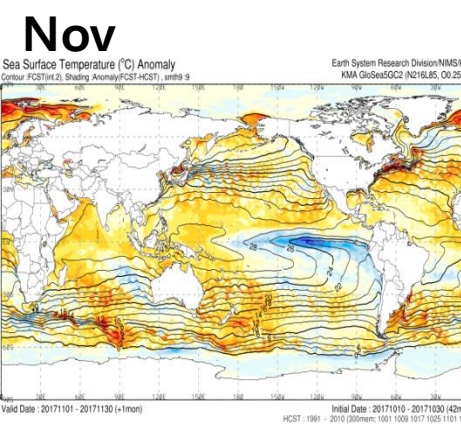
Earth System Research Division/NIMS/KMA
KMA GloSea5GC2 (N216L85, O0.25L70)



Valid Date : 20171201 - 20171231 (+2mon)
Initial Date : 20171010 - 20171030 (42mem)
HCST : 1991 - 2010 (360mem; 1001 1009 1017 1025 1101 1109)

Valid Date : 20180101 - 20180131 (+3mon)
Initial Date : 20171010 - 20171030 (42mem)
HCST : 1991 - 2010 (360mem; 1001 1009 1017 1025 1101 1109)

Valid Date : 20180201 - 20180228 (+4mon)
Initial Date : 20171010 - 20171030 (42mem)
HCST : 1991 - 2010 (360mem; 1001 1009 1017 1025 1101 1109)



Valid Date : 2017101 - 20171130 (+1mon)
Initial Date : 20171010 - 20171030 (42mem) Valid Date : 20171201 - 20171231 (+2mon)
HCST : 1991 - 2010 (360mem; 1001 1009 1017 1025 1101)

Valid Date : 20180101 - 20180131 (+3mon)
Initial Date : 20171010 - 20171030 (42mem) Valid Date : 20180201 - 20180228 (+4mon)
HCST : 1991 - 2010 (360mem; 1001 1009 1017 1025 1101 1109)

Valid Date : 20180201 - 20180228 (+4mon)
Initial Date : 20171010 - 20171030 (42mem) Valid Date : 20180201 - 20180228 (+4mon)
HCST : 1991 - 2010 (360mem; 1001 1009 1017 1025 1101 1109)

Valid Date : 20180201 - 20180228 (+4mon)
Initial Date : 20171010 - 20171030 (42mem)
HCST : 1991 - 2010 (360mem; 1001 1009 1017 1025 1101 1109)

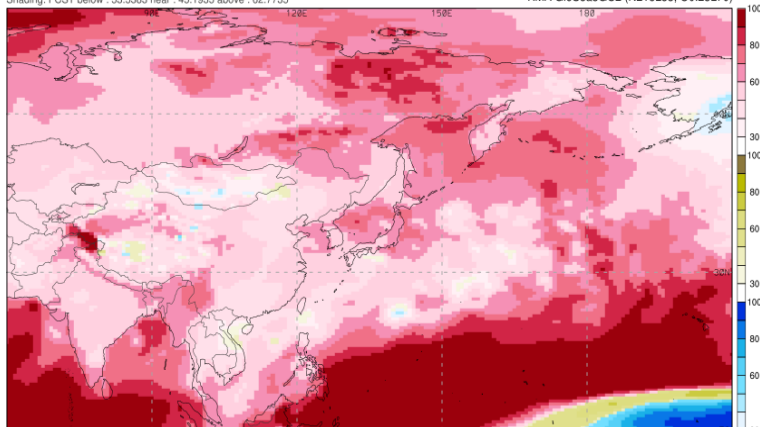
Probabilistic prediction(GloSea5)_10.30

Probability of 1.5m temperature (DJF)

1.5m Temperature total(%)

Shading: FCST below : 53.5383 near : 45.1935 above : 62.7735

Earth System Research Division/NIMS/KMA
KMA GloSea5GC2 (N216L85, O0.25L70)



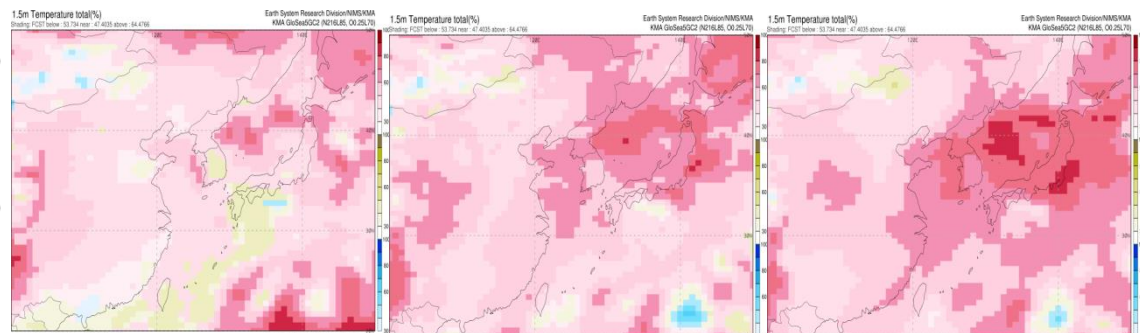
Valid Date : 20171201 - 20180228 (+2 +3 +4 mon)

Initial Date : 20171010 - 20171030 (42mem)
HCST : 1991 - 2010 (360mem; 1001 1009 1017 1025 1101 1109)

Dec

Jan

Feb



Valid Date : 20171201 - 20171231 (+2mem)

Initial Date : 20171010 - 20171030 (42mem)
HCST : 1991 - 2010 (360mem; 1001 1009 1017 1025 1101 1109)

Valid Date : 20180101 - 20180131 (+3mem)

Initial Date : 20171010 - 20171030 (42mem)
HCST : 1991 - 2010 (360mem; 1001 1009 1017 1025 1101 1109)

Valid Date : 20180201 - 20180228 (+4mem)

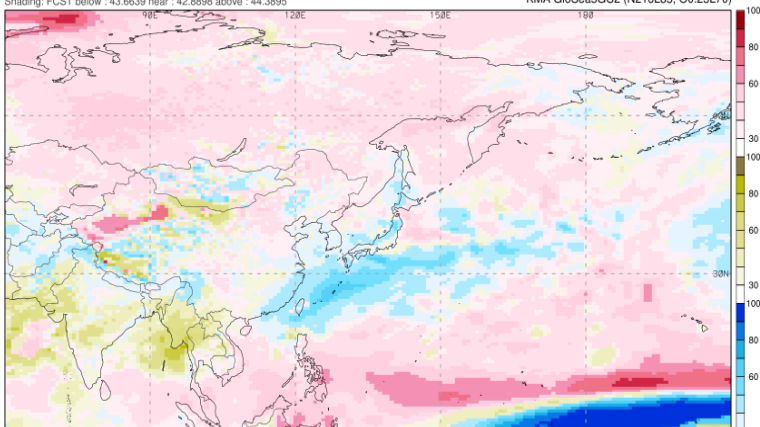
Initial Date : 20171010 - 20171030 (42mem)
HCST : 1991 - 2010 (360mem; 1001 1009 1017 1025 1101 1109)

Probability of precipitation (DJF)

Precipitation total(%)

Shading: FCST below : 43.6639 near : 42.8898 above : 44.3895

Earth System Research Division/NIMS/KMA
KMA GloSea5GC2 (N216L85, O0.25L70)



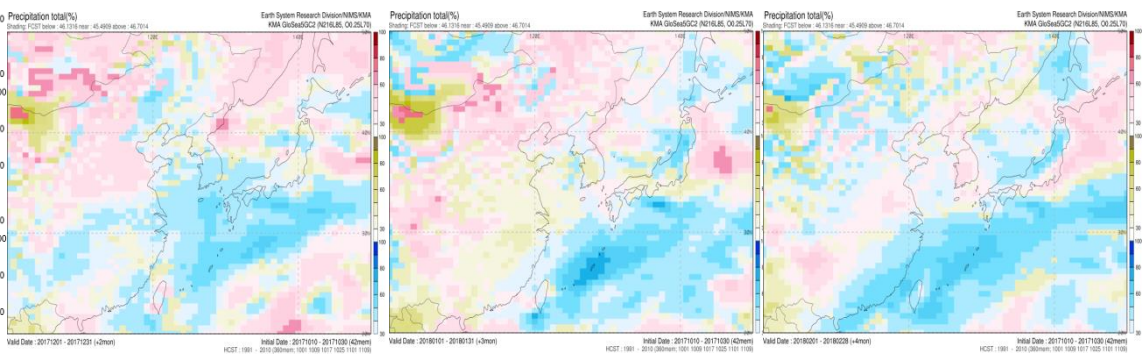
Valid Date : 20171201 - 20180228 (+2 +3 +4 mon)

Initial Date : 20171010 - 20171030 (42mem)
HCST : 1991 - 2010 (360mem; 1001 1009 1017 1025 1101 1109)

Dec

Jan

Feb



Valid Date : 20171201 - 20171231 (+2mem)

Initial Date : 20171010 - 20171030 (42mem)
HCST : 1991 - 2010 (360mem; 1001 1009 1017 1025 1101 1109)

Valid Date : 20180101 - 20180131 (+3mem)

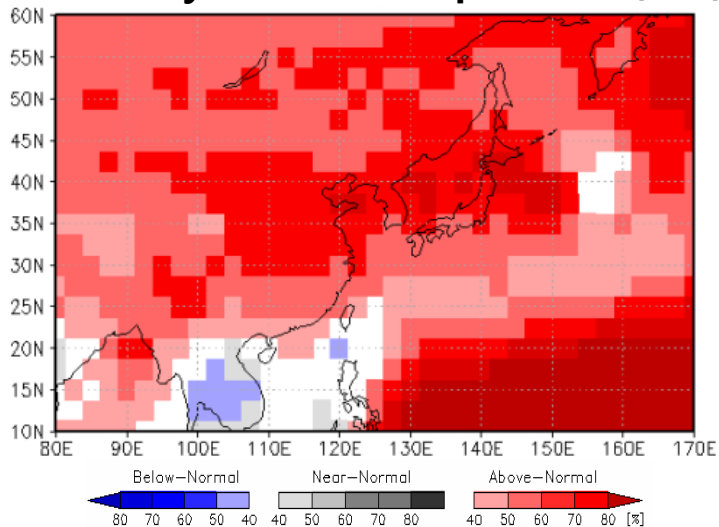
Initial Date : 20171010 - 20171030 (42mem)
HCST : 1991 - 2010 (360mem; 1001 1009 1017 1025 1101 1109)

Valid Date : 20180201 - 20180228 (+4mem)

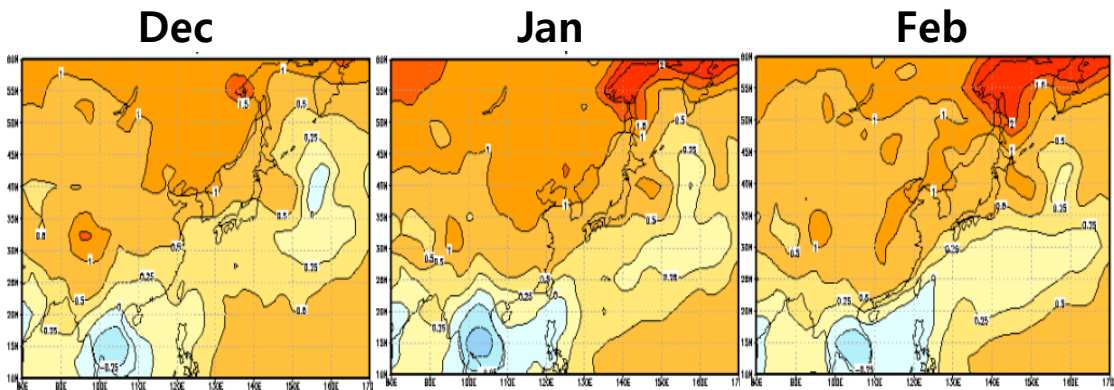
Initial Date : 20171010 - 20171030 (42mem)
HCST : 1991 - 2010 (360mem; 1001 1009 1017 1025 1101 1109)

MME Prediction (WMO LC)

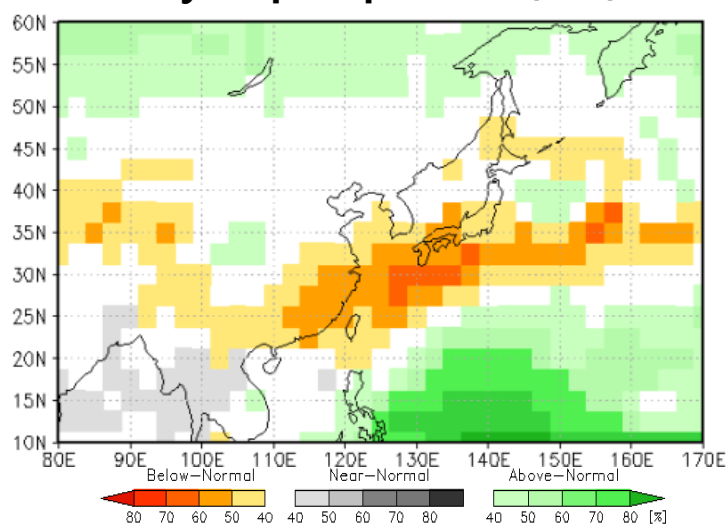
Probability of 1.5m temperature (DJF)



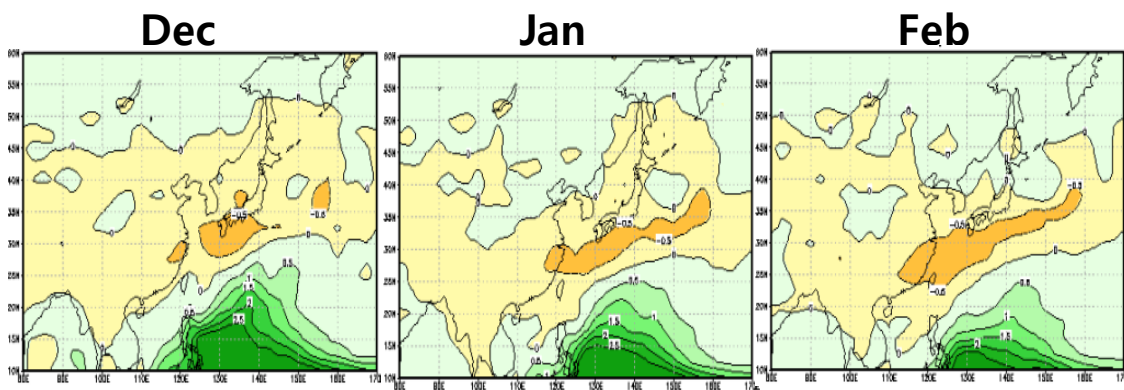
Ensemble mean for 2m temperature



Probability of precipitation (DJF)

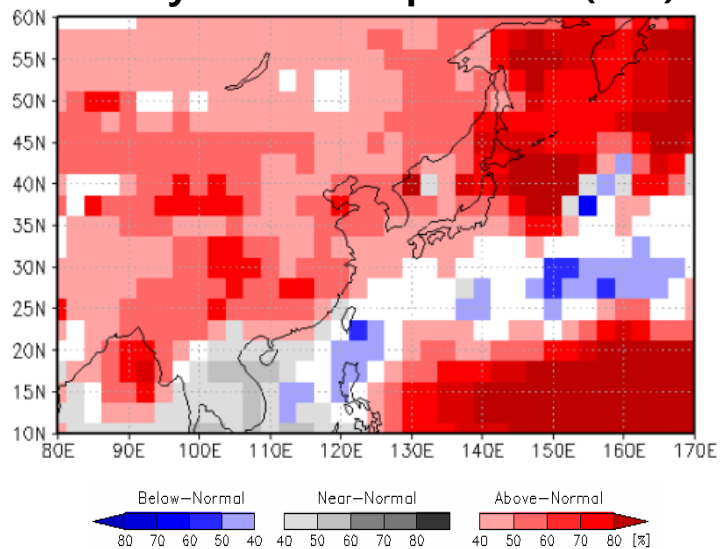


Ensemble mean for precipitation



MME Prediction (ECMWF)

Probability of 2m temperature (DJF)

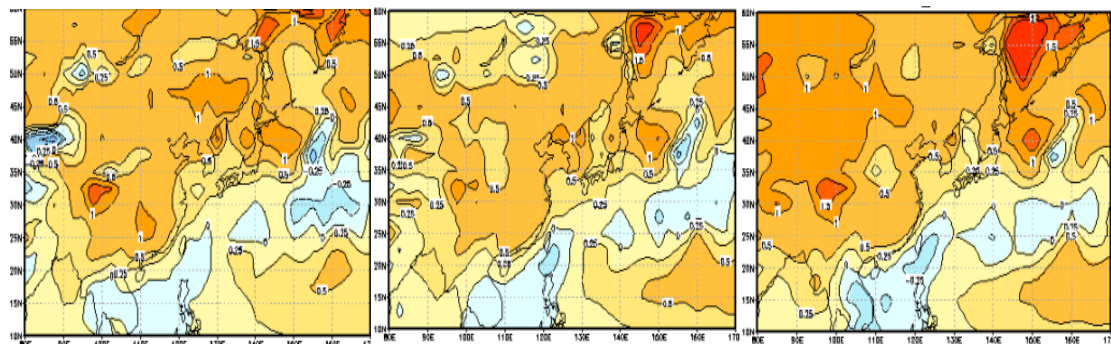


Ensemble mean for 2m temperature

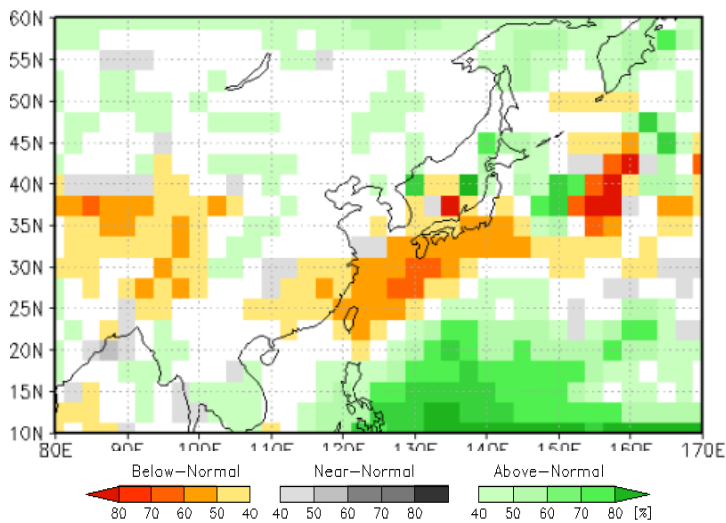
Dec

Jan

Feb



Probability of precipitation (DJF)

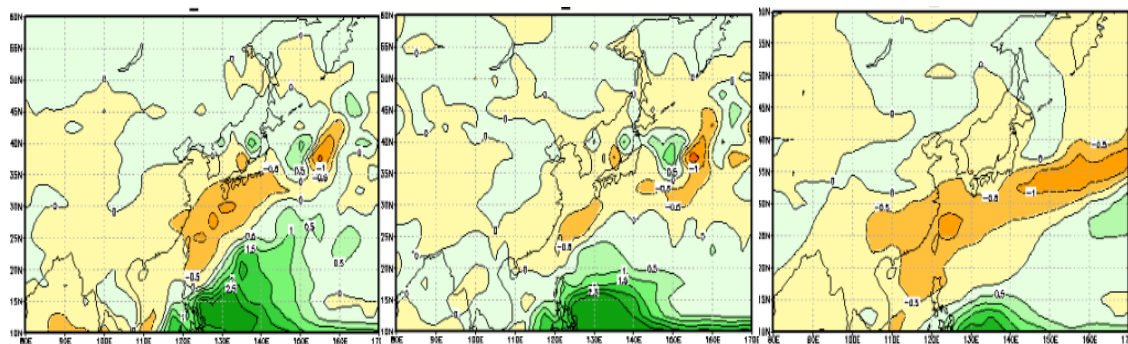


Ensemble mean for precipitation

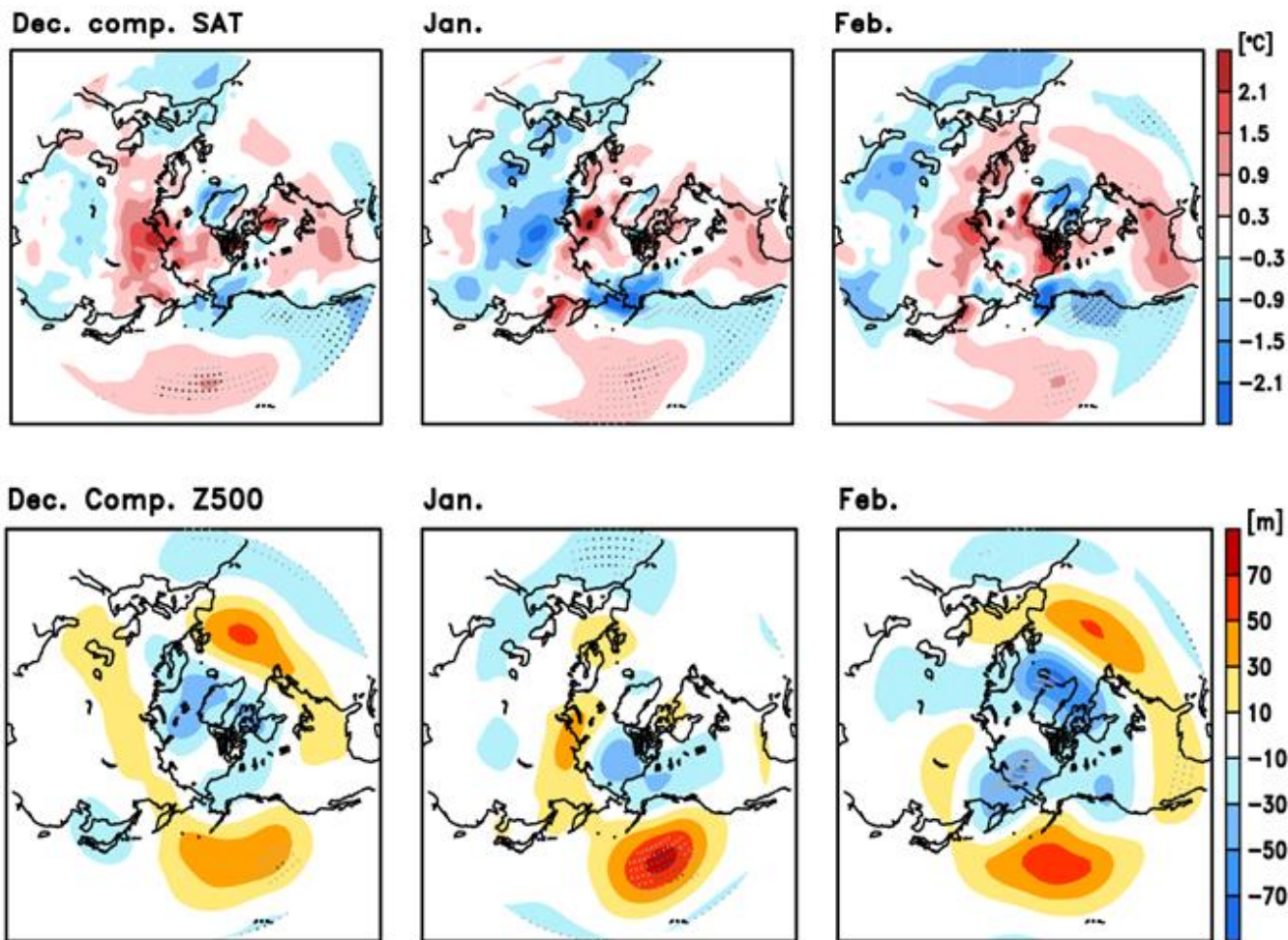
Dec

Jan

Feb



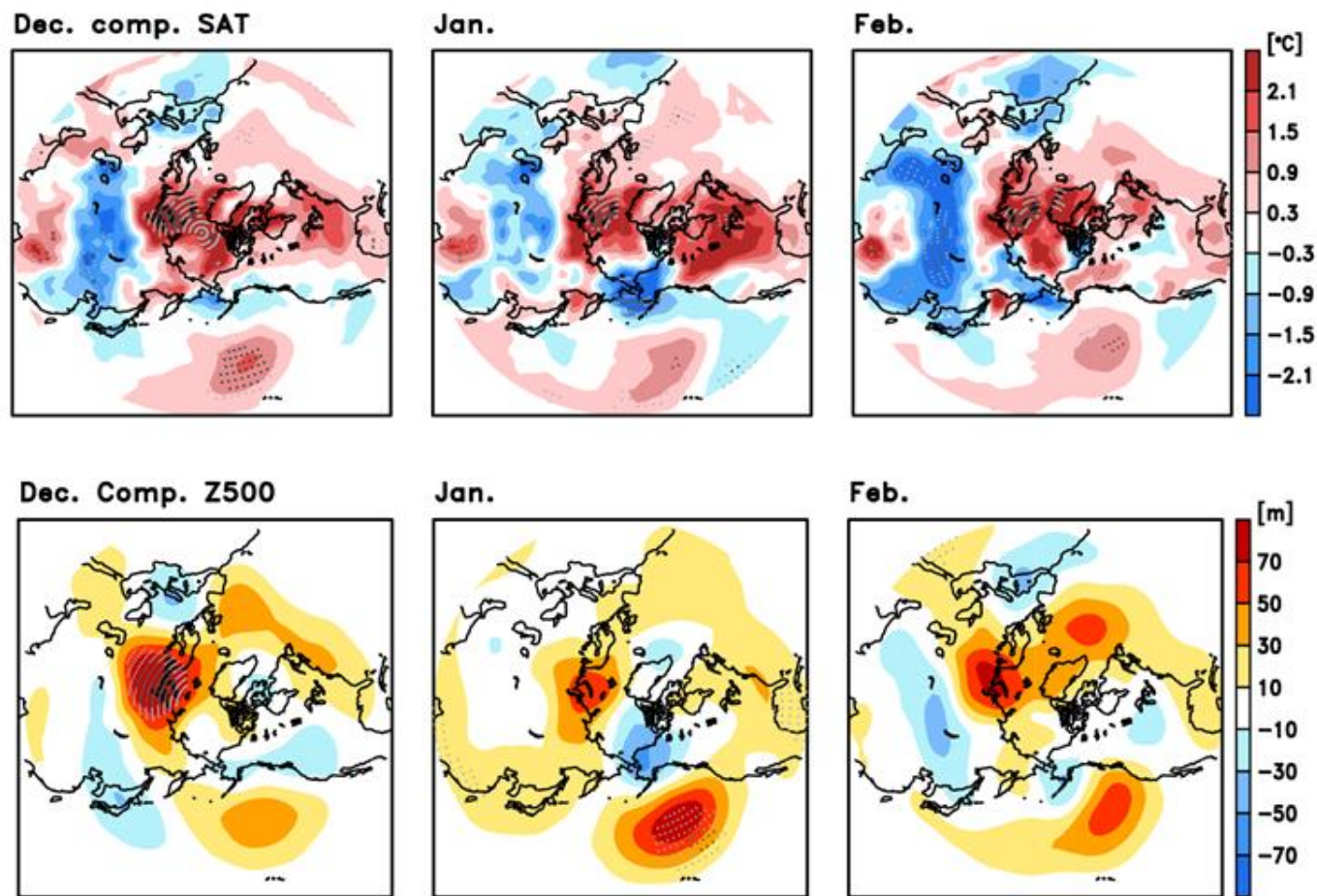
Impact of ENSO – La Nina years composite



• (•) : statistically significant level with 95(90)%

La Nina years : 1973/74, 1975/76, 1984/85, 1988/89, 1995/1996, 1998/99,
1999/2000, 2005/06, 2007/08, 2008/09, 2010/11, 2011/12

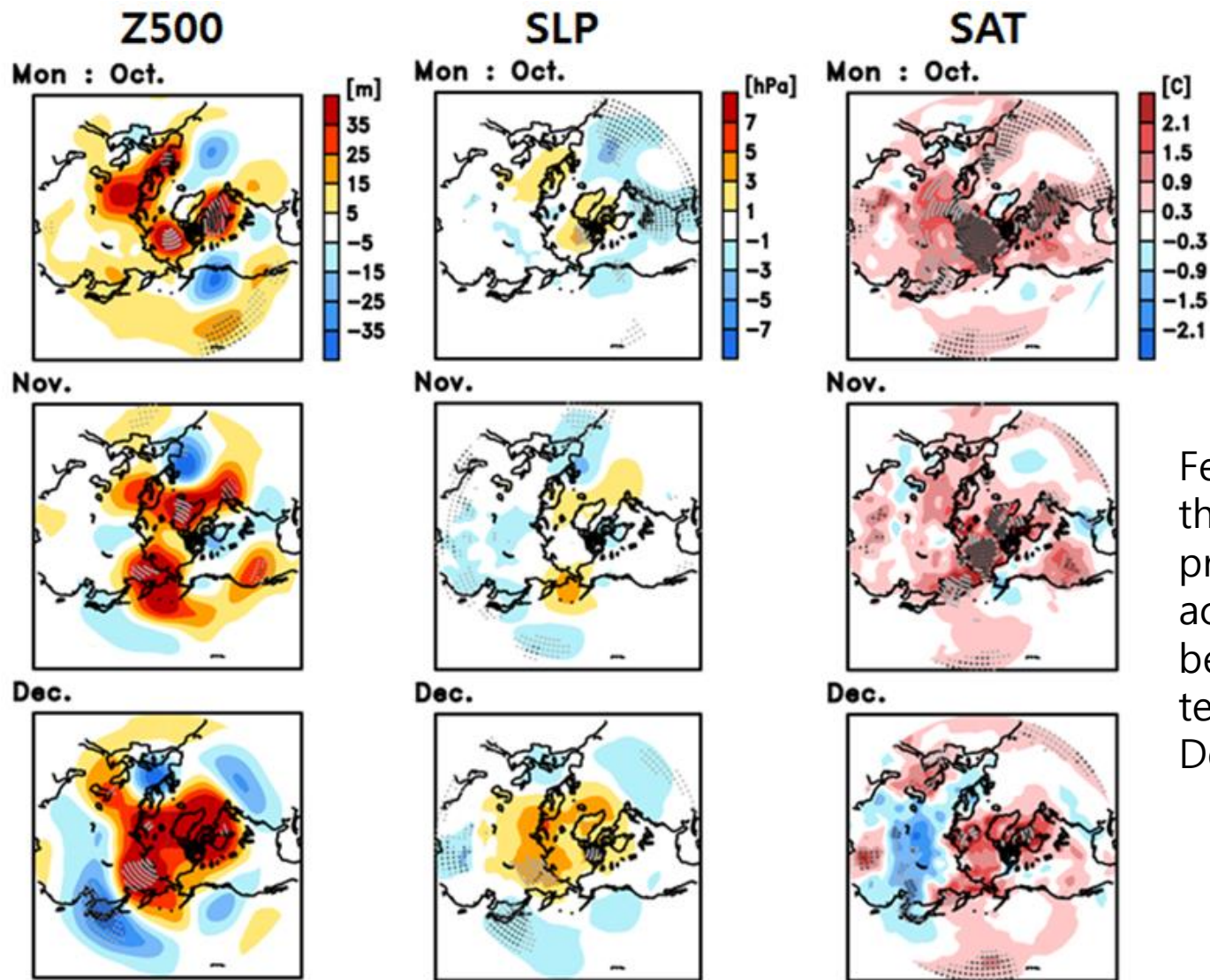
Impact of Barents / Kara Sea Ice



• (•) : statistically significant level with 95(90)%

Severe winters across East Asia are associated with anomalous warmth in the Barents-Kara Sea region.

Impact of Laptev Sea Ice

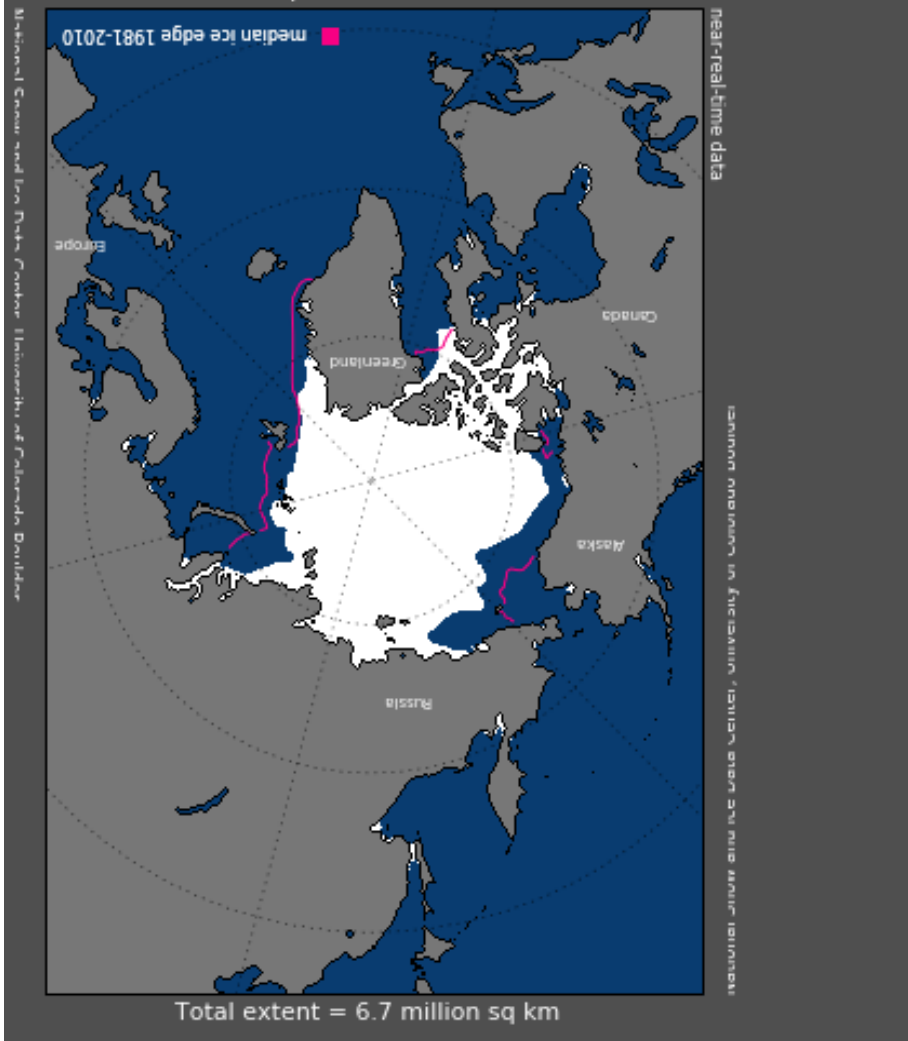


Fewer sea ice over the Laptev Sea for previous October is accompanied by the below-normal temperature for December for Korea.

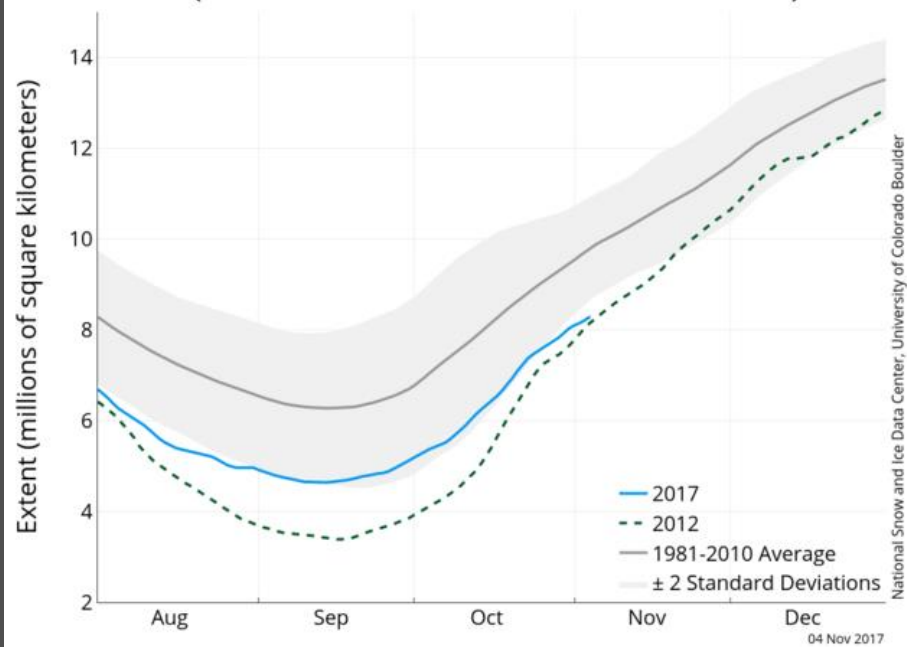
• (•) : statistically significant level with 95(90)%

Current condition of Arctic Sea Ice

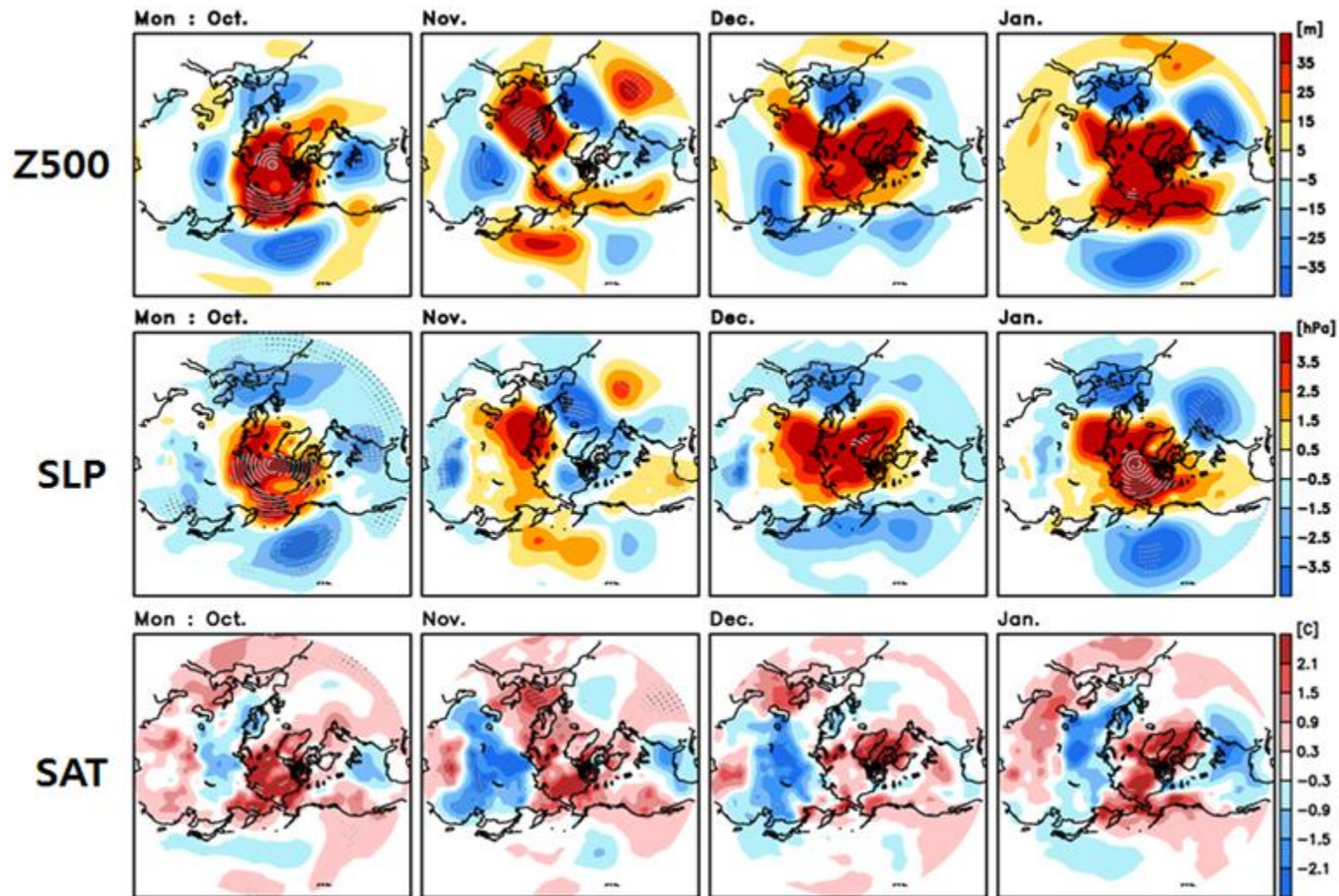
Sea Ice Extent, Oct 2017



Arctic Sea Ice Extent
(Area of ocean with at least 15% sea ice)

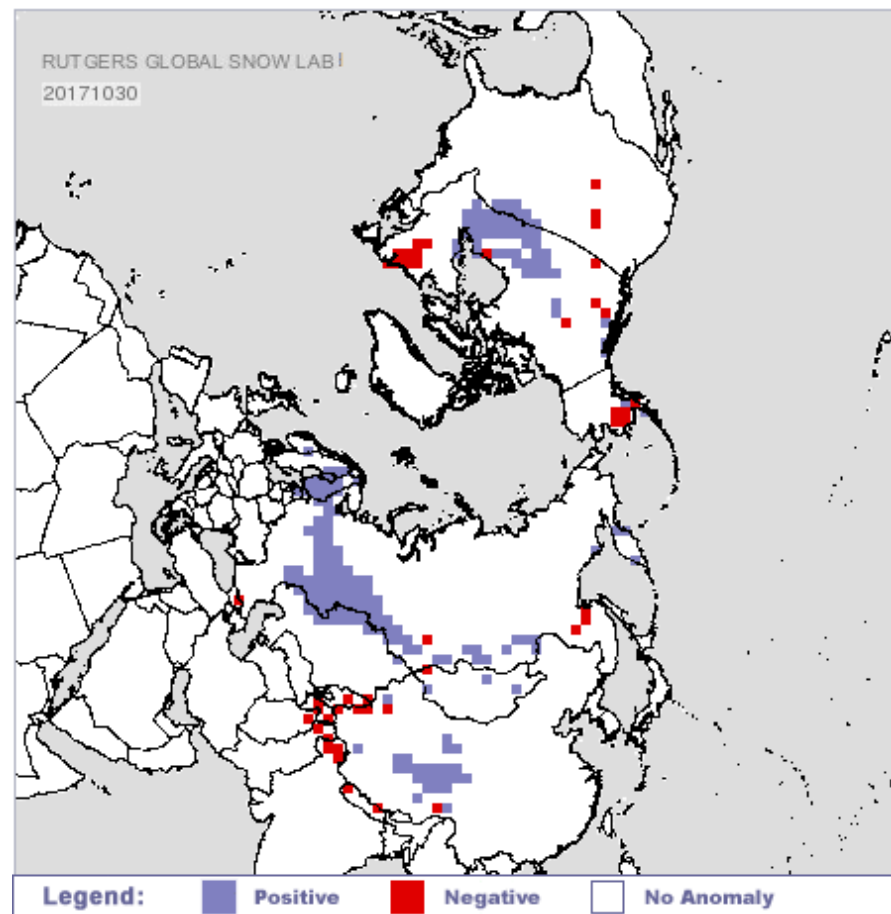
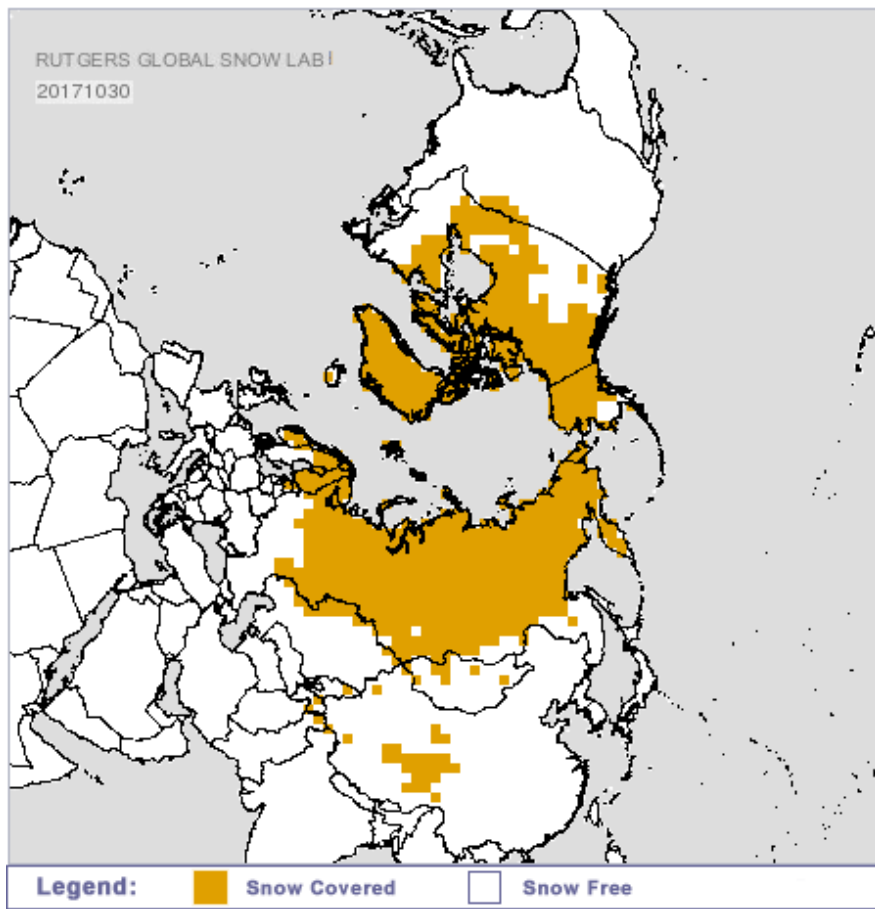


Impact of Snowcover



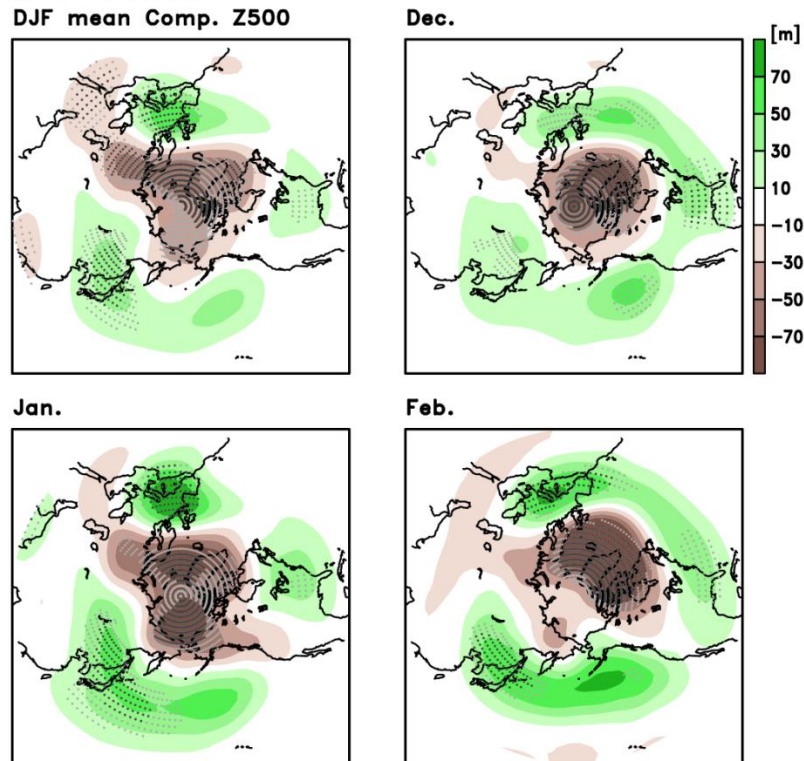
More snowcover over the Eurasian continent and its fast progress for the previous October are significantly related to below-normal temperature for early winter.

Current condition of Snowcover



Impact of Arctic Oscillation

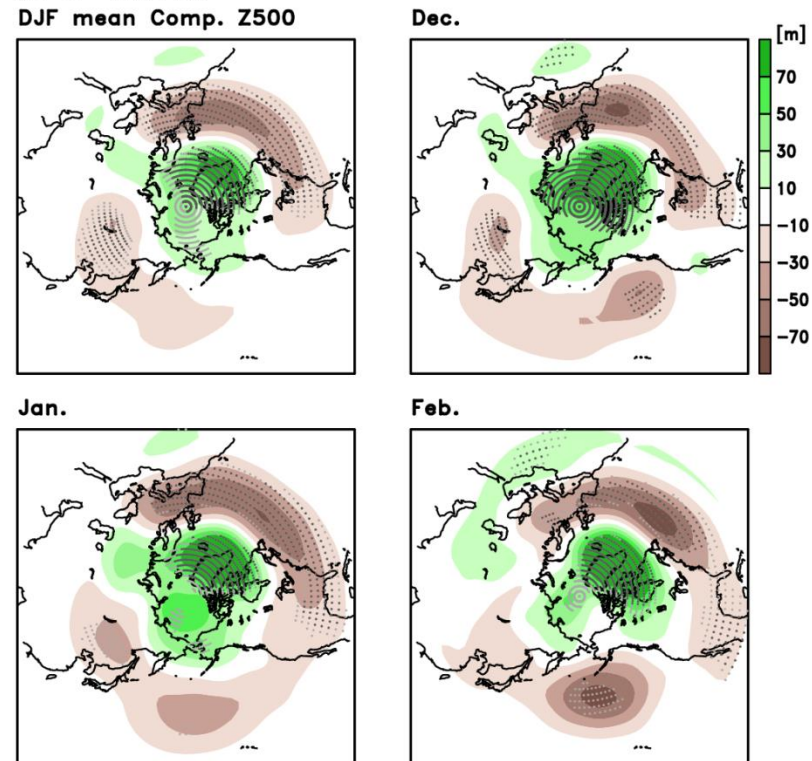
Period : 1973–2015 **Positive AO**
 AO > +0.75 std
 DJF mean Comp. Z500



Weakening of Siberian High

✓ **Artic Oscillation Index (AOI)**

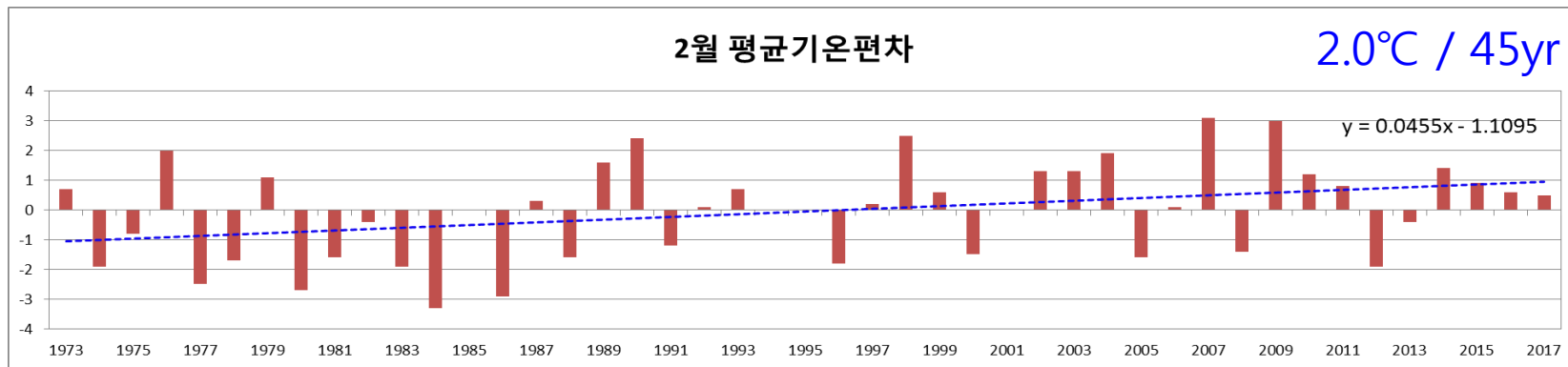
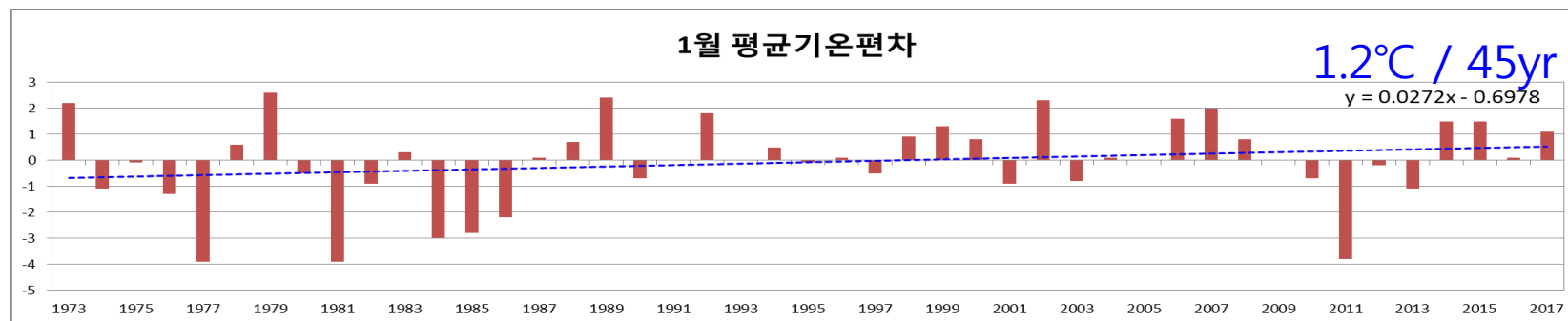
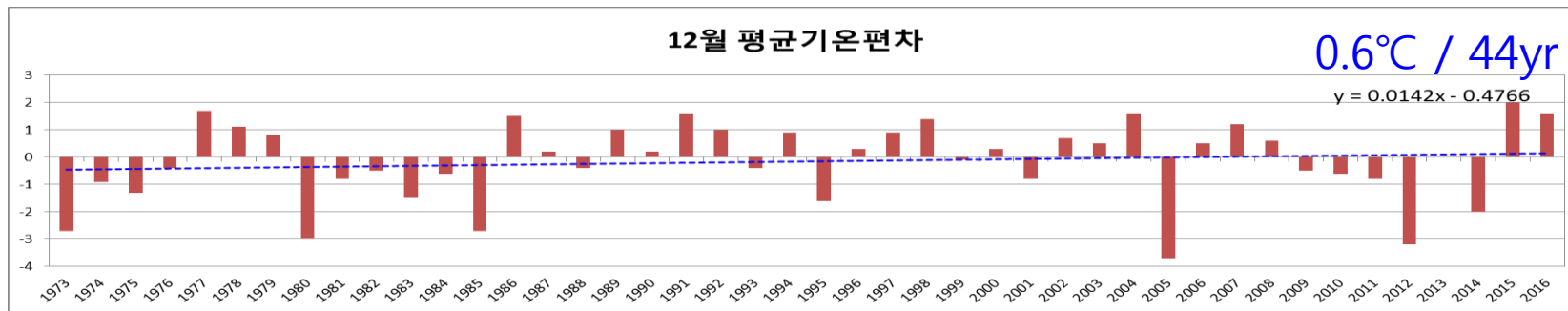
Period : 1973–2015 **Negative AO**
 AO < -0.75 std
 DJF mean Comp. Z500



Southward cold air

	Dec	Jan	Feb
SAT	0.35*	0.41*	0.31*
PRCP	-0.05	0.28	0.15

Trend



Summary

■ Consideration for prediction

- Weak La Niña is expected
- Most dynamic model results show above-normal temperature and near or below-normal precipitation for the following winter
- Most statistical analyses (La Niña, arctic sea ice, and Eurasian snowcover) give us a little below-normal temperature for early winter, near or above-normal temperature after mid winter, and below-normal precipitation

■ 2017/18 winter outlook

- Winter monsoon is expected to be a little weak
- Strong intra-seasonal variation

	Temperature			Precipitation		
	Below Normal	Near normal	Above normal	Below Normal	Near normal	Above normal
Winter	20	40	40	20	50	30



Thank you

