Seasonal Outlook for Winter 2011/2012 over Japan

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1. Introduction

Outline of JMA's Cold Season Forecast

Temperature

Precipitation & Snowfall

Geographical subdivisions

Issue date : September 22nd

(reviewed on October 25th)

Forecast Period : December - February

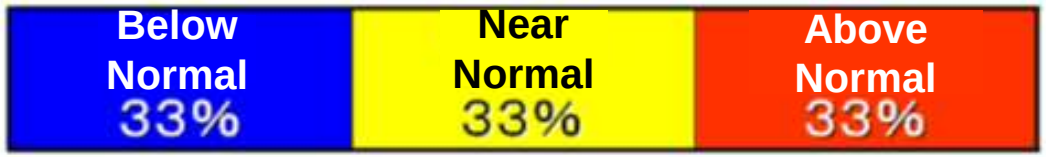
Forecast Element :

Probabilities of three categories (below normal, near normal, above normal) of …

- mean temperature
- total precipitation amount
- total snowfall amount

(only the Sea of Japan side)

Climatic frequency



(Categories are based on 1981-2010)

Forecasting Methods

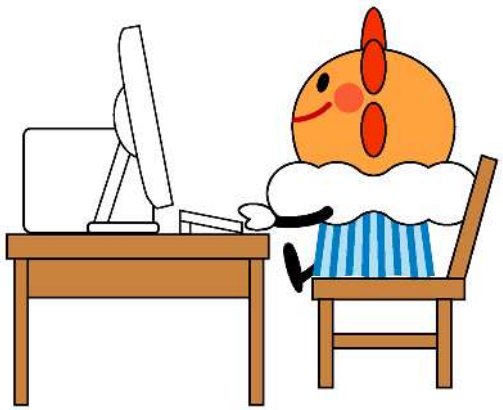
Numerical Prediction Model

- CGCM (Atmosphere-Ocean coupled General Circulation Model)
- Ensemble size : 51 (9 BGM & 6 days with 5-day LAF)
- Evaluated by 30-year hindcast (1979-2008)

Statistical Method

- OCN (Optimal Climate Normals)

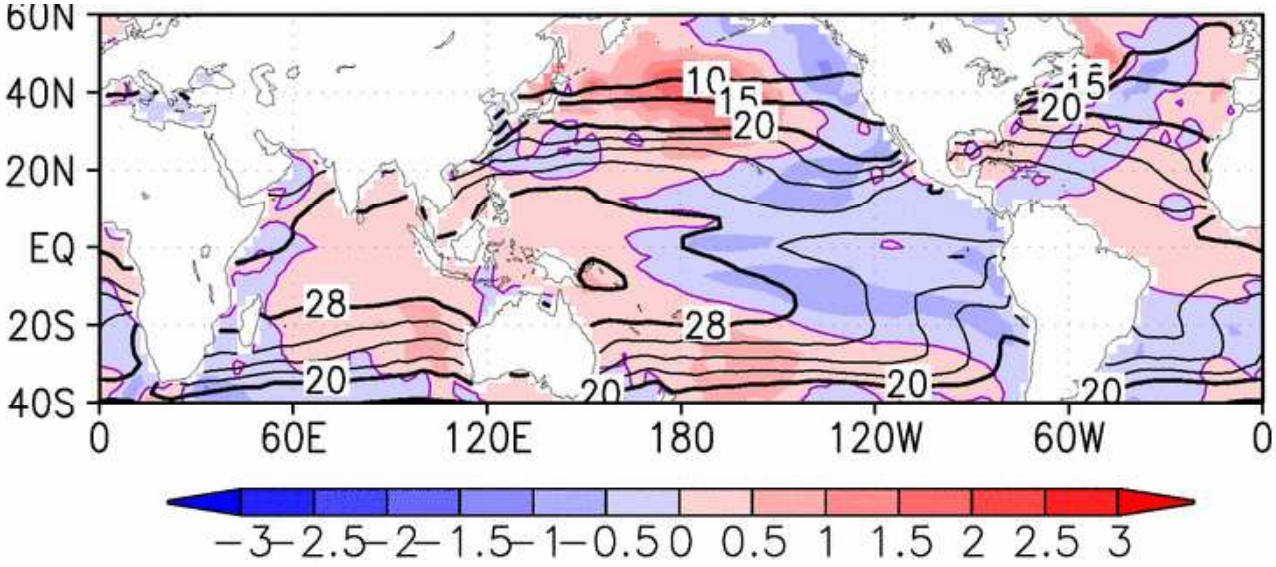
2. Grounds for JMA's Seasonal Forecast for 2011/2012 winter



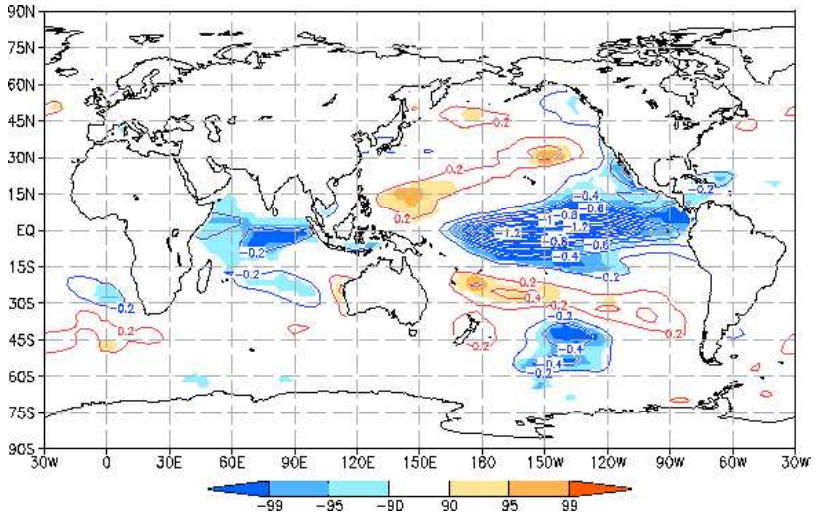
Predicted SST anomalies (DJF)

Initial Date : Oct. 13, 2011

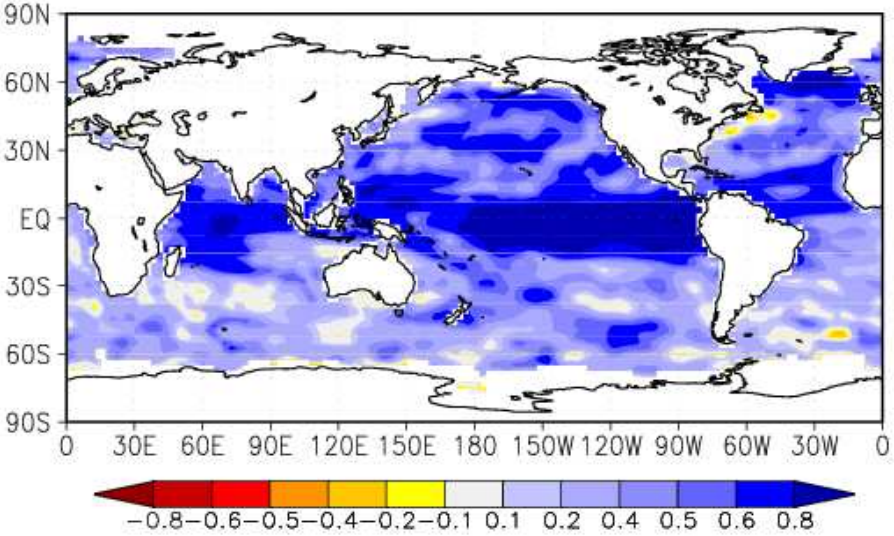
Predicted SST anomalies



SSTA La Niña composite map



Prediction skill of SST (ACC)

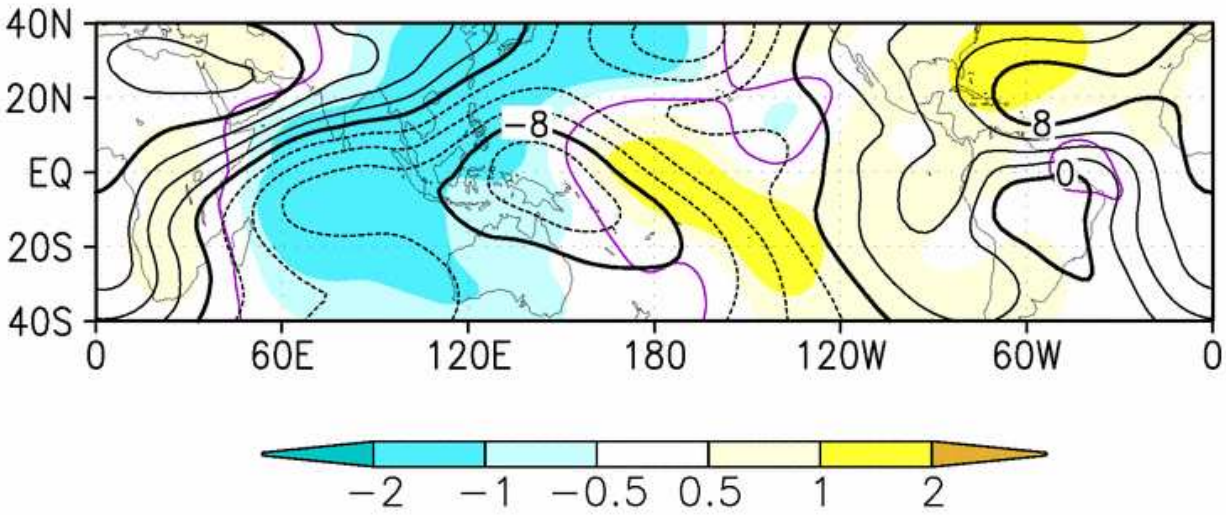


- The SSTs are below normal in the central and eastern Pacific, and above normal in the western Pacific. This pattern is similar to that of La Niña events.
- However, the Indian Ocean SSTs are above normal and different from La Niña.
- Prediction skill of tropical SSTs is very high.

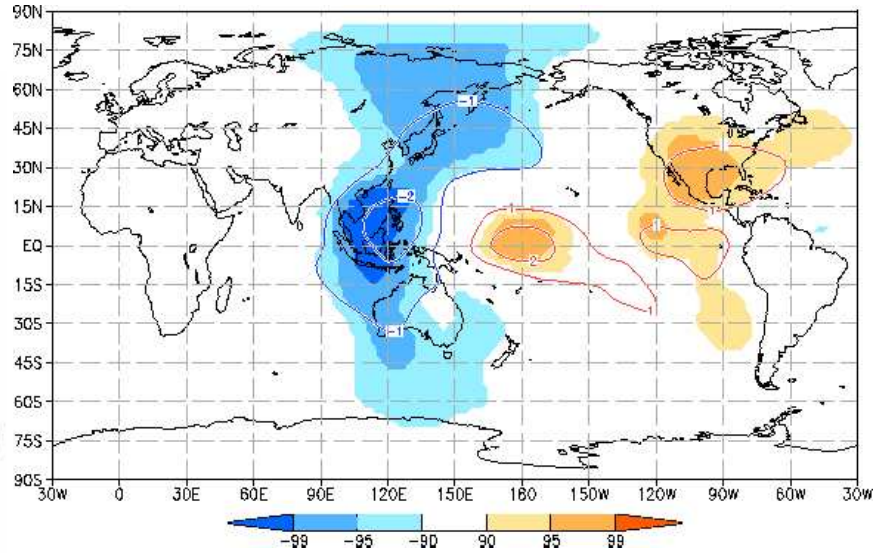
Velocity Potential at 200hPa (DJF)

Initial Date : Oct. 13, 2011

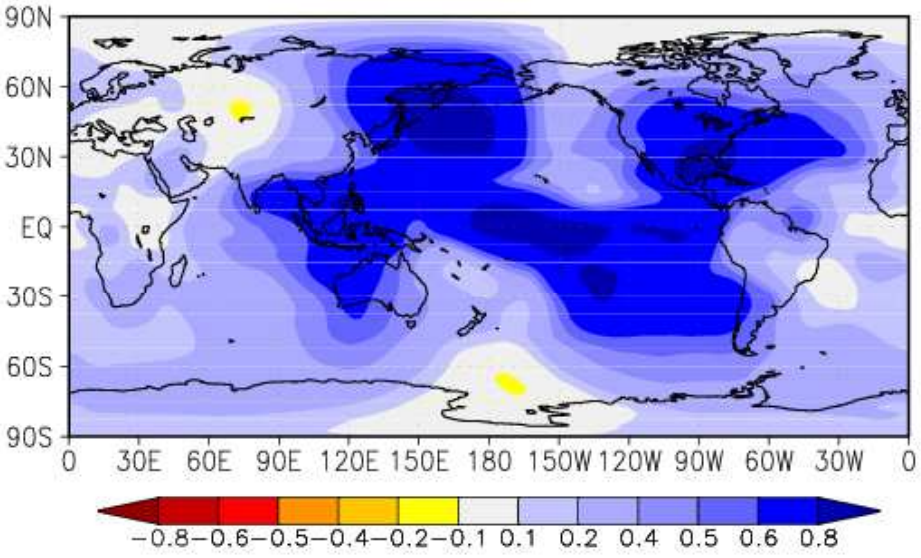
Predicted CHI200 anomalies



CHI200 anomaly La Niña composite map



Prediction skill of CHI200 (ACC)

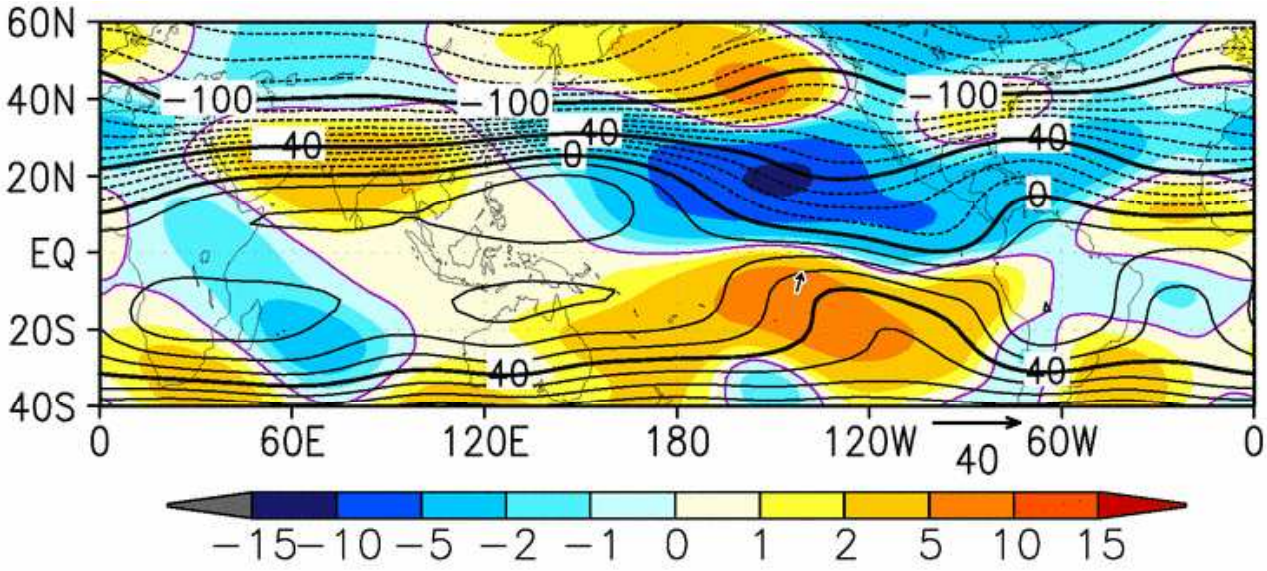


- Stronger convection activity is appeared over maritime continent. On the other hand, weaker convection activity is seen over the eastern Pacific. This pattern is similar to that of La Niña events.
- However, stronger convection activity is also appeared over the Indian Ocean.

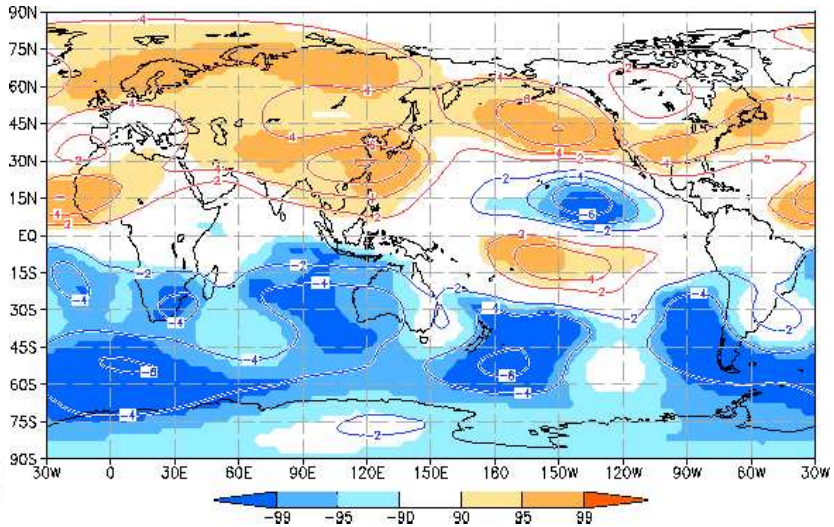
Stream Function at 200hPa (DJF)

Initial Date : Oct. 13, 2011

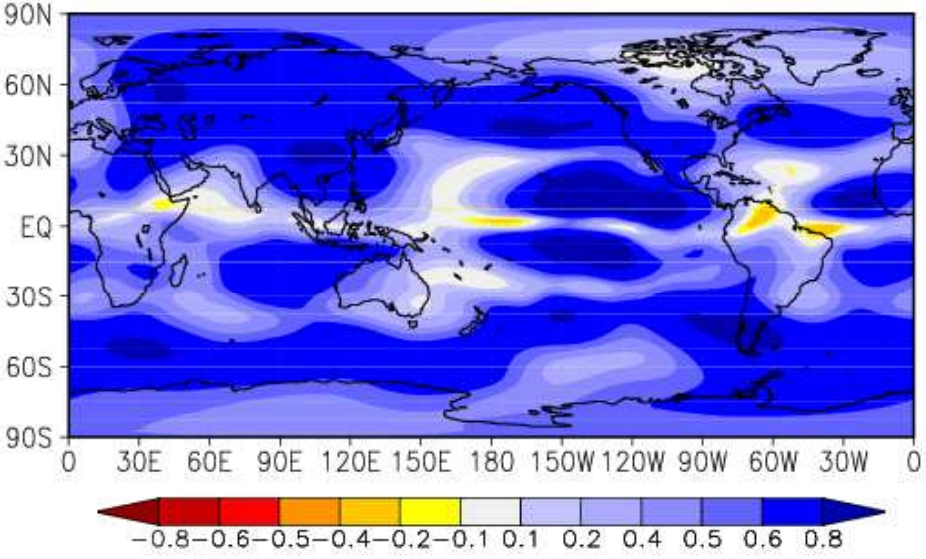
Predicted PSI200 anomalies



PSI200 anomaly La Niña composite map



Prediction skill of PSI200 (ACC)

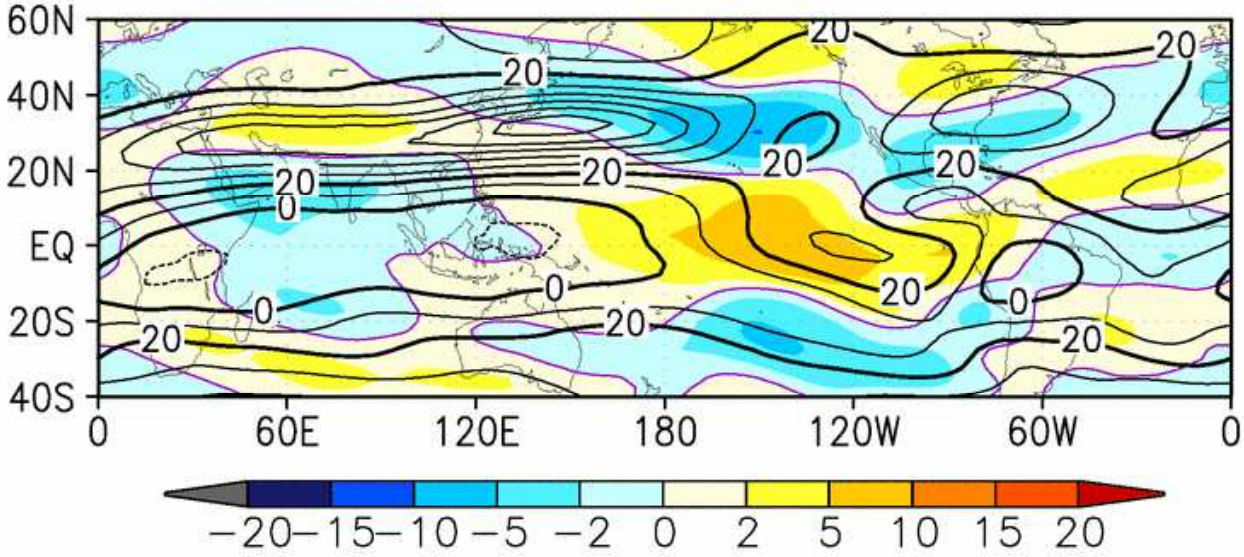


- Over the Pacific, the anomaly pattern is similar to that of La Niña events.
- Anti-cyclonic anomalies in the both hemisphere are predicted to be over the Indian Ocean, not over maritime continent. This pattern is due to the stronger convection activity over the Indian Ocean (Matsuno-Gill response).

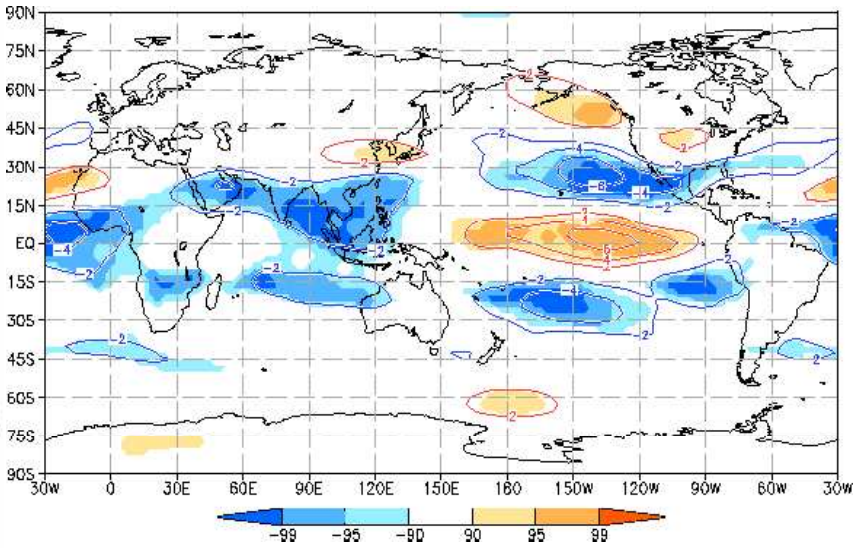
Zonal Wind at 200hPa (DJF)

Initial Date : Oct. 13, 2011

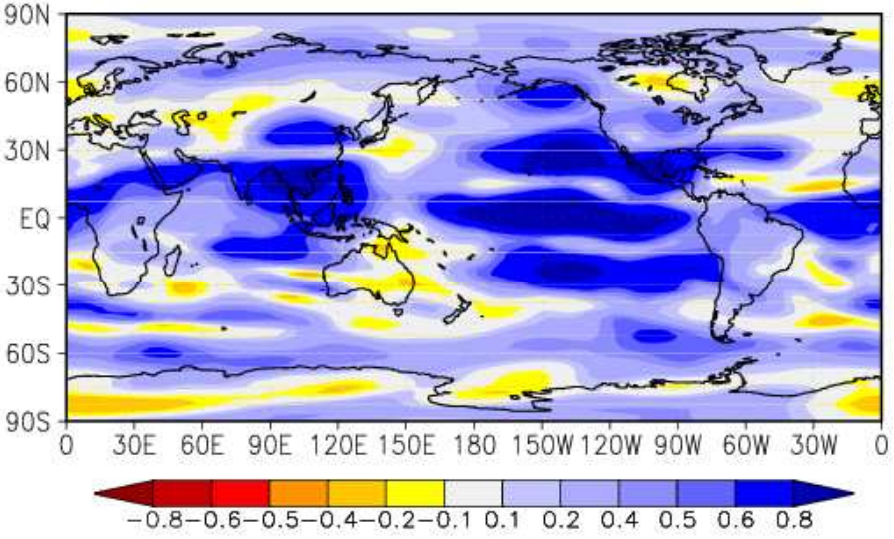
Predicted U200 anomalies



U200 anomaly La Niña composite map



Prediction skill of U200 (ACC)

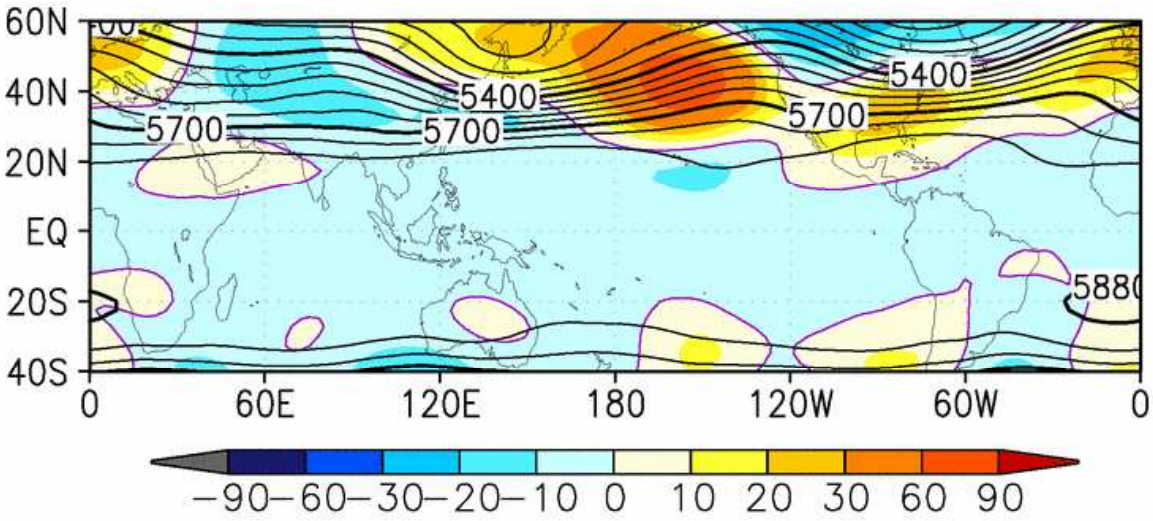


- The sub-tropical jet stream is predicted to shift northward over Eurasian Continent.
- Though the tendency is not so clear ,the jet is predicted to shift southward around Japan.
- Prediction skills over the mid- and high-latitude is not high.

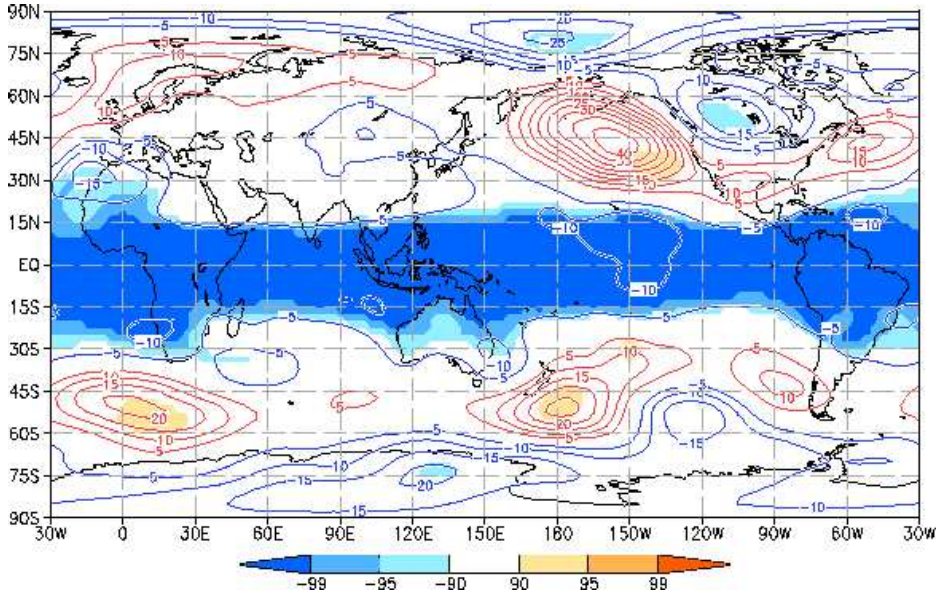
Geo-potential Height at 500hPa (DJF)

Initial Date : Oct. 13, 2011

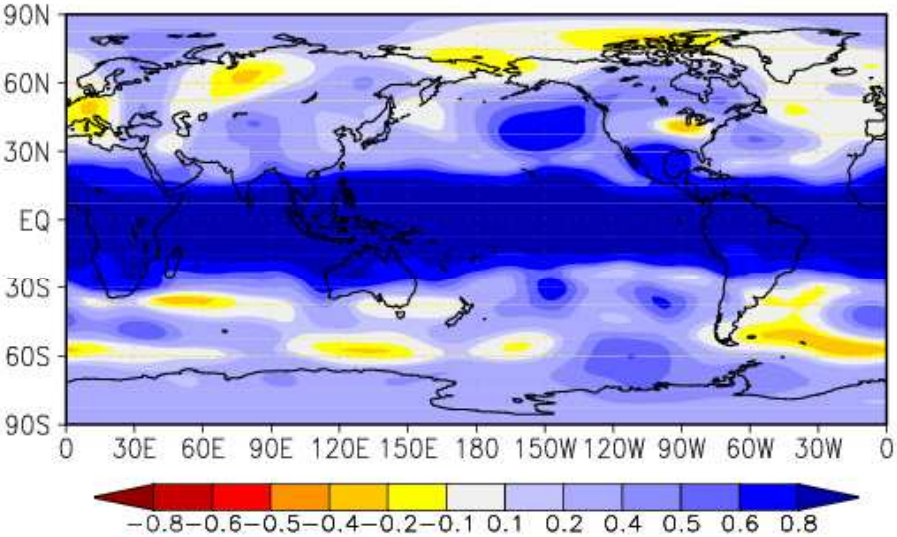
Predicted z500 anomalies



z500 anomaly La Niña composite map



Prediction skill of z500
(Anomaly correlation)

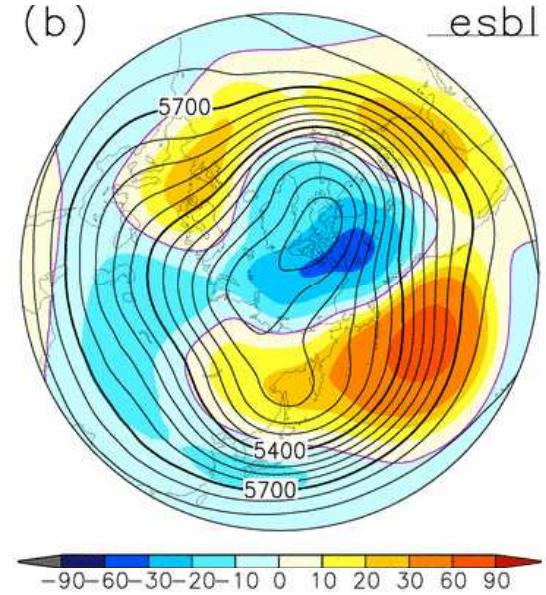


- The predicted anomaly pattern around Japan is similar to that of La Niña events.
- Negative PNA pattern is predicted, which makes Aleutian Low weaker than climatic normal.
- The model does not have enough skill except for tropics.

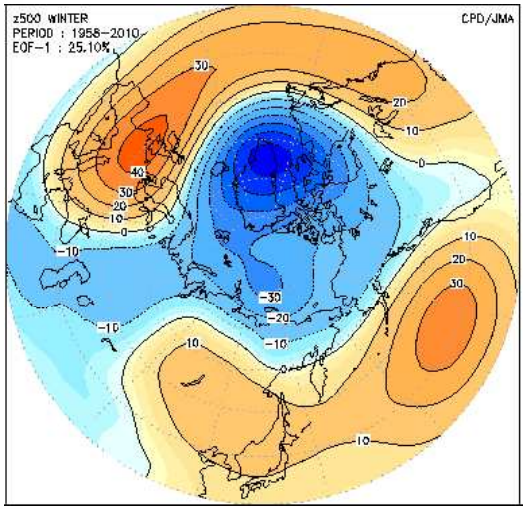
Prediction of the Arctic Oscillation (AO)

Initial Date : Oct. 13, 2011

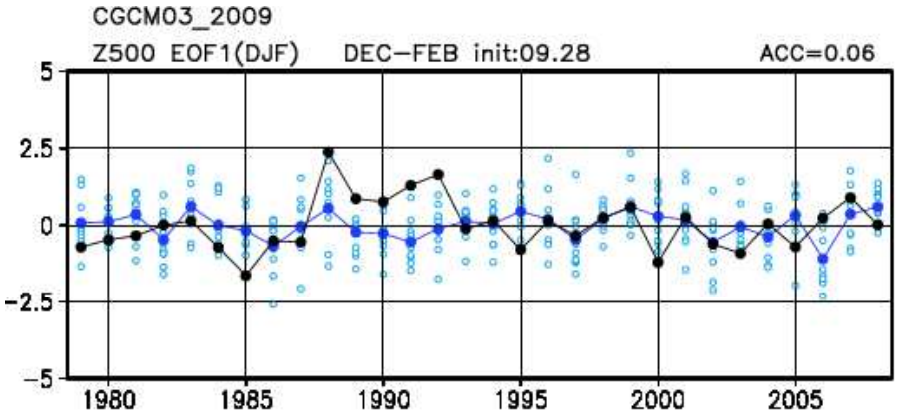
Predicted 500hPa height



EOF1 of 500hPa height in DJF (AO pattern)



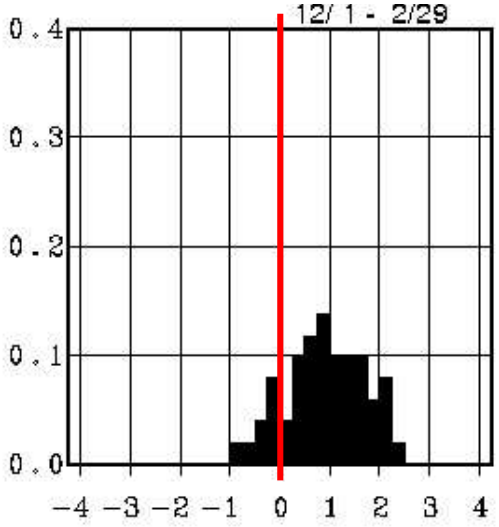
Observed and predicted DJF mean AO index.



Observed : black, Predicted : blue

- AO is an oscillation in sea-level pressure between the Arctic and the mid-latitudes.
- JMA monitors the AO by 1st component of EOF of 500 hPa height in DJF.

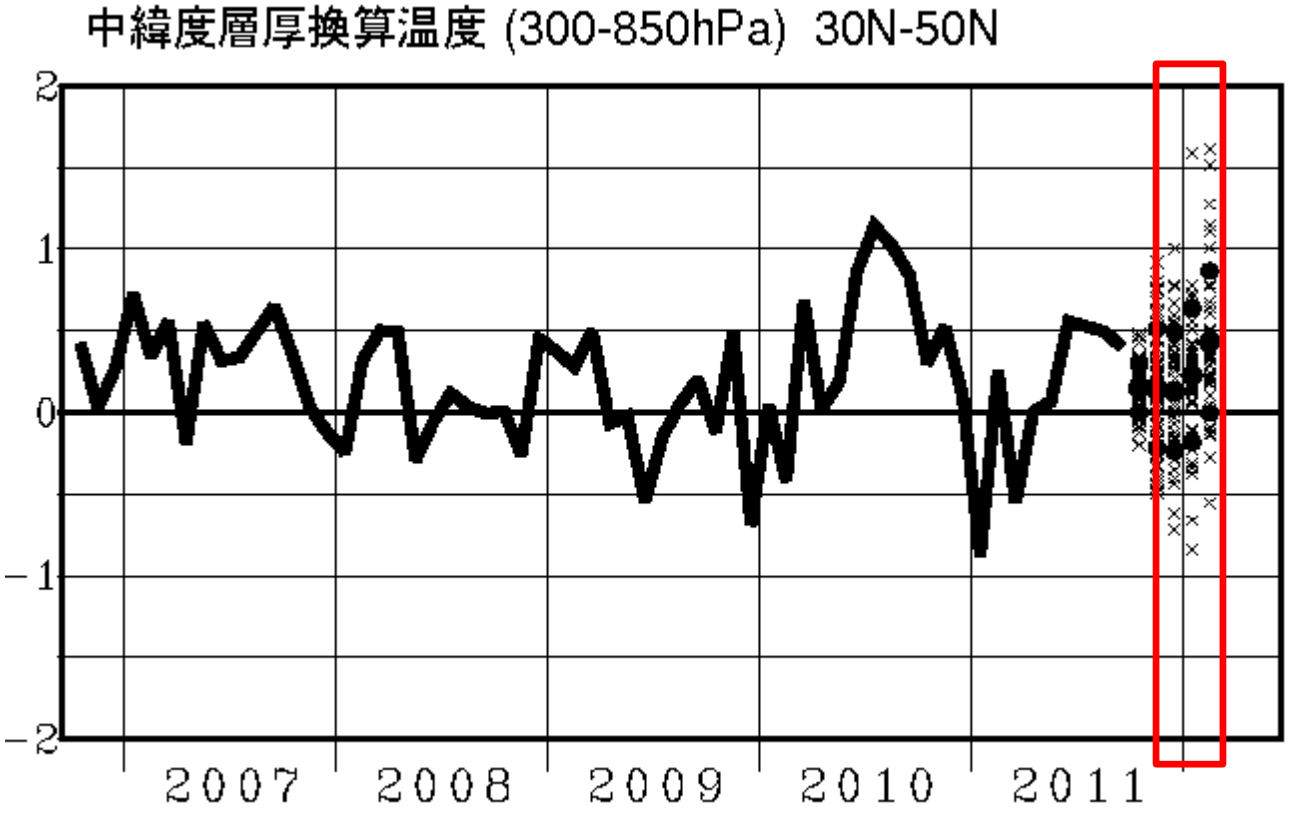
Predicted EOF1 score



- Positive (negative) phase of AO tends to cause weak (strong) winter monsoon, and above-normal (below-normal) temperature in Japan.
- Slightly positive phase of the Arctic Oscillation (AO) is predicted by CGCM for this winter.
- However, the result of the ensemble model varies widely among members.
- Skill is not high.

Zonal Mean Temperature

Predicted zonal mean temperature anomaly calculated from thickness



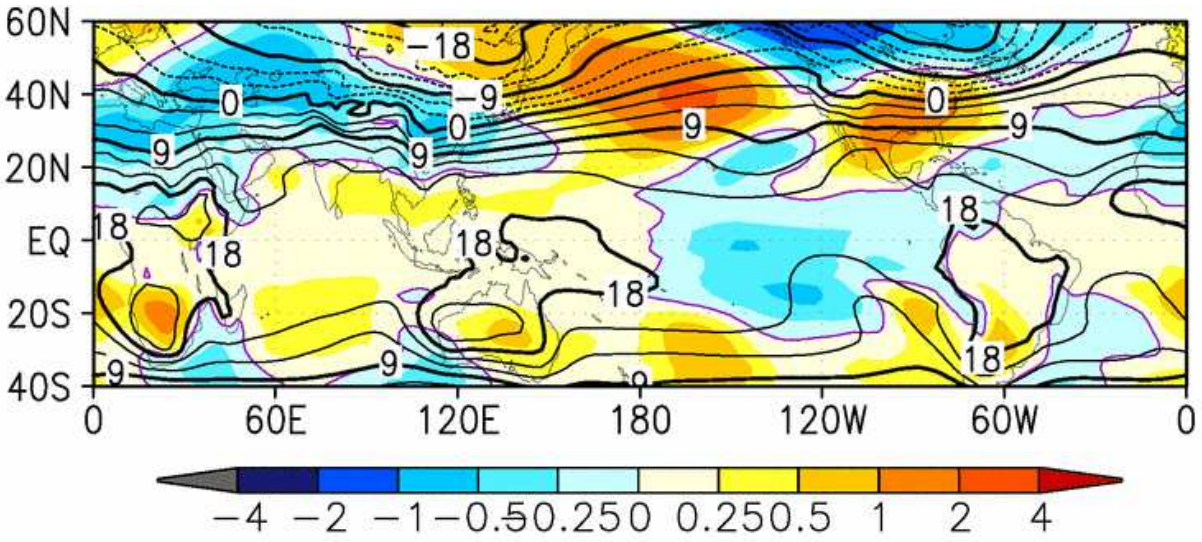
Initial Date : Oct. 13, 2011

•Zonal mean temperature over the mid-latitudes of the Northern Hemisphere (30N-50N) is predicted to be above normal through DJF.

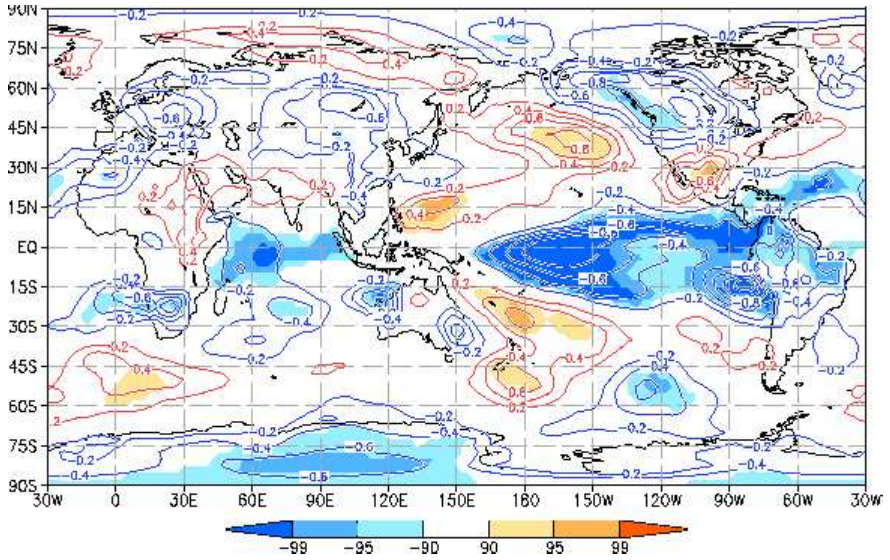
Temperature at 850hPa (DJF)

Initial Date : Oct. 13, 2011

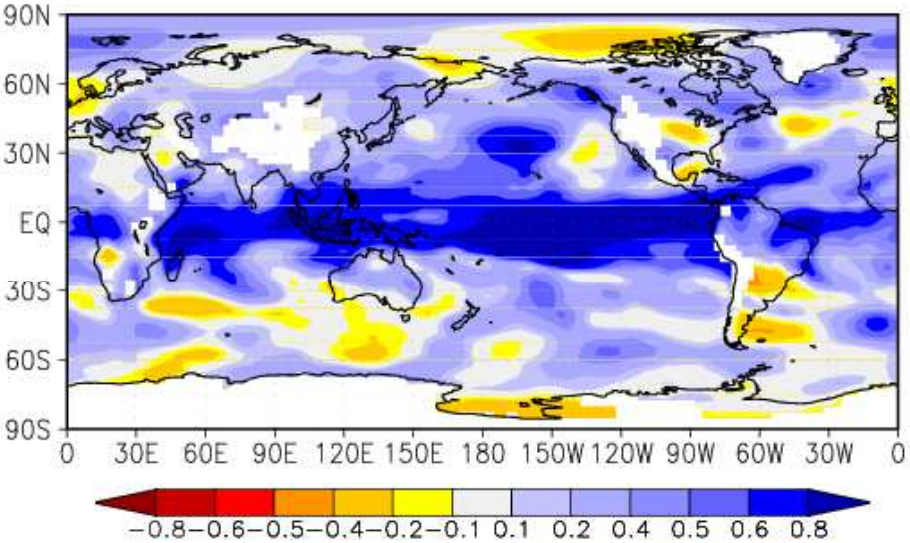
Predicted t850 anomalies



t850 anomaly La Niña composite map



Prediction skill of t850 (ACC)

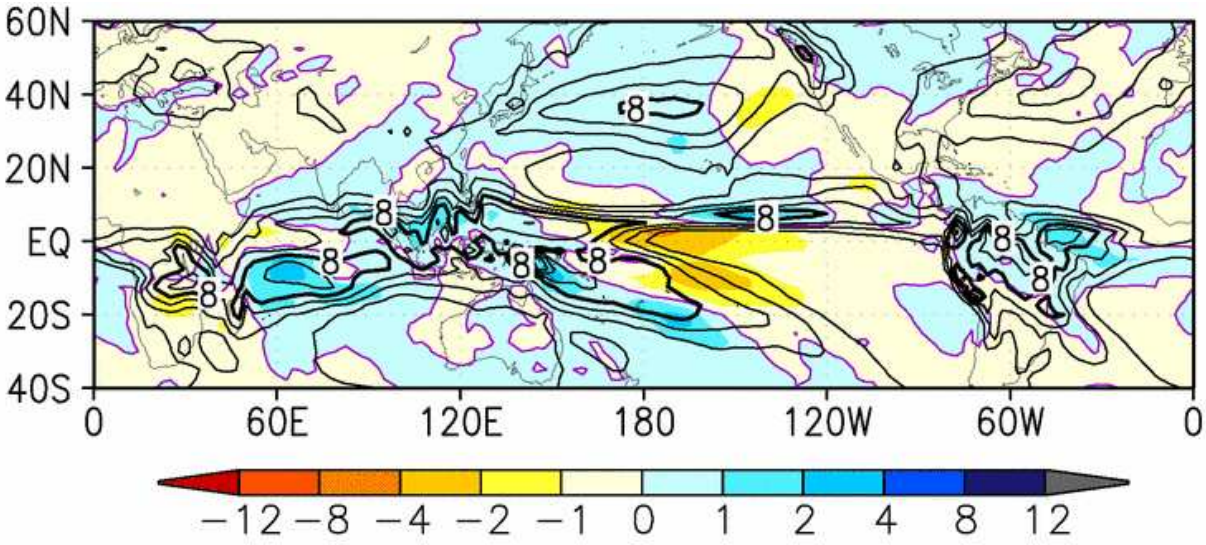


- Northern Japan is predicted to be warmer due to weaker Aleutian Low.
- Western Japan is predicted to be colder due to the sub-tropical jet which slightly shifted southward.

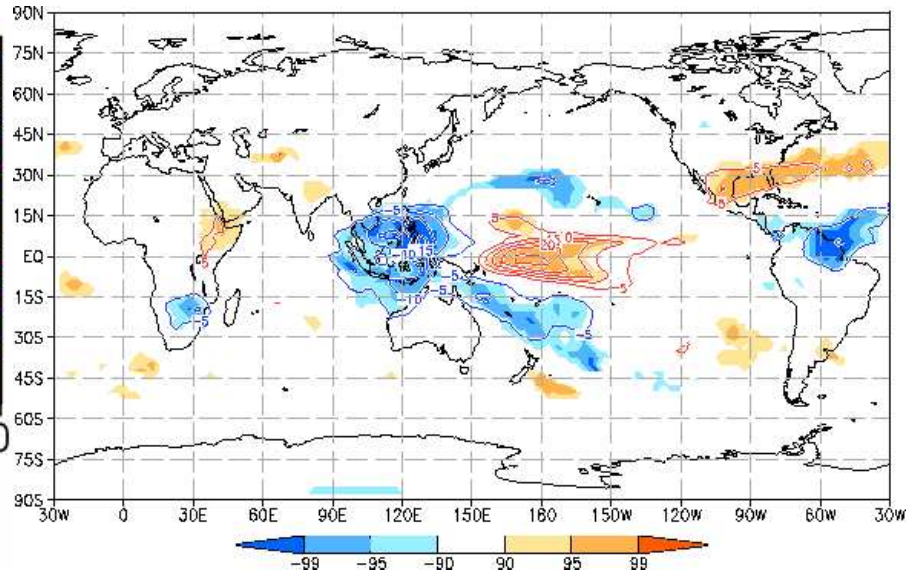
Precipitation (DJF)

Initial Date : Oct. 13, 2011

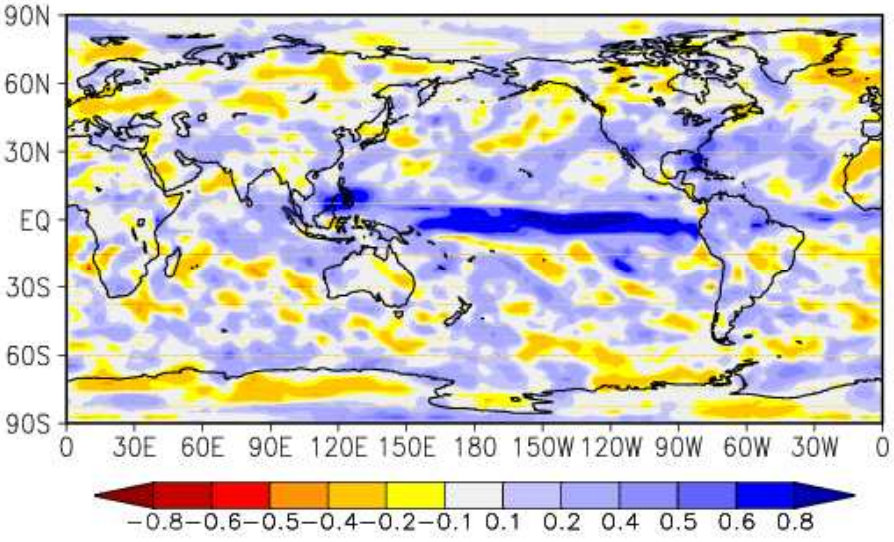
Predicted precipitation anomalies



OLR anomaly La Niña composite map



Prediction skill of precipitation (ACC)



Numerical Prediction Guidance

3-month mean Temperature	Probability (%)		
	B	N	A
Northern Japan	32	32	36
Eastern Japan	34	26	40
Western Japan	33	30	37
Okinawa/Amami	31	23	46

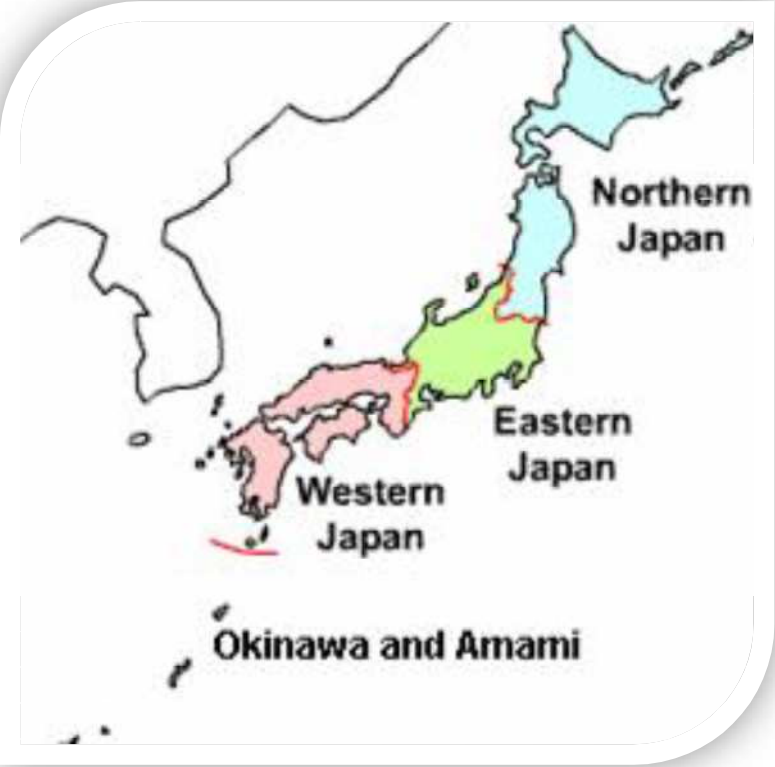
B: Below Normal N: Near Normal A: Above Normal
(Base period : 1981-2010)

•Area averaged temperature anomalies obtained from the numerical prediction model are almost near normal.

Statistical Method : OCN

OCN : Optimal Climate Normals

Statistical guidance based on the recent 10-year tendency



3-month mean Temperature	Probability (%)		
	B	N	A
Northern Japan	20	40	40
Eastern Japan	30	20	50
Western Japan	20	50	30
Okinawa/Amami	10	40	50

B: Below Normal N: Near Normal A: Above Normal

(Base period : 1981-2010)

- Eastern Japan and Okinawa/Amami : above normal
- Northern Japan : near or above normal
- Western Japan : near normal
- High temperature tendency in the recent climate should be considered!

3. Conclusions

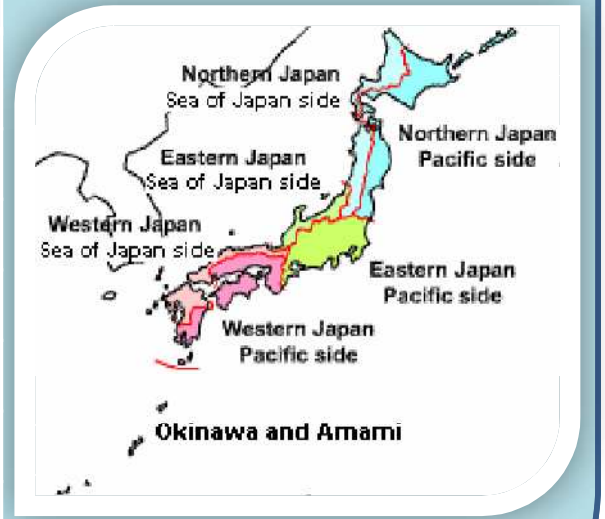
Temperature

Category	−	0	+
Northern Japan	20	**40**	**40**
Eastern Japan	30	40	30
Western Japan	30	40	30
Okinawa and Amami	**40**	**40**	20

(Category −: below normal, 0 : normal, + : above normal, Unit : %)

Precipitation

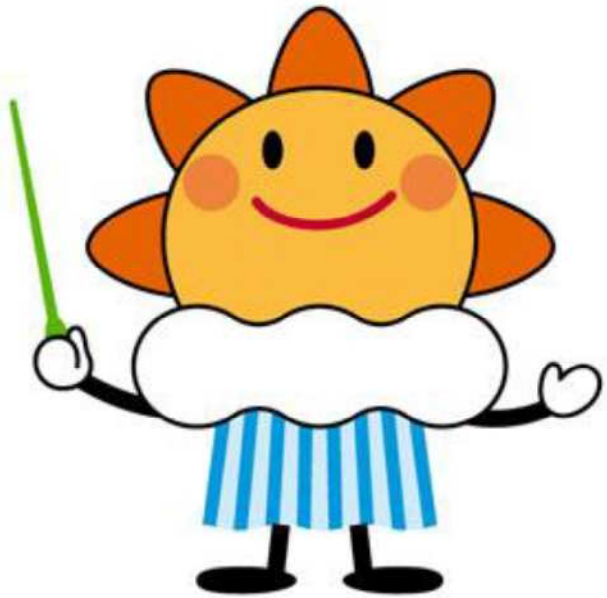
Category		−	0	+
Northern Japan	Sea of Japan side	30	40	30
	Pacific side	20	**40**	**40**
Eastern Japan	Sea of Japan side	30	40	30
	Pacific side	30	40	30
Western Japan	Sea of Japan side	30	40	30
	Pacific side	30	40	30
Okinawa and Amami		**40**	**40**	20



(Category −: below normal, 0 : normal, + : above normal, Unit : %)

Snowfall on the Sea of Japan side shows no signal.

Thank you for your attention!



JMA's mascot is named Harerun (in the hope of hare, the Japanese word for “fine weather”), and is designed with elements of sun, cloud and rainfall. Harerun holds a green baton in prayer for a disaster-free, peaceful world.
The mascot helps to raise public awareness of meteorological services as well as natural disasters and global environmental issues at various events held at the Meteorological Museum and local offices.