Cold season outlook for winter 2018/2019 over Japan

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Outline

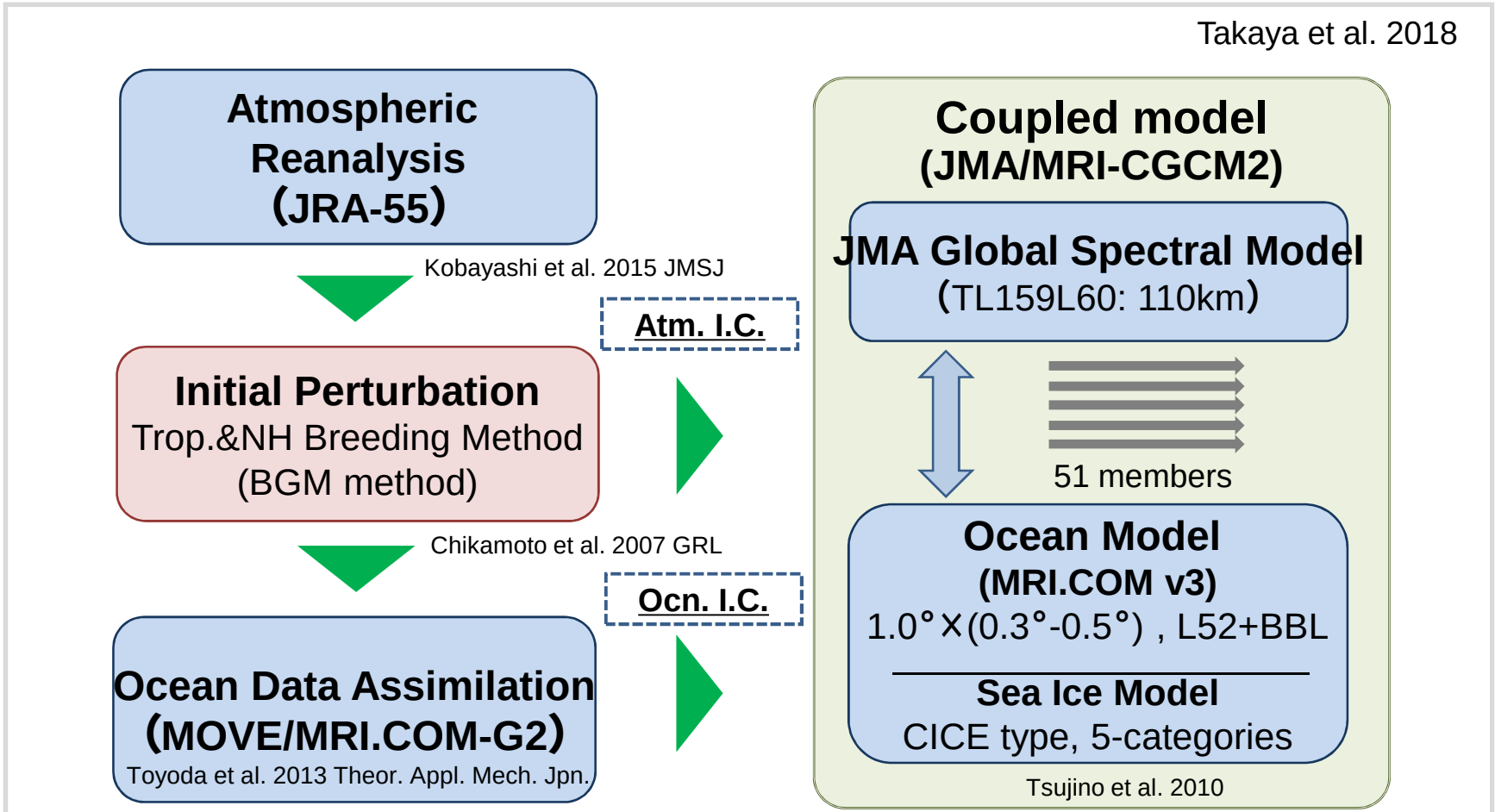
- JMA’s ensemble prediction for winter 2018/2019
- Cold season outlook over Japan

In this presentation,

* Cold season outlook issued on 25th September 2018
* Initial date : 8 September 2018
* Base period for normal is 1981-2010.
* Atmospheric analysis data are JRA-55.
* SST data are COBE-SST and OLR data are provided by NOAA.

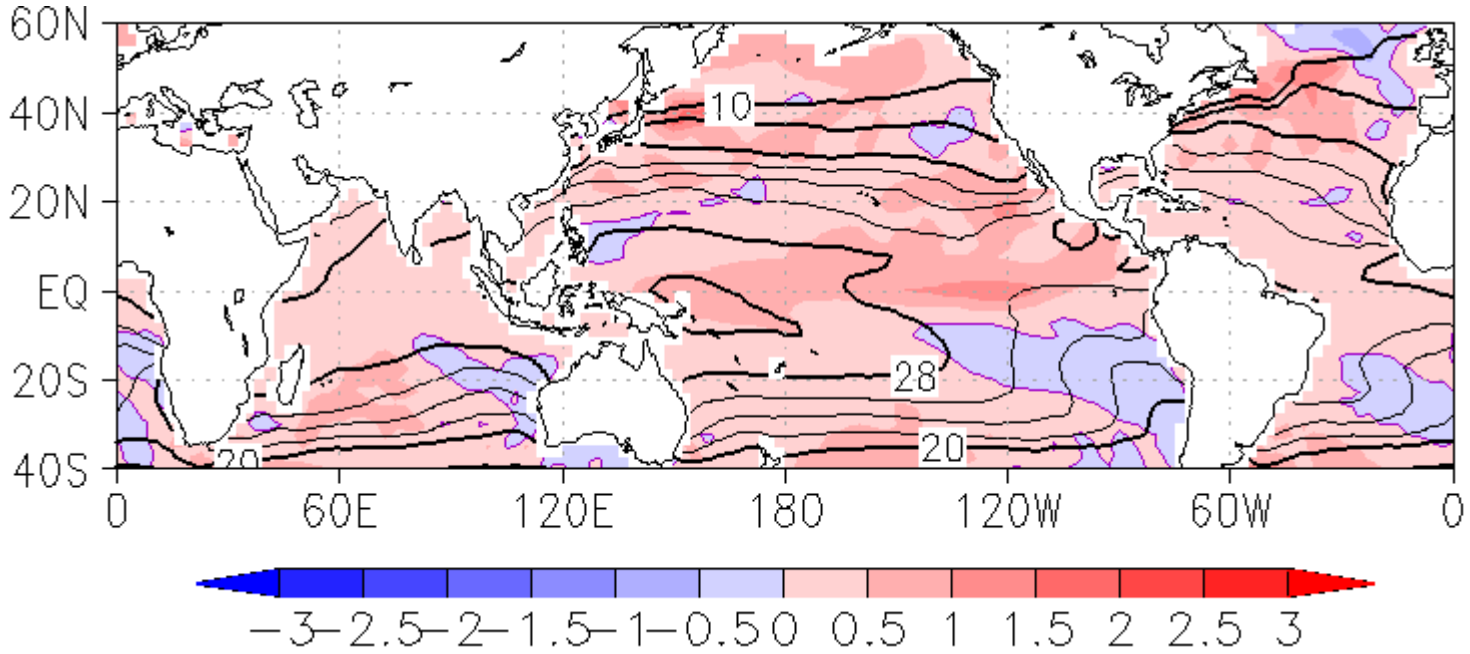
System components of JMA/MRI-CPS2

JMA/MRI-CPS2（Coupled Prediction System 2）

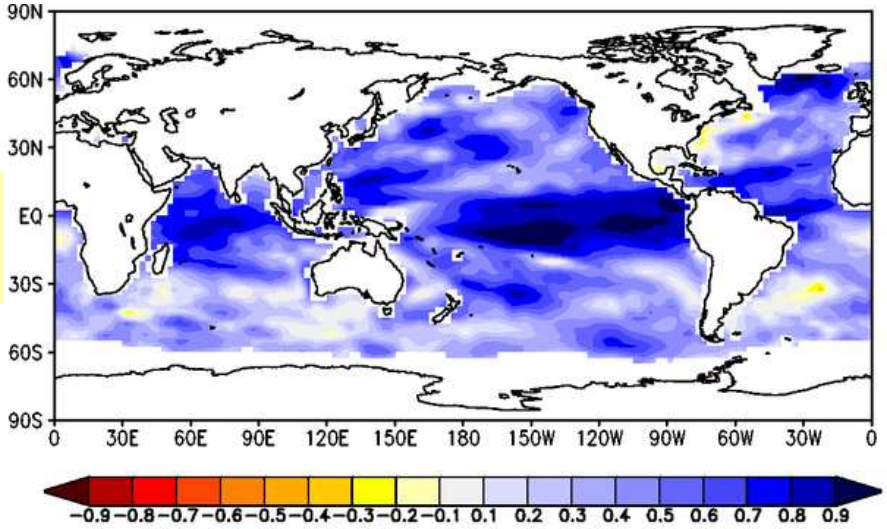


This system consists of three parts: an atmosphere-ocean coupled general circulation model named JMA/MRI-CGCM2, atmospheric and oceanic data assimilation systems, and ensemble generation systems of the atmospheric and oceanic initial conditions. 51-member ensemble integrations are carried out.

Oceanic conditions in DJF 2018/19



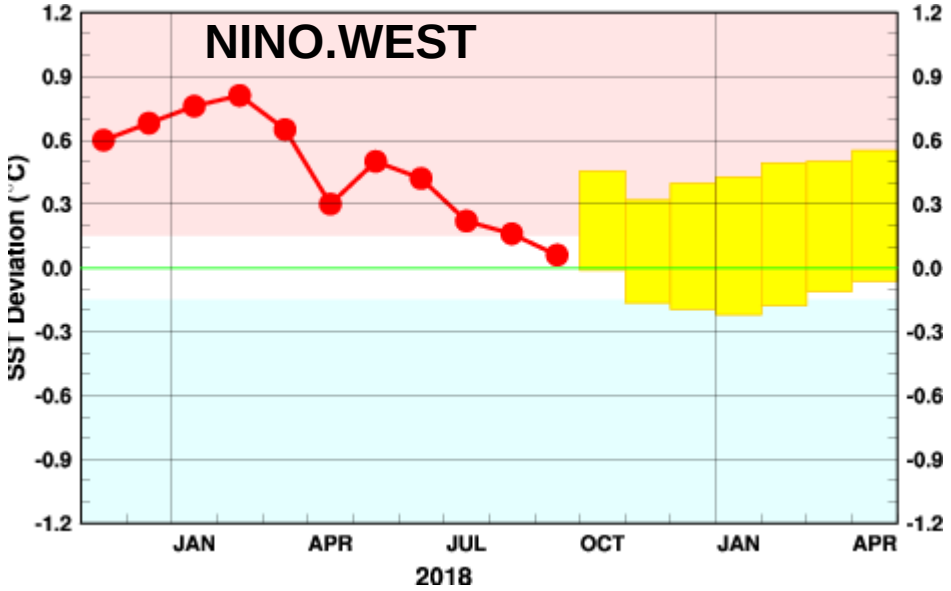
Prediction accuracy
(Anomaly Correlation)
verification result by the 30-year hindcast

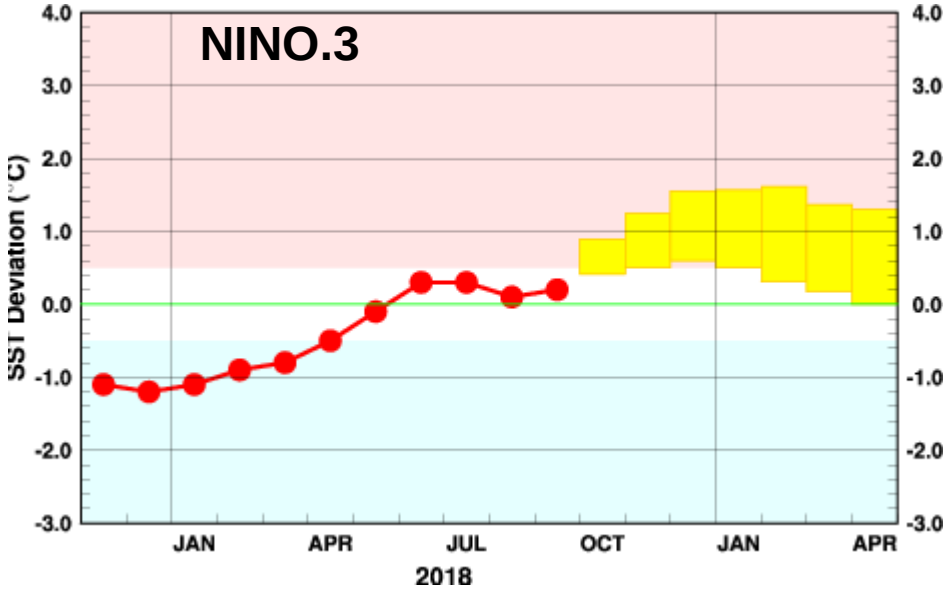


In the tropical region,
prediction reliability is pretty good.

El Niño outlook

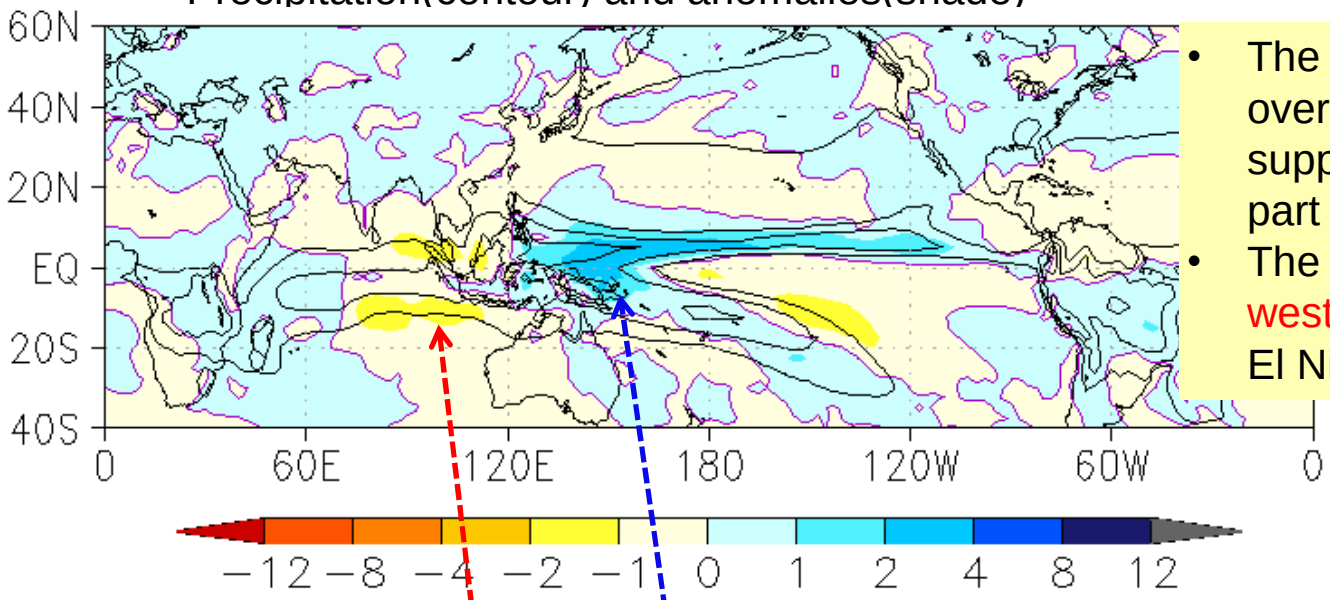
- JMA's coupled prediction system suggests that the NINO.3 SST will be above normal from this autumn to spring.
- It is likely that El Niño will occur in this autumn and persist until spring (70%).
- The area-averaged SST in the tropical western Pacific (NINO.WEST) region was near normal in September. It is likely that the value will be slightly above normal during the coming winter.





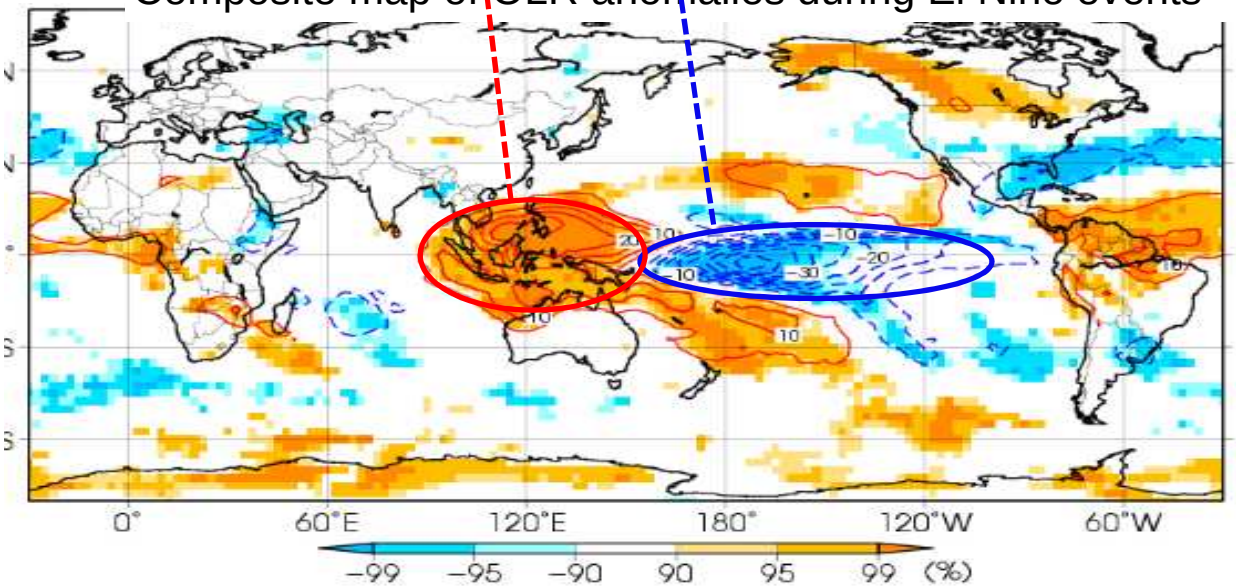
Global circulation in DJF 2018/19

Precipitation(contour) and anomalies(shade)



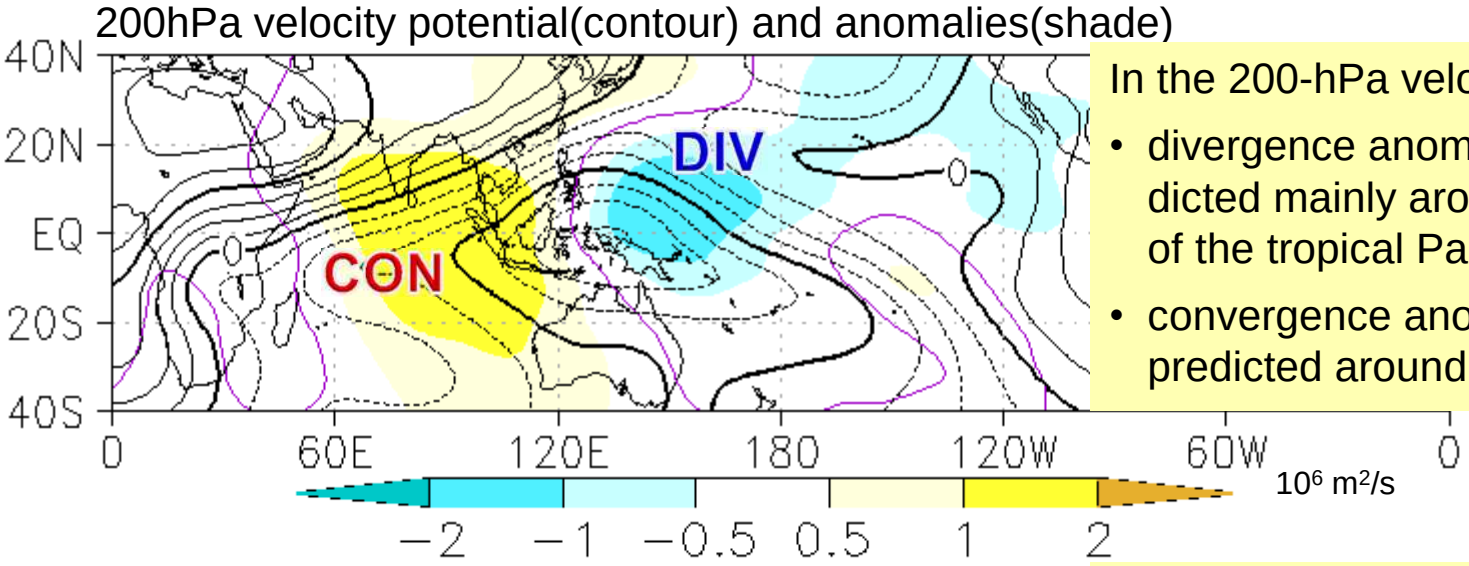
- The convection will be enhanced over the equatorial Pacific and suppressed around the eastern part of the Indian Ocean.
- The precipitation patterns are westward shift compared to the El Niño composite pattern.

Composite map of OLR anomalies during El Niño events



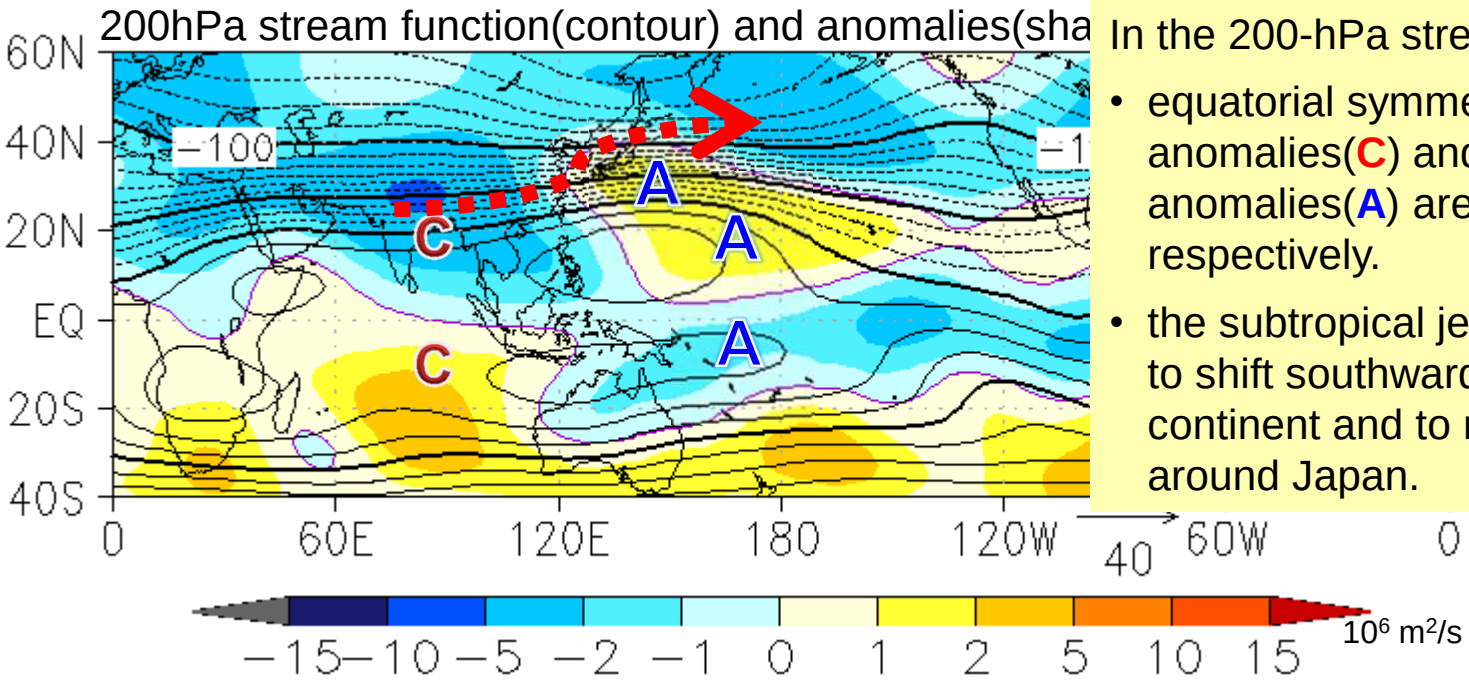
Contours : anomalies at intervals of 5 W/m^2.
Shading : the confidence level.
The base period for composite analysis is 1979 - 2012, while that for the three-month means of November-December-January and December-January-February is 1979/80 - 2012/13.

Global circulation in DJF 2018/19



In the 200-hPa velocity potential field,

- divergence anomalies(**DIV**) are predicted mainly around the western part of the tropical Pacific.
- convergence anomalies(**CON**) are predicted around the Indian Ocean.

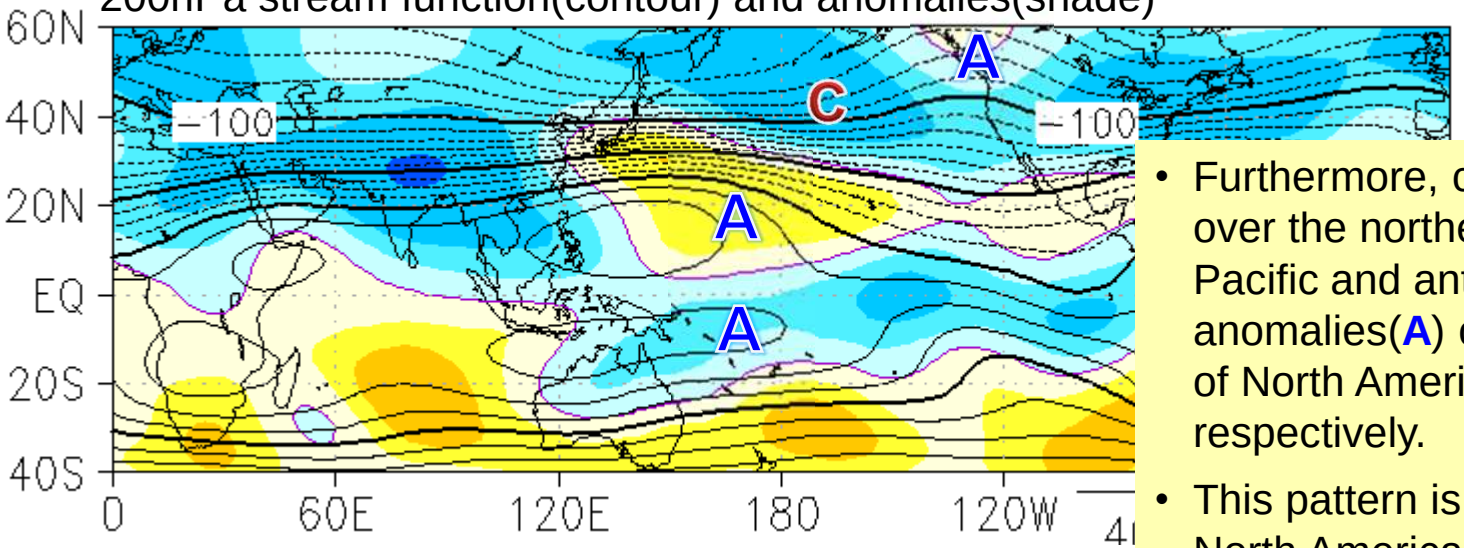


In the 200-hPa stream function field,

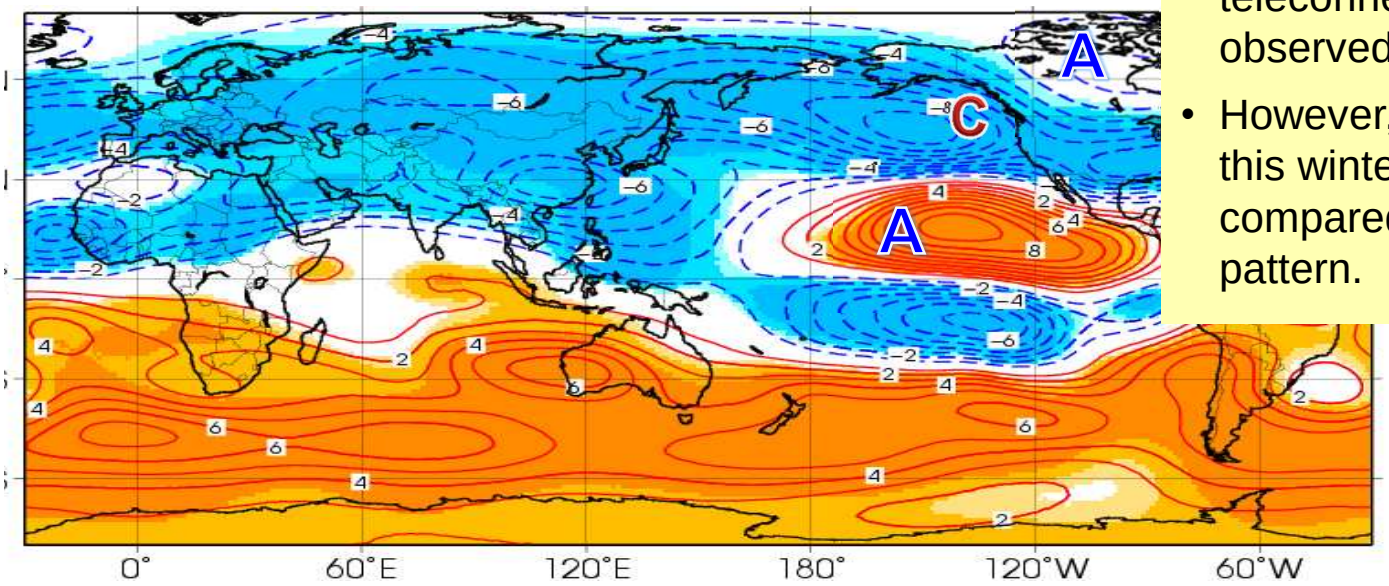
- equatorial symmetric cyclonic anomalies(**C**) and anticyclonic anomalies(**A**) are predicted respectively.
- the subtropical jet stream is expected to shift southward over the Eurasian continent and to meander northward around Japan.

Circulation response over mid-latitude

200hPa stream function(contour) and anomalies(shade)



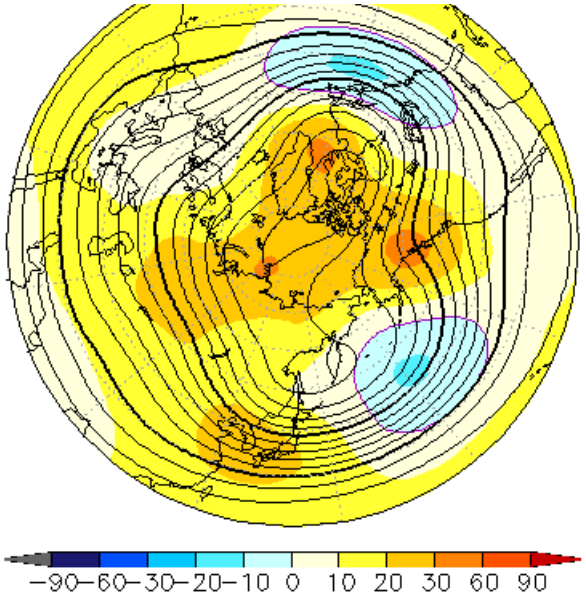
Composite map of 200hPa stream function for El Niño



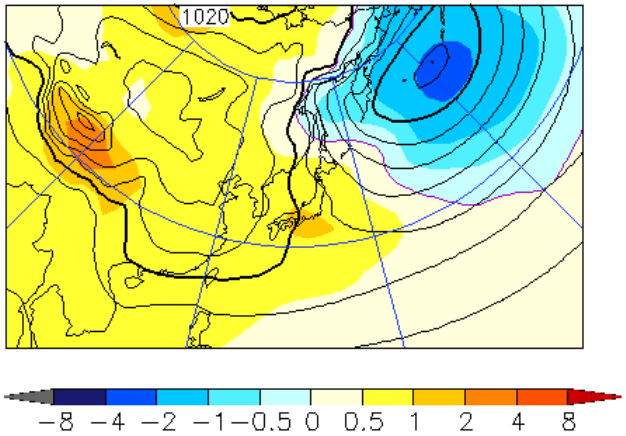
- Furthermore, cyclonic anomalies(**C**) over the northern part of the North Pacific and anticyclonic anomalies(**A**) over the western part of North America are predicted respectively.
- This pattern is similar to the Pacific North American (PNA) teleconnection pattern often observed in El Niño winters.
- However, the expected pattern in this winter seems be westward shift compared to the typical PNA pattern.

Focusing on East Asia

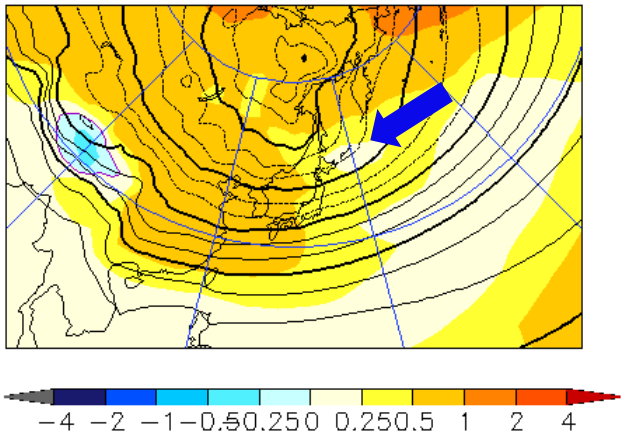
Z500



SLP



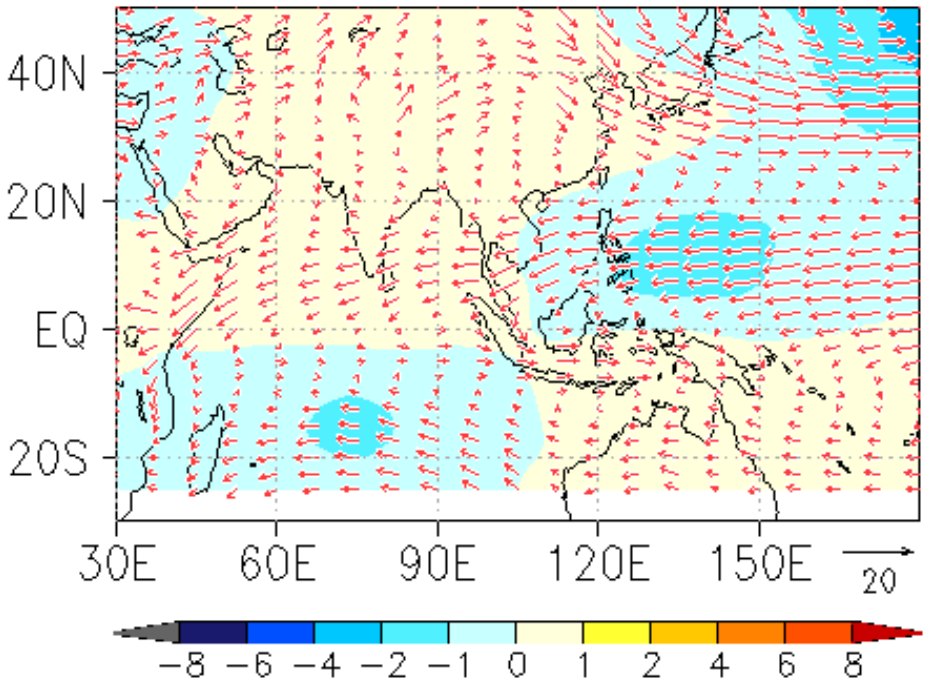
T850



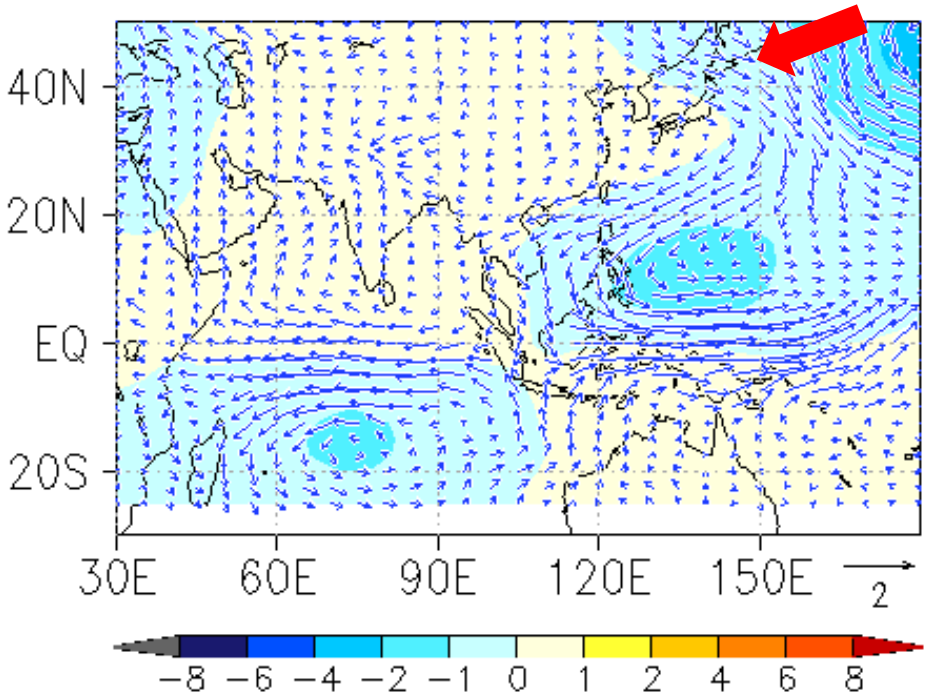
- In the 500-hPa height field, positive anomalies are predicted over East Asia.
- The Aleutian Low is predicted stronger than normal corresponding to the westward shift of PNA pattern.
- In the 850-hPa temperature field, positive anomalies are predicted over East Asia, however relatively weak anomalies are also predicted around Northern Japan.

East Asian winter monsoon

850hPa wind (vector)
850hPa stream function anomalies(shade)



850hPa wind anomalies (vector)
850hPa stream function anomalies(shade)



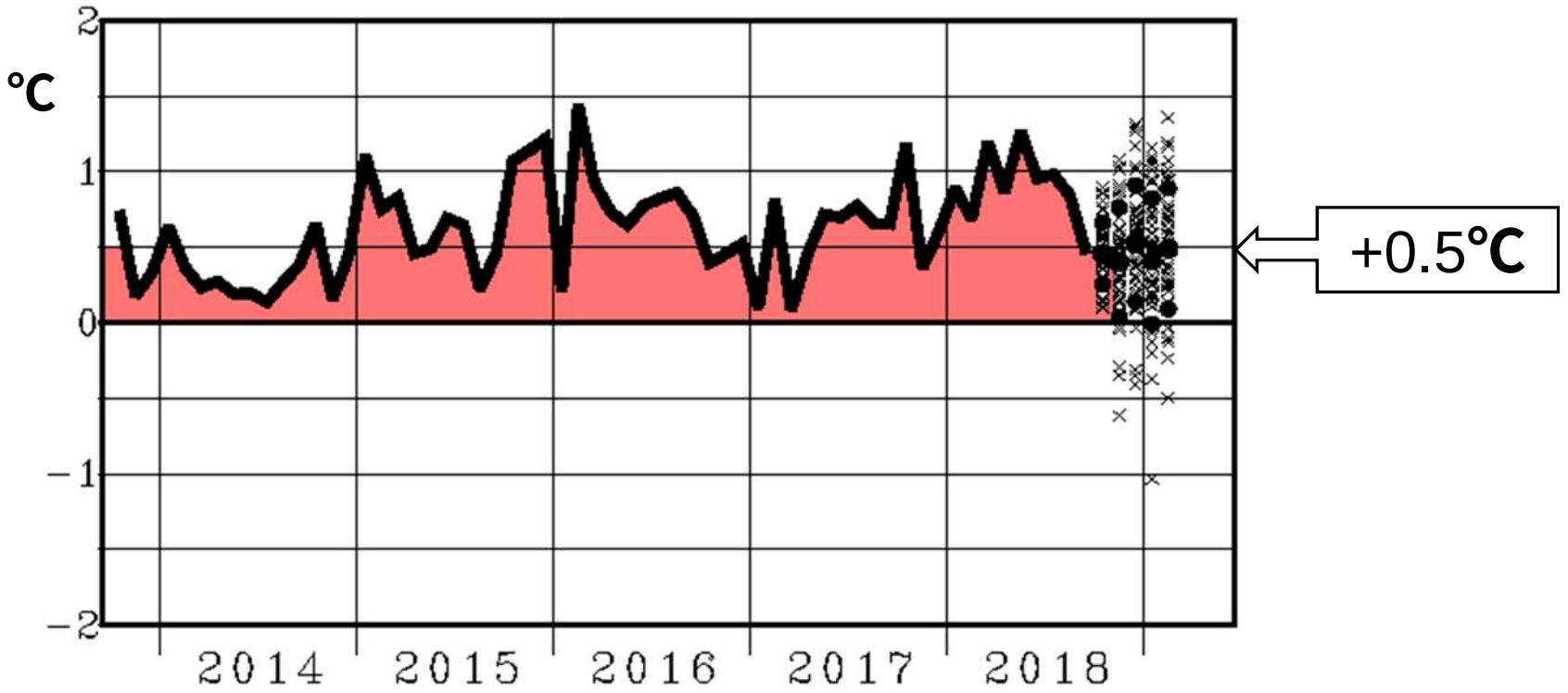
The strength and extent of northwesterly flow around Japan are used as one of the EAWM activity indices in JMA.

The winter monsoon will be as strong as normal in Northern Japan.

On the other hand, it will be weaker than normal in Eastern/Western Japan and Okinawa/Amami.

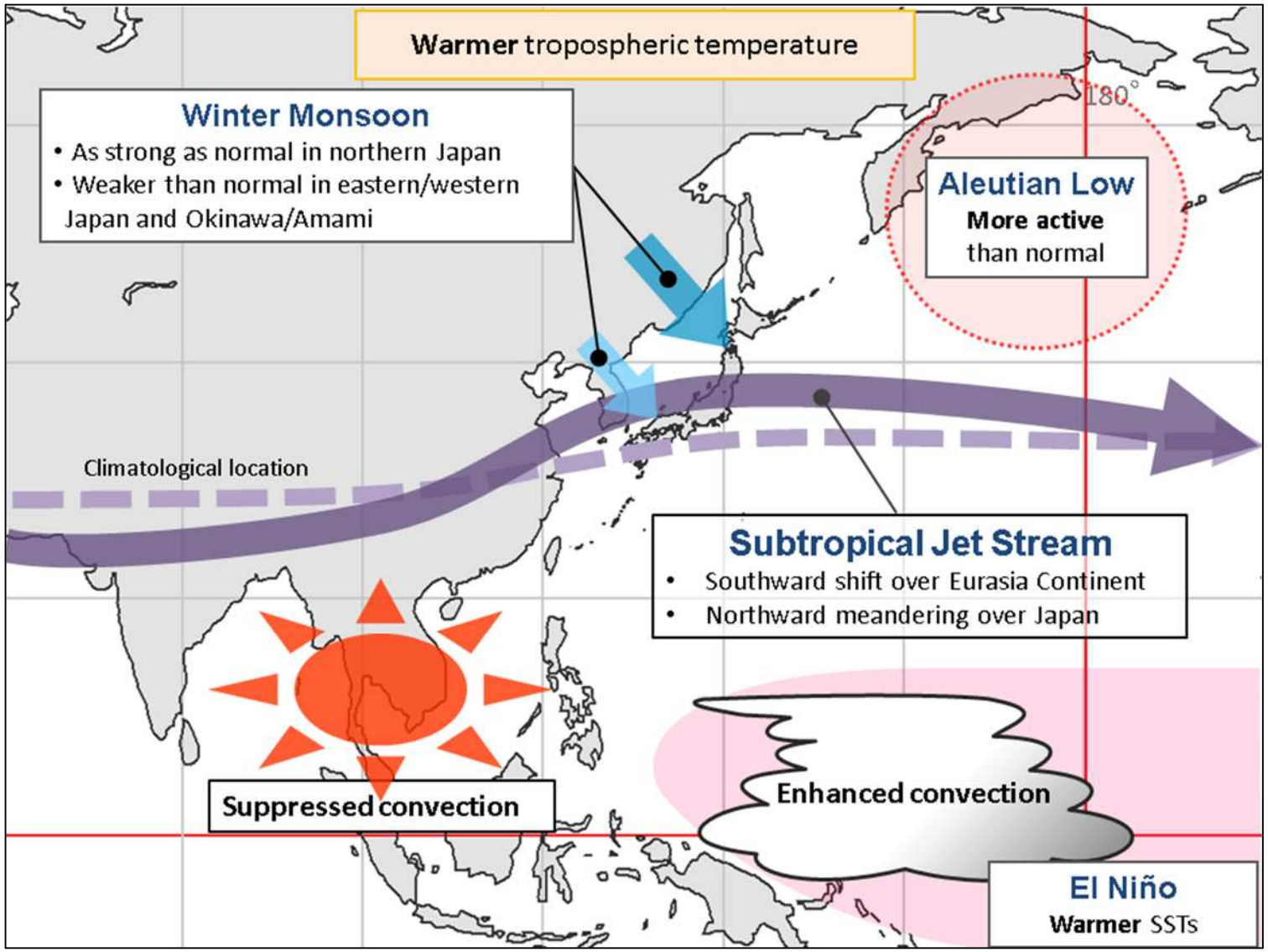
Tropospheric thickness

Zonal mean thickness in the troposphere (300hPa - 850hPa, 30N – 50N)



Overall temperatures in the troposphere are expected to be higher than normal in association with the global warming. These tendencies are likely to increase the chance of above-normal temperatures over mid-latitude regions.

Conceptual diagram for East Asian circulation in DJF 2018/19



Probability forecast of seasonal mean temperature for DJF 2018/19 in Japan

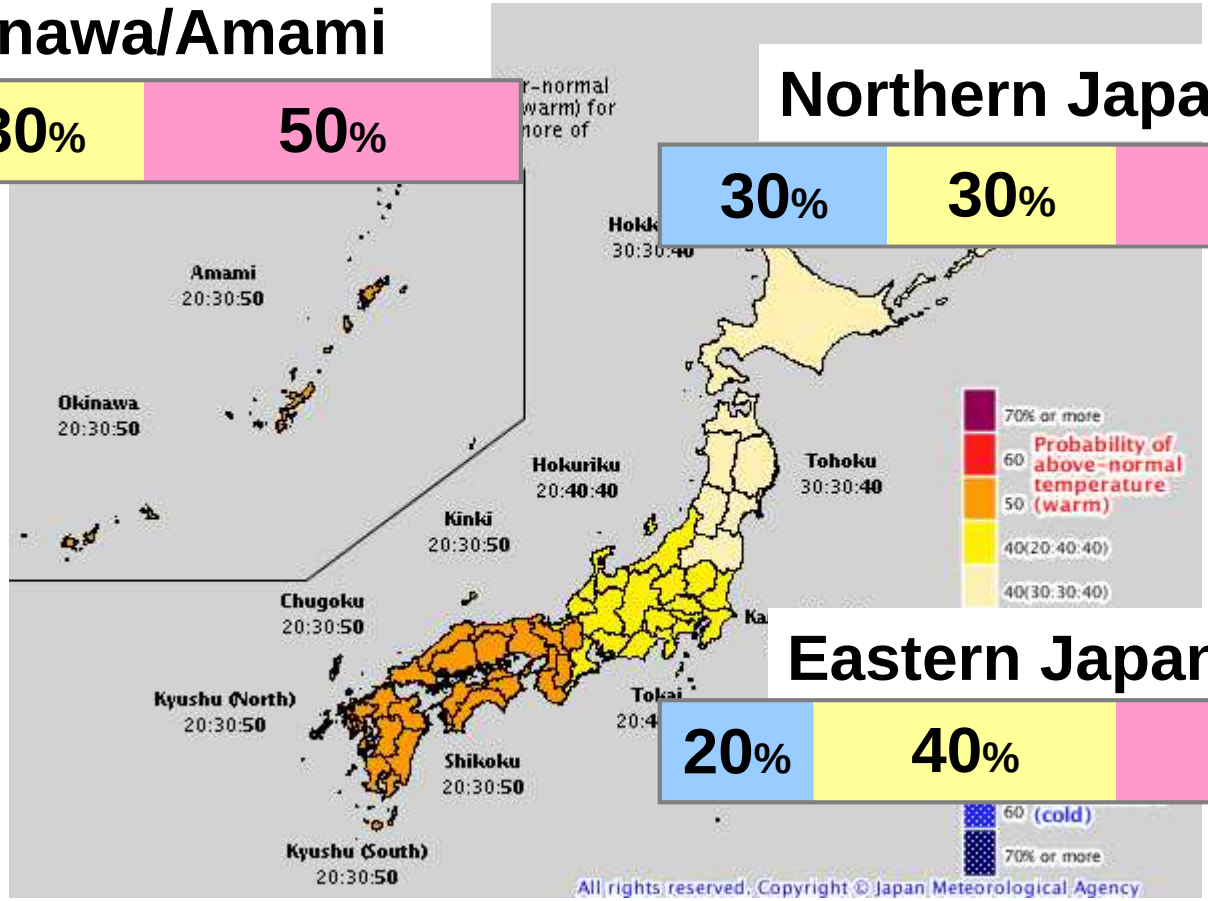
Cold season outlook issued on 25th September 2018

Okinawa/Amami

20%	30%	50%

Northern Japan

30%	30%	40%



Eastern Japan

20%	40%	40%

Western Japan

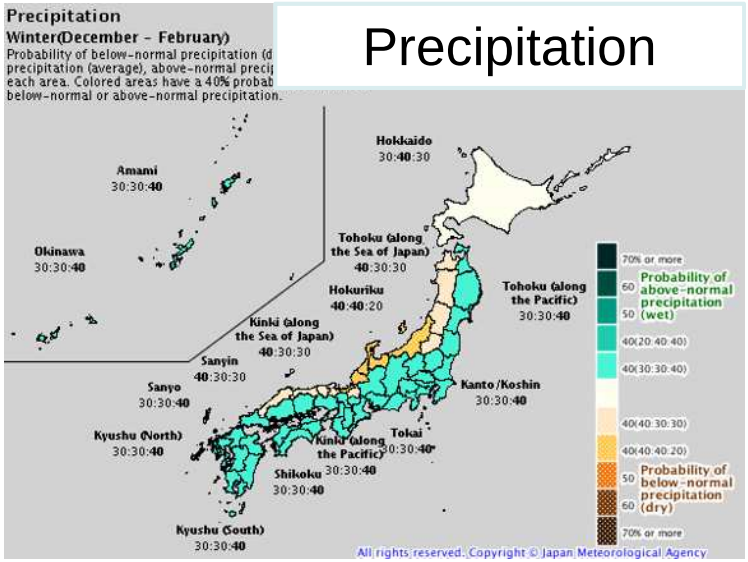
20%	30%	50%

Climatology

Below normal 33%	Near normal 33%	Above normal 33%

Probability forecast of seasonal precipitation/snowfall for DJF 2018/19 in Japan

Precipitation



Northern Japan

30%	40%	30%

Sea of Japan side of Eastern Japan

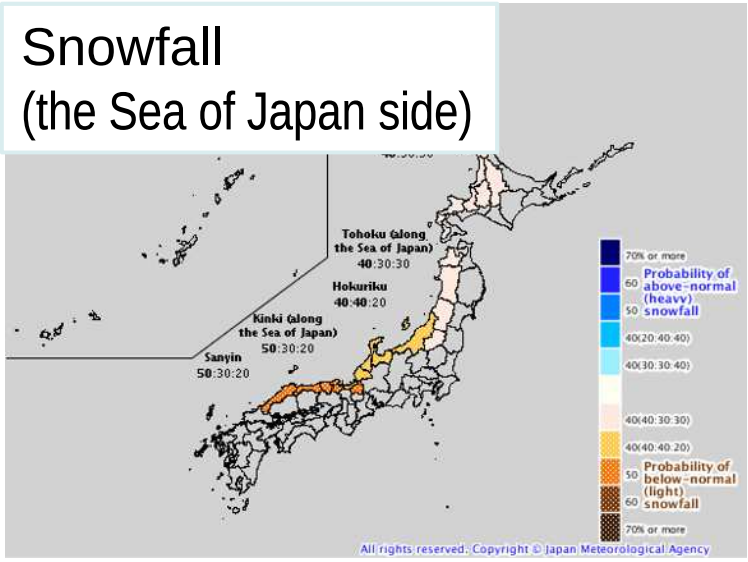
40%	40%	20%

Pacific side of Eastern Japan, and Western Japan and Okinawa/Amami

30%	30%	40%

Precipitation amounts are expected to be below normal tendencies due to the weak monsoon in the sea of Japan side of Eastern Japan.

Snowfall (the Sea of Japan side)



Sea of Japan side of Northern Japan

40%	30%	30%

Sea of Japan side of Eastern Japan

40%	40%	20%

Sea of Japan side of Western Japan

50%	30%	20%

Snowfall are also expected to be below normal over Eastern and Western Japan.

Summary

Temperature

Northern Japan

Near-normal

Eastern Japan

Above-normal/Near-normal

Western Japan and Okinawa/Amami

Above-normal

Precipitation

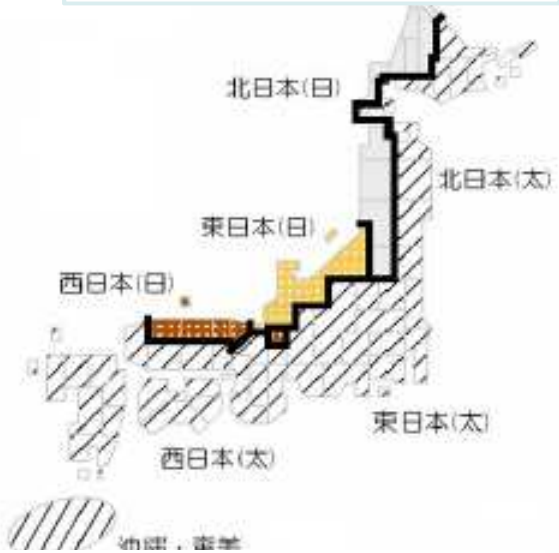
Sea of Japan side of Eastern Japan

Below-normal/Near-normal

Others

Near-normal

Snowfall (the Sea of Japan side)



Northern Japan

Near-normal

Eastern Japan

Below-normal/Near-normal

Western Japan

Below-normal

A warm winter and below-normal snowfall are expected nationwide except of Northern Japan.

It will be near-normal temperature and snowfall over Northern Japan.

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.