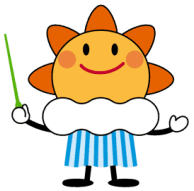
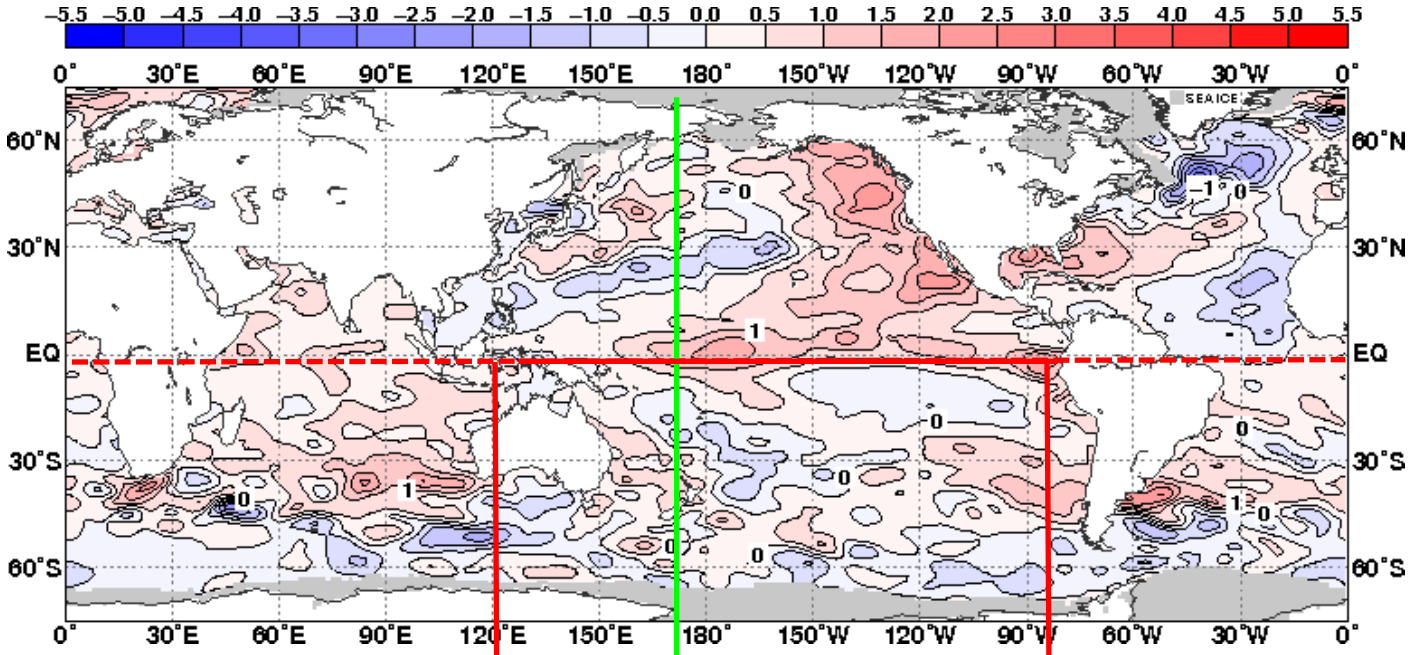


Seasonal outlook of the East Asian Summer in 2015

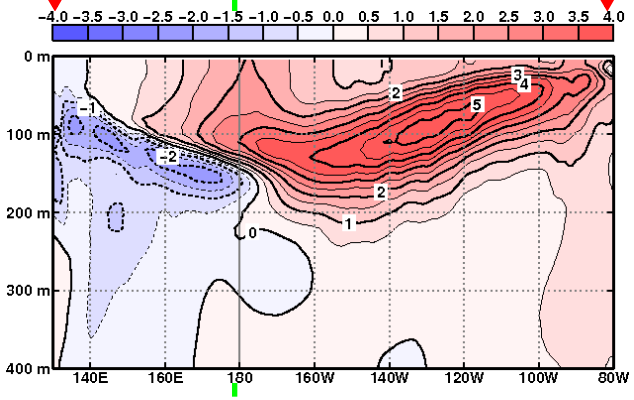
Motoaki Takekawa
Tokyo Climate Center
Japan Meteorological Agency

Oceanic conditions in April 2015

SST anomalies

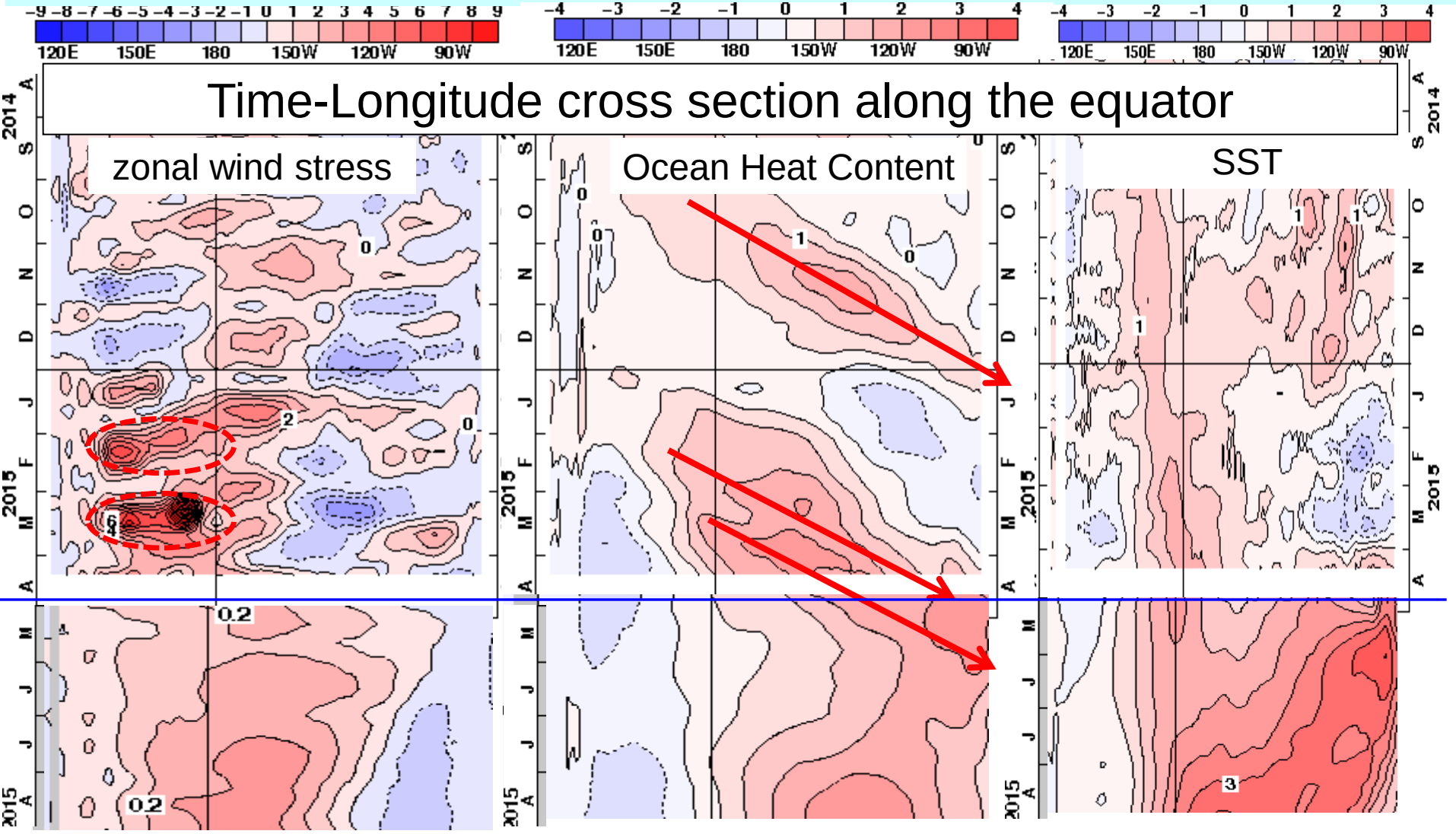


 # The distribution of SST anomalies shows an El Nino like condition.
 # Positive anomalies are dominant in sub-surface sea temperature along the equatorial central and eastern Pacific



Sub-surface sea temperature anomalies in the equatorial Pacific

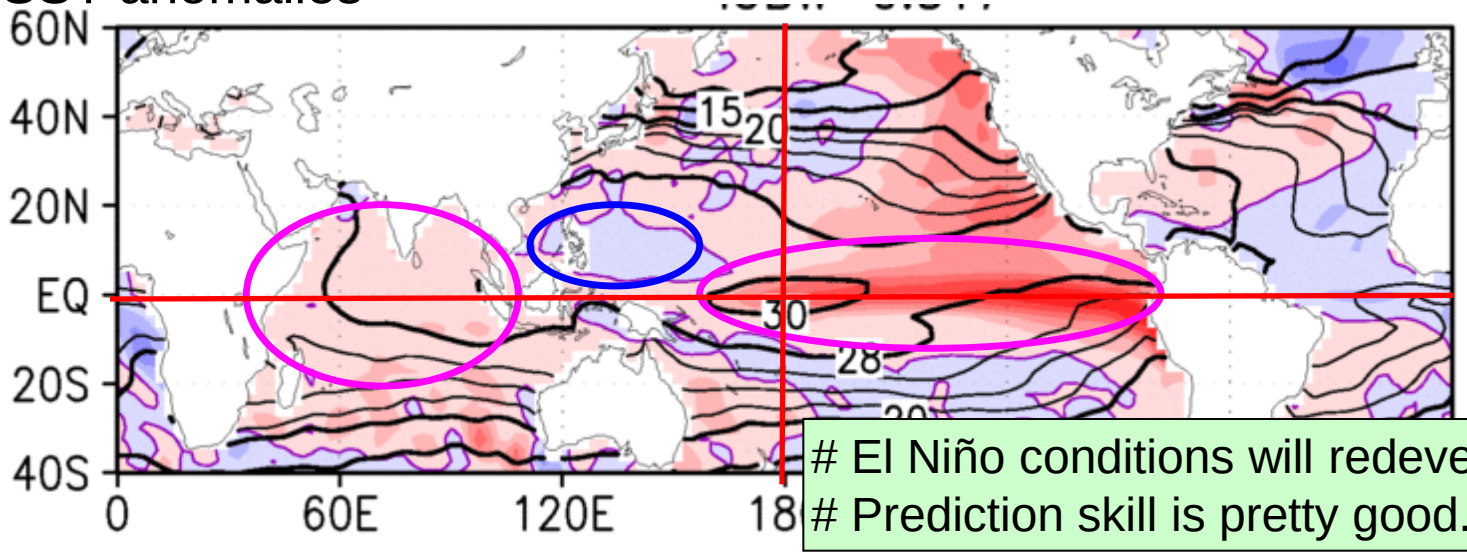
Inter-seasonal evolution of oceanic conditions



Strong westerly bursts excited warm Kelvin waves with large amplitude.
Kelvin waves have reached the west coast of South America.

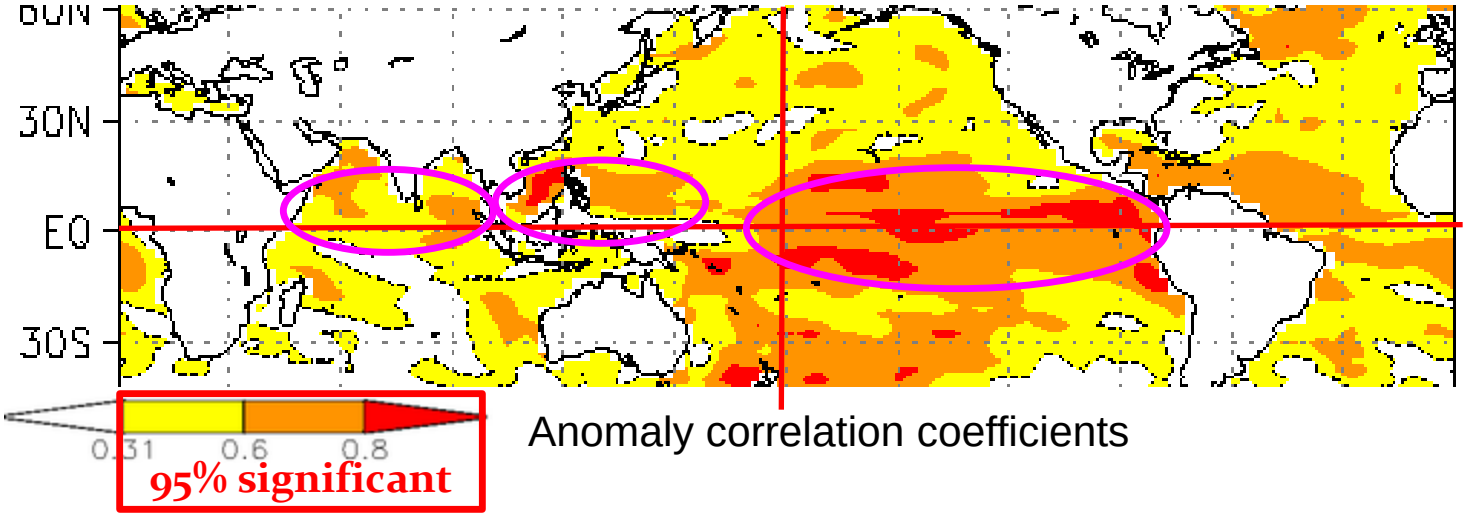
Predicted oceanic conditions in JJA (1)

SST anomalies



El Niño conditions will redevelop.
Prediction skill is pretty good.

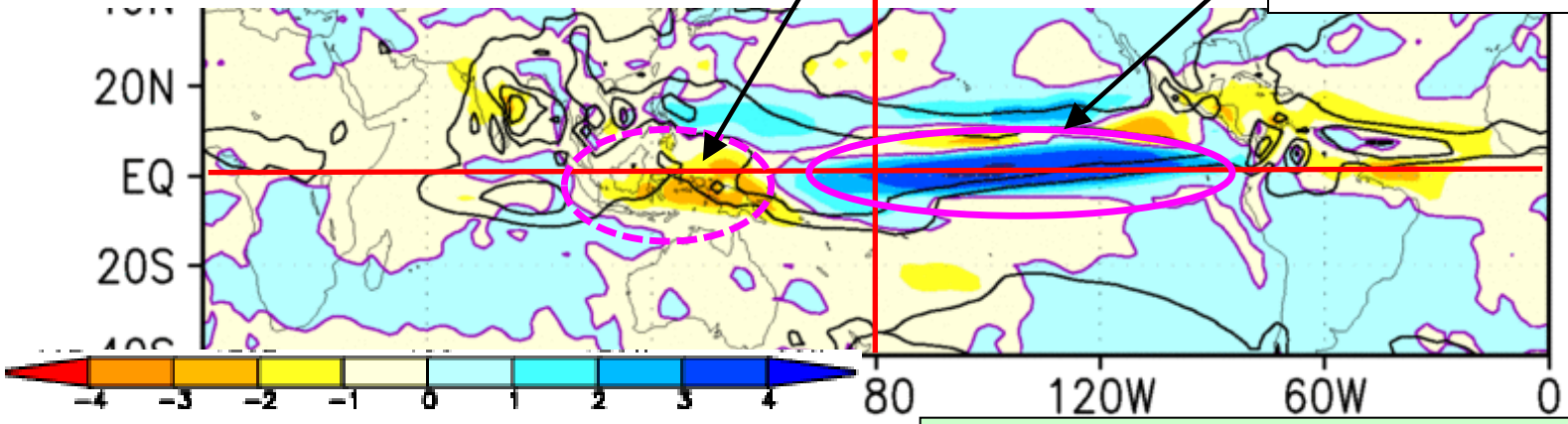
Prediction accuracy (verification result by the 30-year hindcast)



Anomaly correlation coefficients

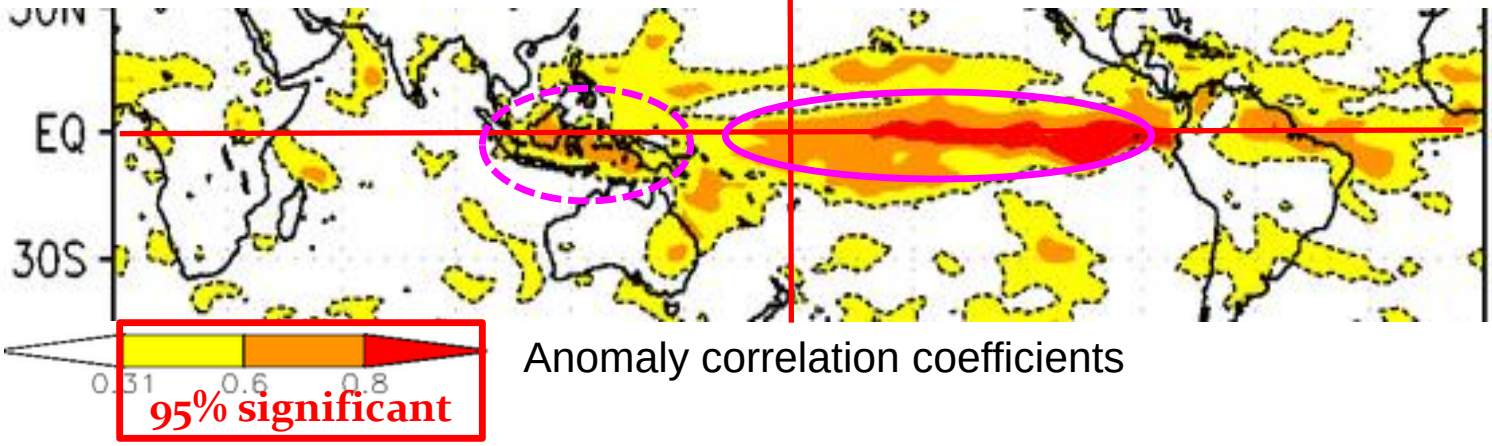
Predicted sub-tropical circulation in JJA (1)

Precipitation and anomalies



Distribution of precipitation shows characteristics of El Niño events.
Prediction skill is good.

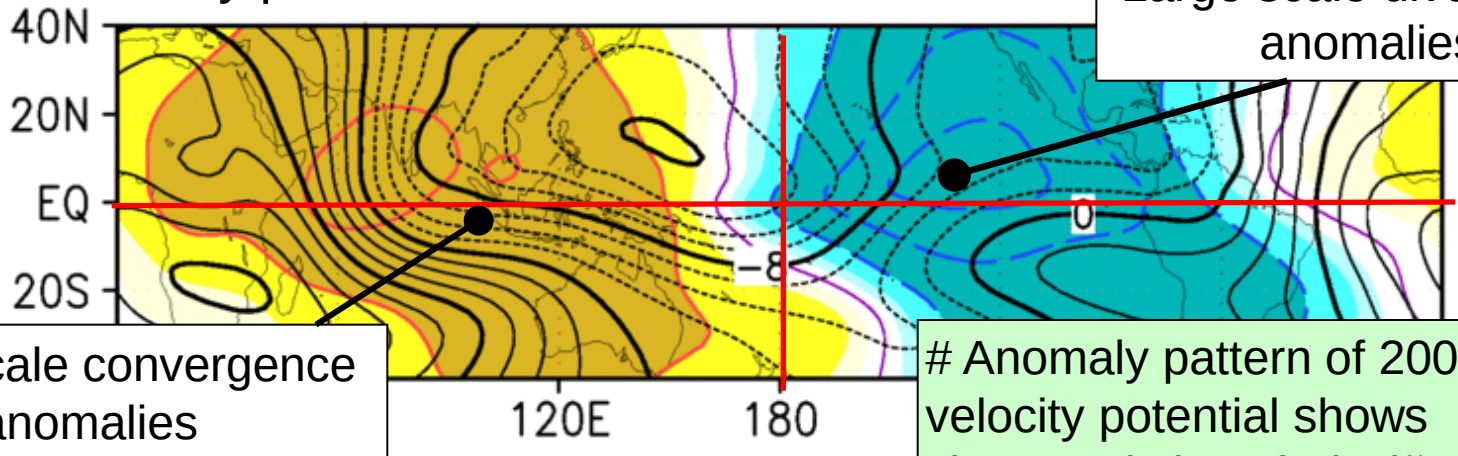
Prediction accuracy (verification result by the 30-year hindcast)



Anomaly correlation coefficients

Predicted sub-tropical circulation in JJA (2)

200hPa velocity potential and anomalies

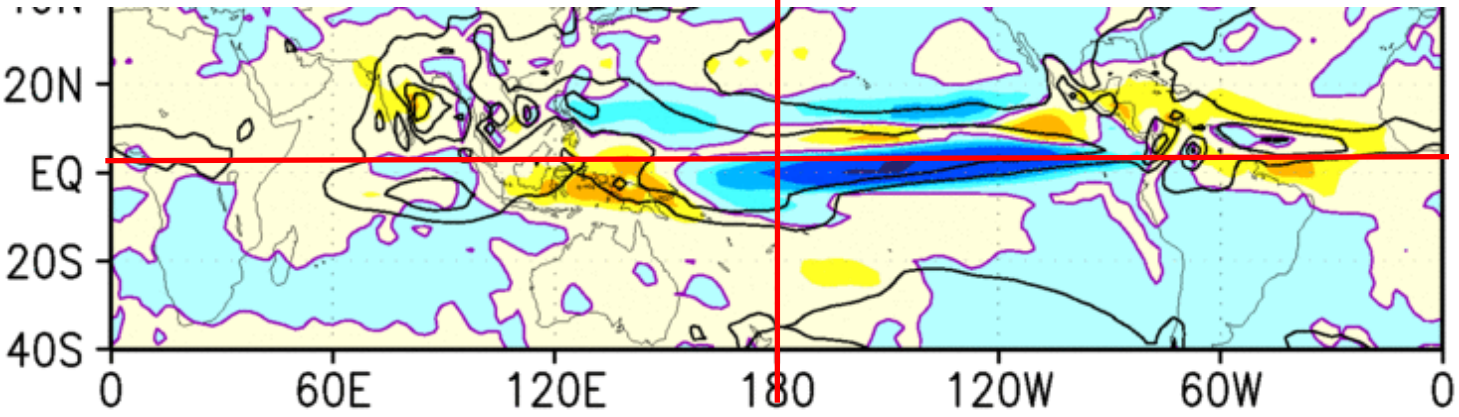


Large scale divergence anomalies

Large scale convergence anomalies

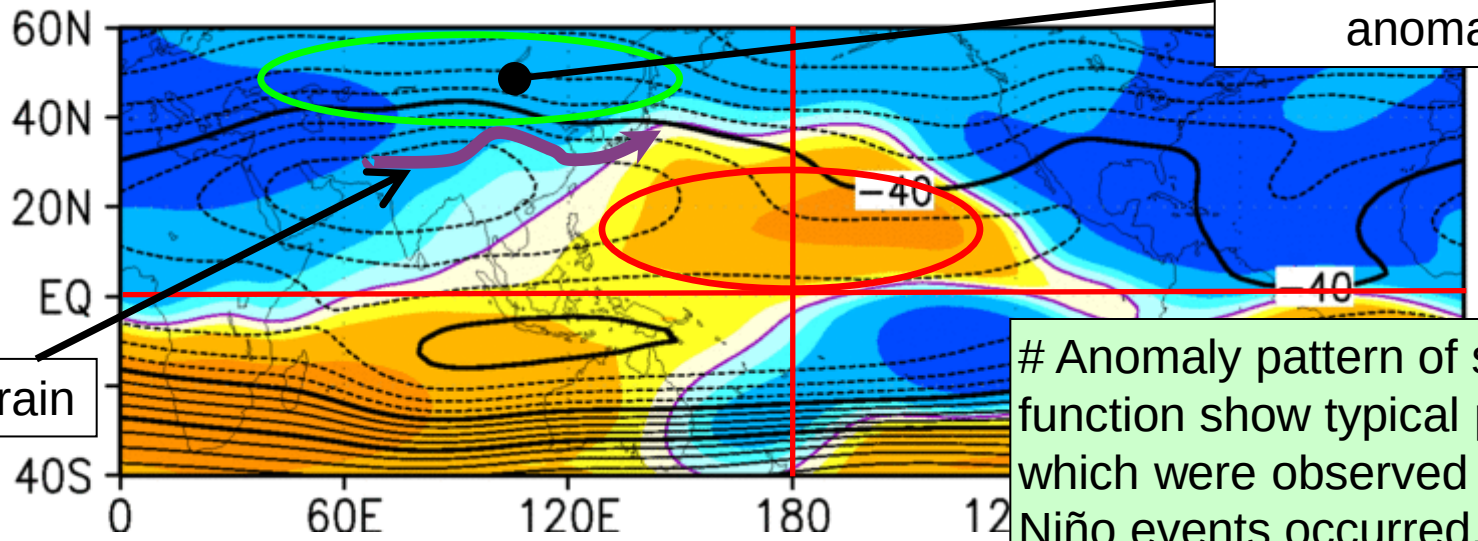
Anomaly pattern of 200hPa velocity potential shows characteristics of El Niño events.

Precipitation and anomalies



Predicted sub-tropical circulation in JJA (2)

200hPa stream function and anomalies

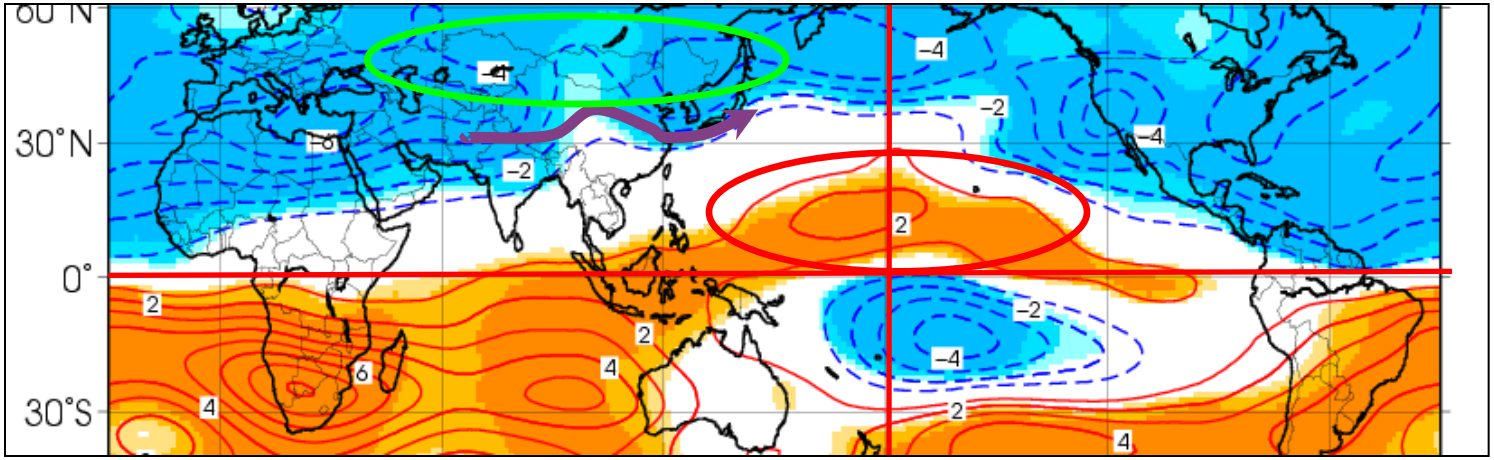


Cyclonic circulation anomalies

Wave train

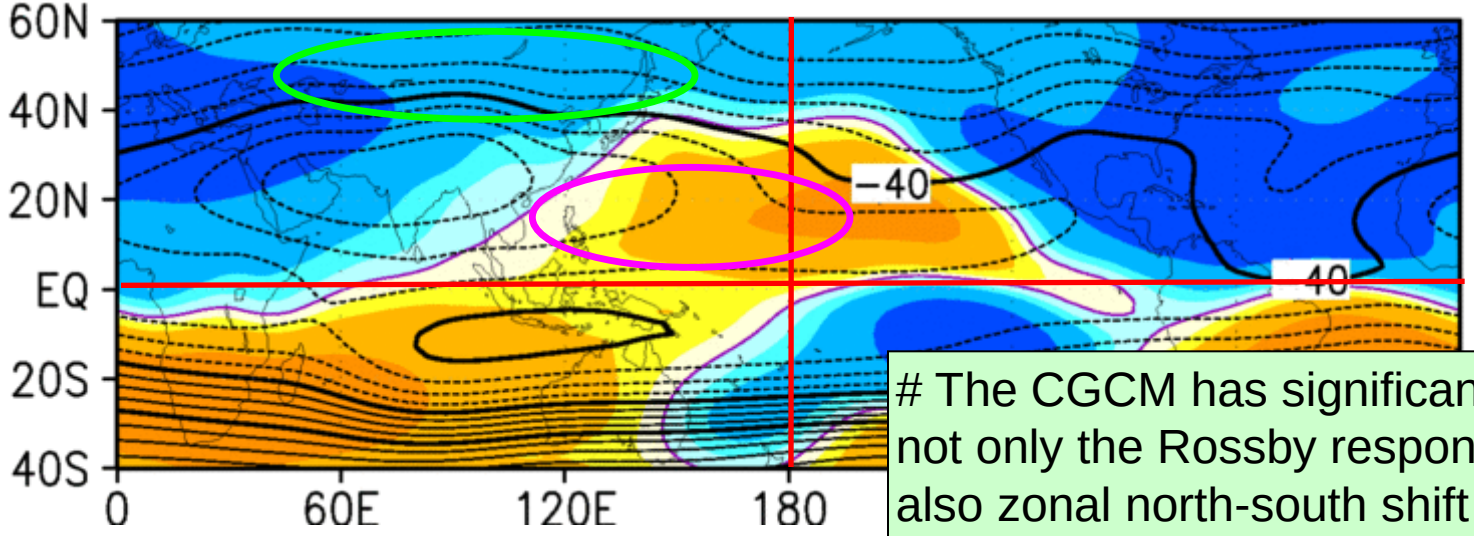
Anomaly pattern of stream function show typical patterns which were observed when El Niño events occurred.

El Nino composite : 200hPa stream function anomalies



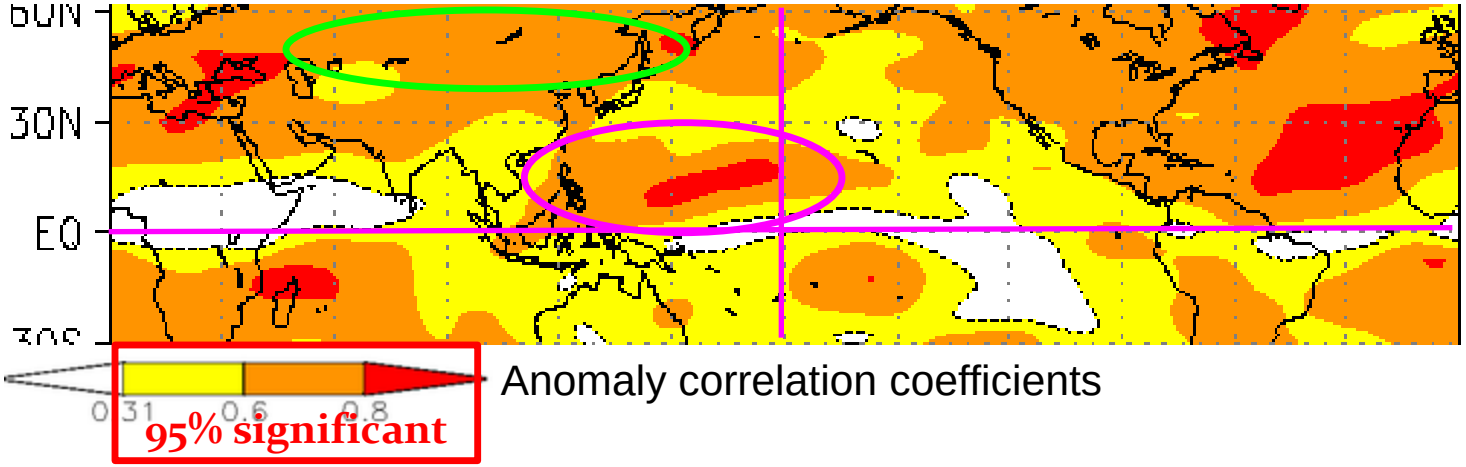
Predicted sub-tropical circulation in JJA (2)

200hPa stream function and anomalies



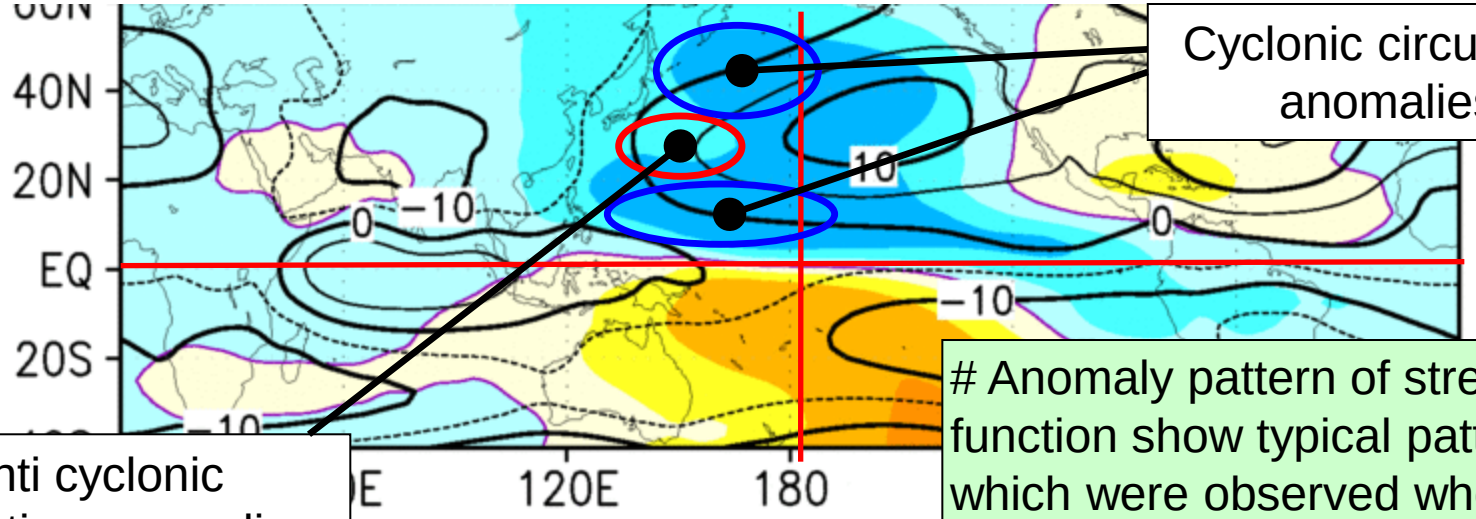
The CGCM has significant skill in not only the Rossby response, but also zonal north-south shift of sub-tropical jet.

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



Predicted sub-tropical circulation in JJA (3)

850hPa stream function and anomalies

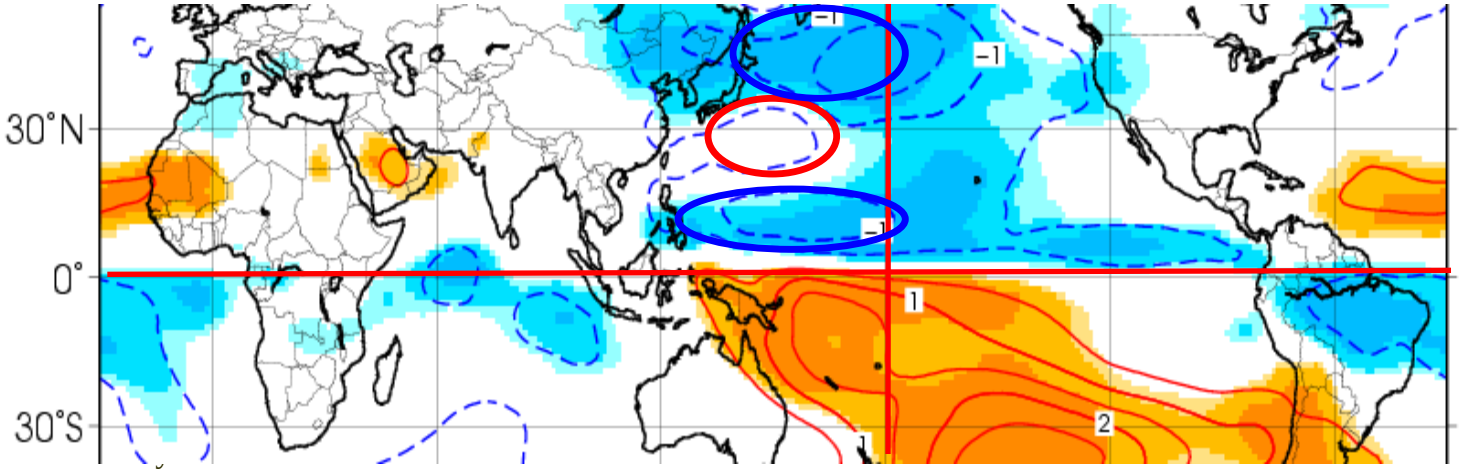


Cyclonic circulation anomalies

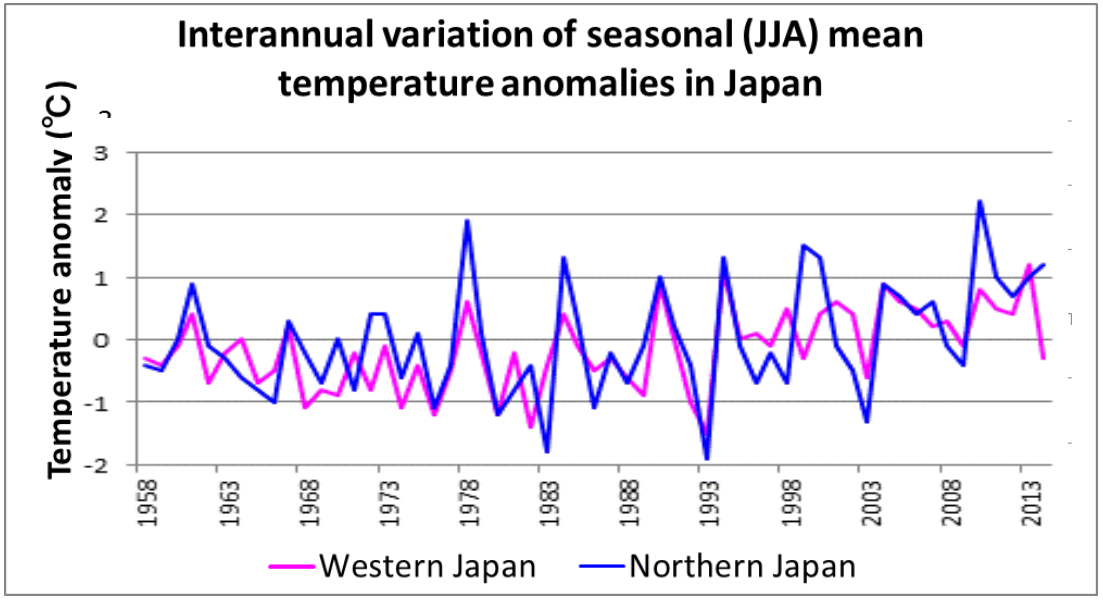
Anti cyclonic circulation anomalies

Anomaly pattern of stream function show typical patterns which were observed when El Niño events occurred.

El Nino composite: 850hPa stream function anomalies



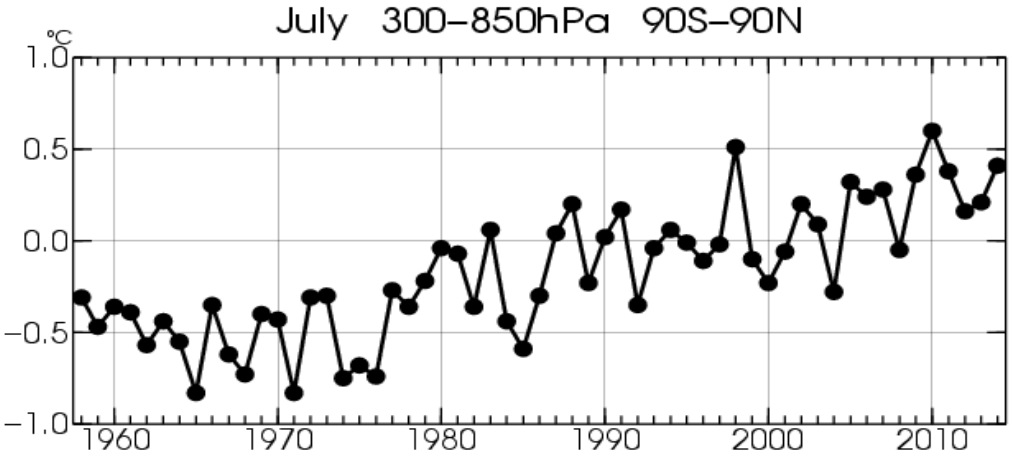
Interannual variation of summer mean temperature



Temperature ranks during recent 10years (2005-2014)

	Below normal	Near normal	Above normal
Northern Japan	0	2	8
Eastern Japan	1	3	6
Western Japan	1	3	6
Okinawa	0	3	7

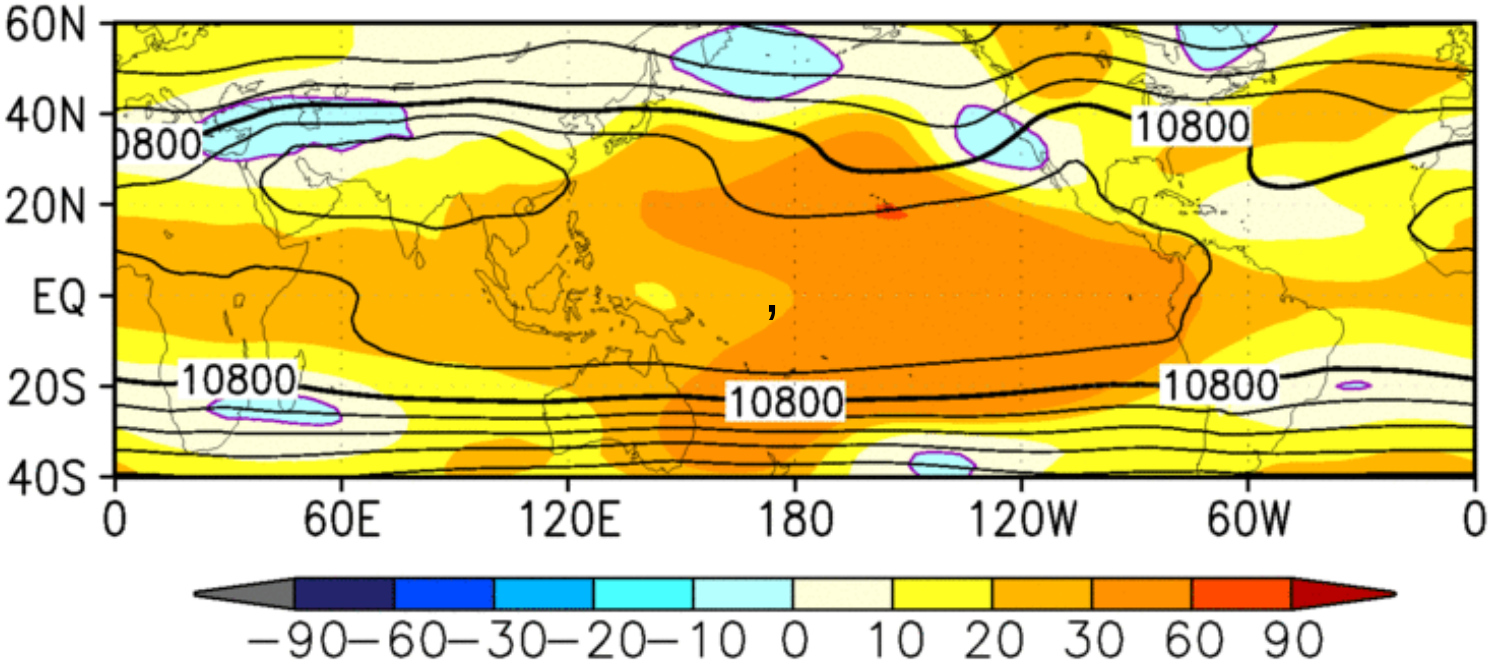
Tropospheric thickness temperature



Hot summer has been dominant in Japan recently.
warming tendency is seen in tropospheric thickness temperature .

Predicted sub-tropical circulation in JJA (4)

Tropospheric thickness temperature(JJA 200-850hPa)



Overall temperatures in the troposphere are expected to be higher than normal, particularly on the lower latitudes side of the sub tropical jet.

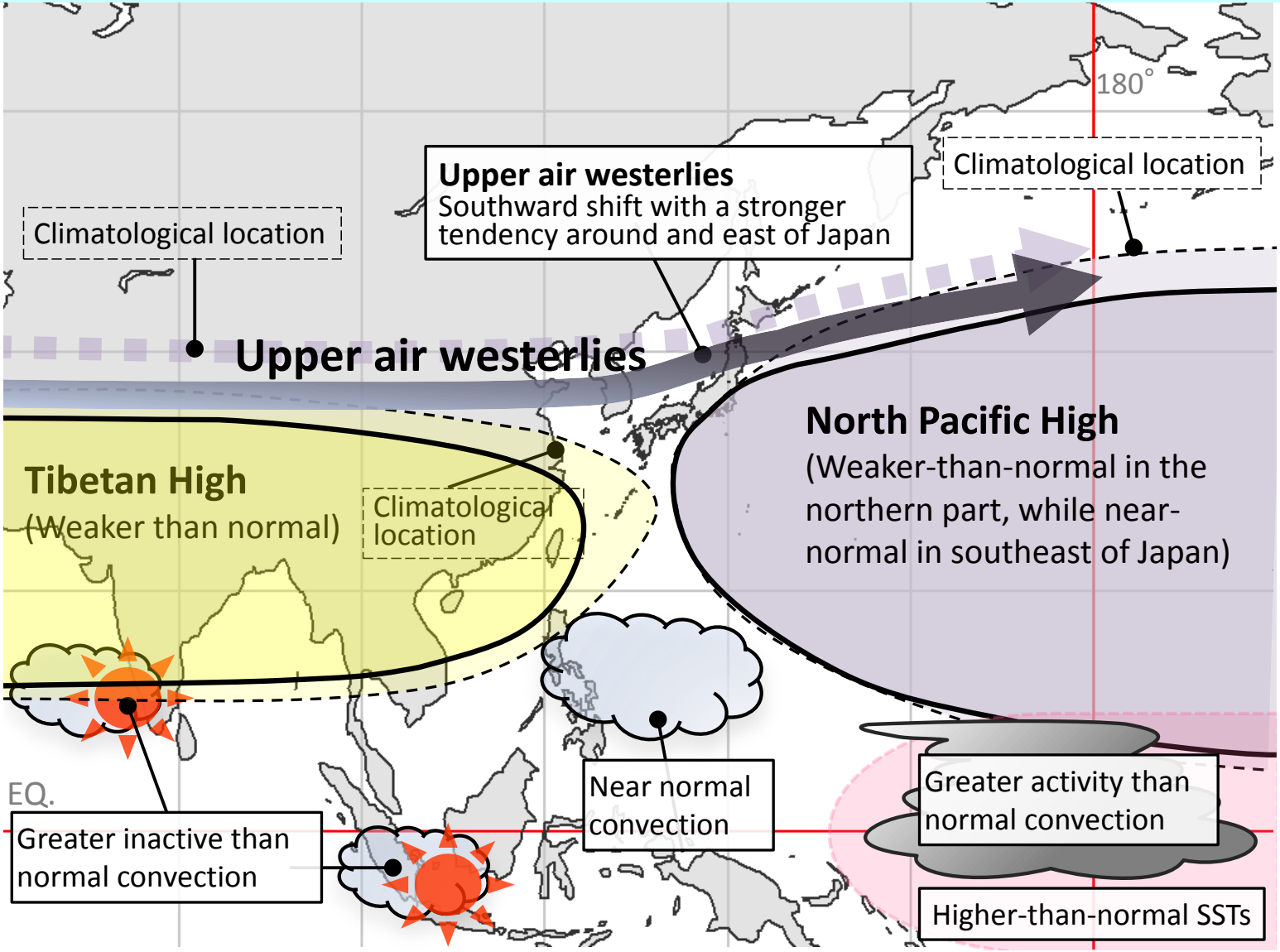
summary of Numerical prediction and its interpretation

・It is likely that El Niño conditions will redevelop by the boreal summer 2015.
・Predicted atmospheric circulation anomalies are as follows,

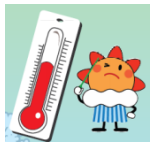
- Asian summer monsoon will be generally weaker than normal.
- The sub-tropical jet will shift southward compared to the normal latitude. This means weak Tibetan high.
- North pacific high will not extend to north, but around southeast of Japan, it will be not weaker than normal.
- These characteristics are consistent with those observed during past El Niño events.

・Additionally, it is necessary to consider that overall temperatures in the troposphere are expected to be higher than normal, particularly on the lower latitudes side of the sub tropical jet, reflecting recent warming tendency and high SSTs in the equatorial Pacific.

Schematic chart of outlook for East Asian circulation in JJA 2015



Probability forecast of seasonal mean temperature for JJA 2015 in Japan



Climatology

33	33	33
Low	Normal	High

Northern Japan

30	40	30

Western Japan

30	30	40

Eastern Japan

20	40	40

Okinawa & Amami

30	30	40

Summer mean temperatures are expected to be both near normal and above normal with 40% probabilities in eastern Japan.

Probability forecast of seasonal precipitation for JJA 2015 in Japan

Climatology

33	33	33
Below normal	Normal	Above normal

Northern Japan

20	40	40

Western Japan

30	30	40

Eastern Japan

30	40	30

Okinawa & Amami

30	30	40

Summer precipitation amounts are expected to be both near normal and above normal with 40% probabilities in northern Japan.

Thank you