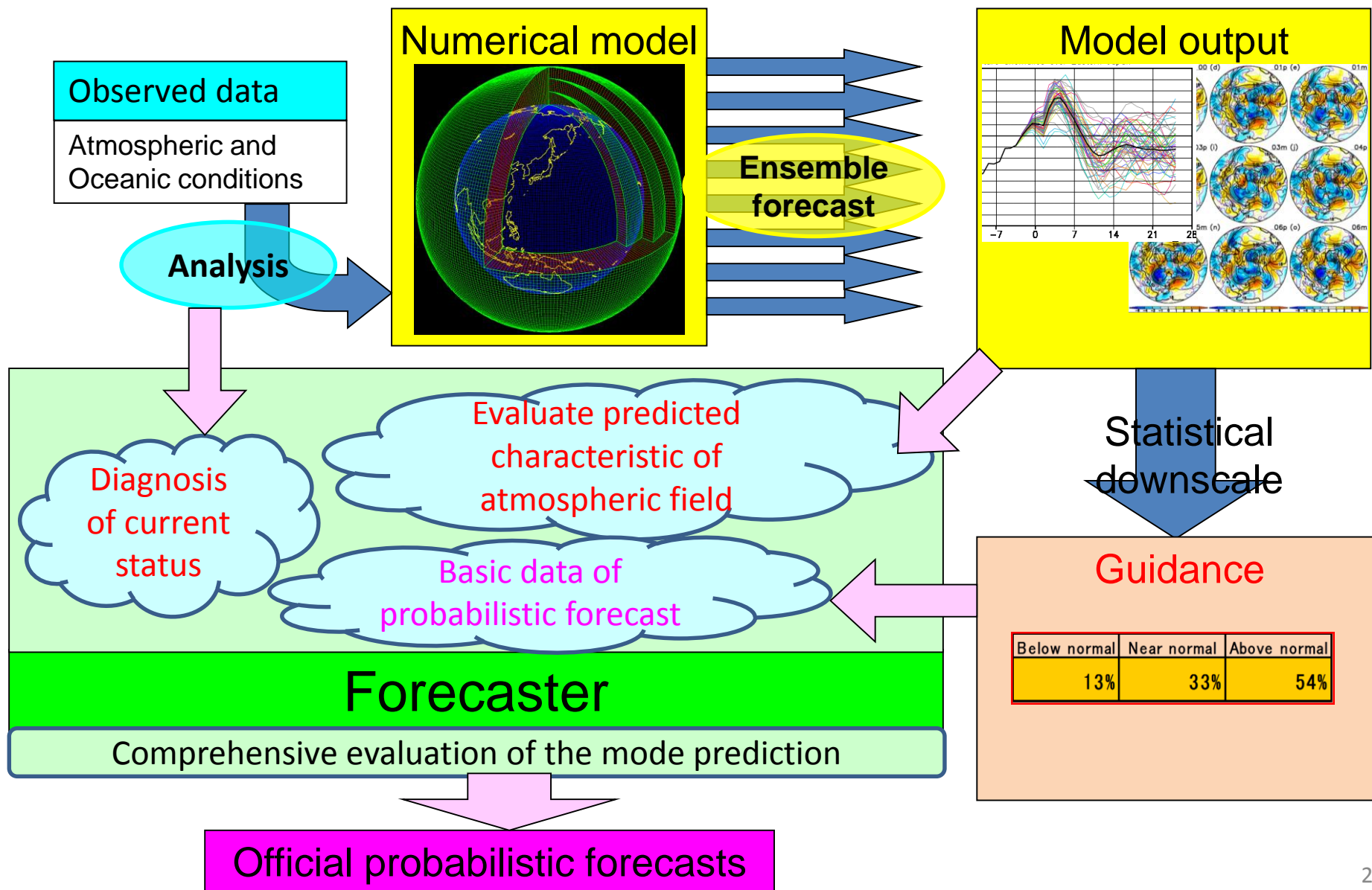


Introduction of climate monitoring and analysis products for one-month forecast

TCC Training Seminar on One-month Forecast
on 13 November 2018

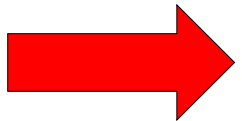
10:30 – 11:00

Typical flow of making one-month forecast



Focus point of current status for one-month forecast

- SST (ENSO, anomalies over the tropics)
- Atmospheric circulation in the tropics
 - ISO (MJO, BSISO) active/inactive, phase
 - Convective activity over the tropics
 - Influence of the anomalous convection on the sub-tropical (mid-latitude) atmosphere
- Atmospheric circulation in the mid-high latitudes
 - Position and meanderings of the sub-tropical jet or polar front jet
 - Rossby wave propagation along the jet streams
 - Subtropical High? Siberian High? Aleutian Low



Refer to the “Climate System Monitoring”

<https://ds.data.jma.go.jp/gmd/tcc/tcc/products/clisys/index.html>

Products for Climate System Monitoring on the TCC website

1. Animation Maps
2. Asian Monsoon Monitoring Indices
3. Time-Longitude Cross Section
4. Madden-Julian Oscillation (MJO) Phase and Amplitude monitor
5. Composite map for El Niño / La Niña events
6. Sea Surface Temperature

1. Animation Maps (1)

Animation Maps web pages provide various analysis charts and are useful to analyze the time evolution of atmospheric circulation and tropical convective activity. 1, 5, 7, 10 and 30-day average charts are available. Animation Maps are available for the period from 1958 to two days prior, and are updated every day.

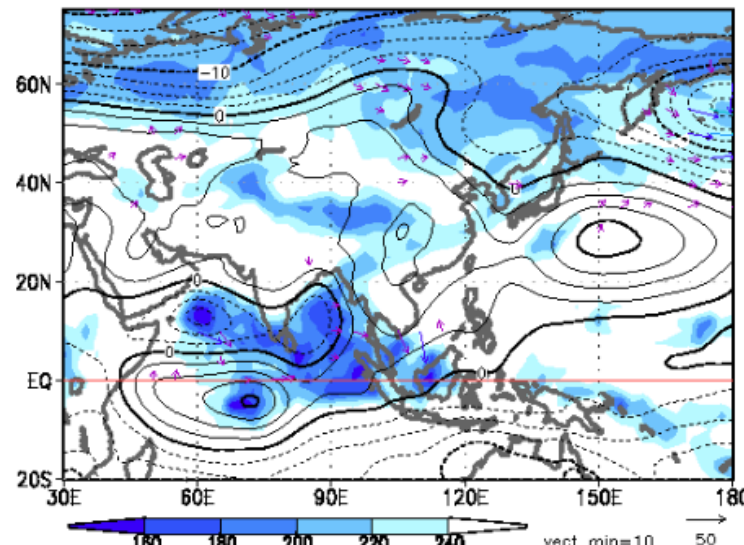
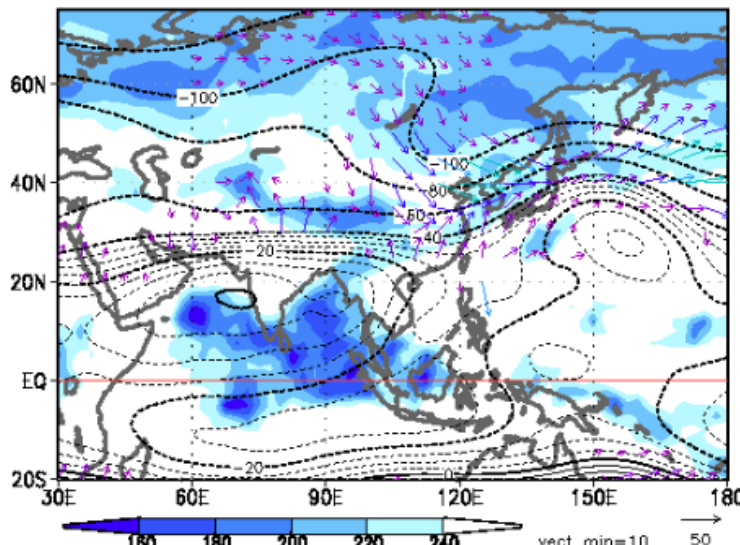
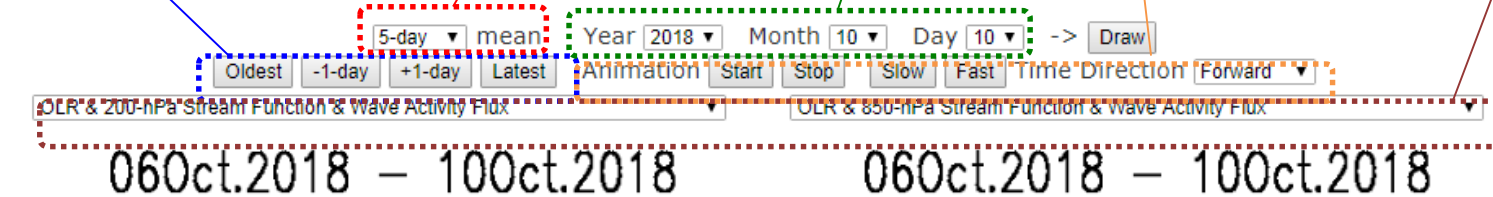
To put the date backward/forward

Average period (1,5,7,10,30-day)

Date

To control animation

Select elements

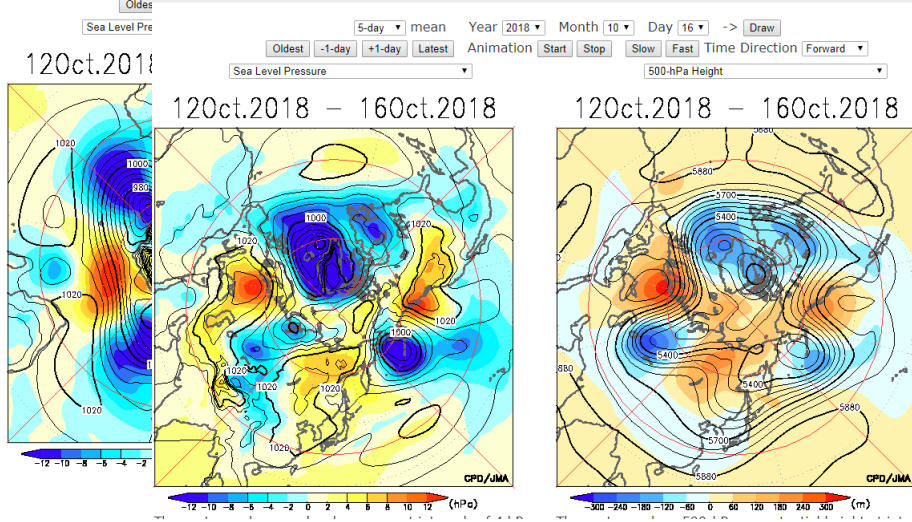


Asian
Region

1. Animation Maps (2)

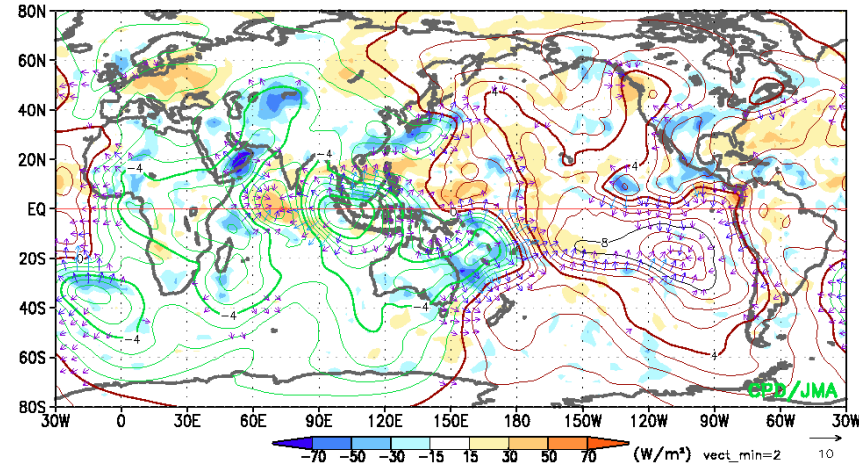
Animation Maps (Southern Hemisphere) [Explanation](#)

Animation Maps (Northern Hemisphere) [Explanation](#)



5-day mean Year 2018 Month 10 Day 16 -> Draw
Oldest -1-day +1-day Latest Animation Start Stop Slow Fast Time Direction Forward

120 Oct 2018 - 160 Oct 2018
OLR & 200-hPa Velocity Potential & Divergent Wind Vector (Anomaly)



Animation Maps cover four areas:

Asian Region, Northern and Southern Hemisphere and Global Area.

Home World Climate Climate System Monitoring **El Nino Monitoring**

HOME > Climate System Monitoring > Analysis Charts and Monitoring Indices

Analysis Charts and Monitoring Indices

Analysis Charts

- > Atmospheric Circulation (5-day, 10-day, month, 3-month)
- > Time Cross Section, Indices
- > Oceanic Figures and Tables
- > Animation Maps (Asian Region, Global Area, Northern Hemisphere, Southern Hemisphere)

Monitoring Indices

- > FNSO and Asian Monsoon Monitoring Indices

Animation Maps are available from “Analysis Charts and Monitoring Indices” page on the TCC website.

<https://ds.data.jma.go.jp/tcc/tcc/products/clisys/acmi.html>

2. Asian Monsoon Monitoring Indices

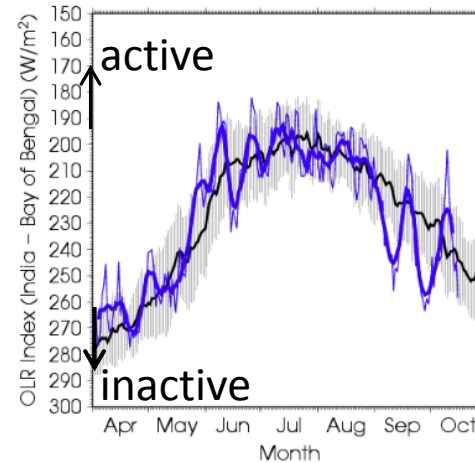
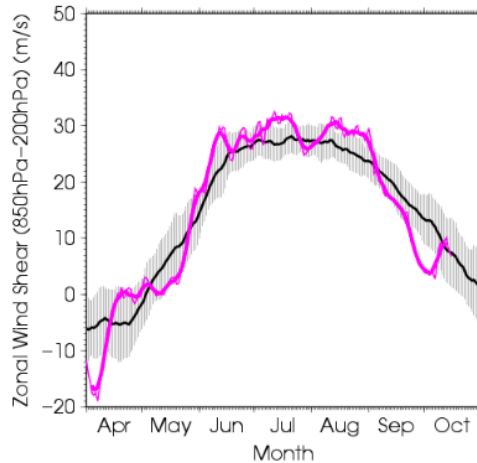
This web page provides the daily time series of Asian Monsoon Monitoring Indices. These indices are useful in monitoring the strength and expansion of the Asian summer monsoon, and are updated every day.

Asian Monsoon Monitoring Indices (daily timeseries)

Year: 2018

Element: Vertical zonal-wind shear (North Indian Ocean)

Element: OLR index (India - Bay of Bengal)



The zonal wind shear index between the upper and lower troposphere over the North Indian Ocean and southern Asia

OLR averaged over India and the Bay of Bengal

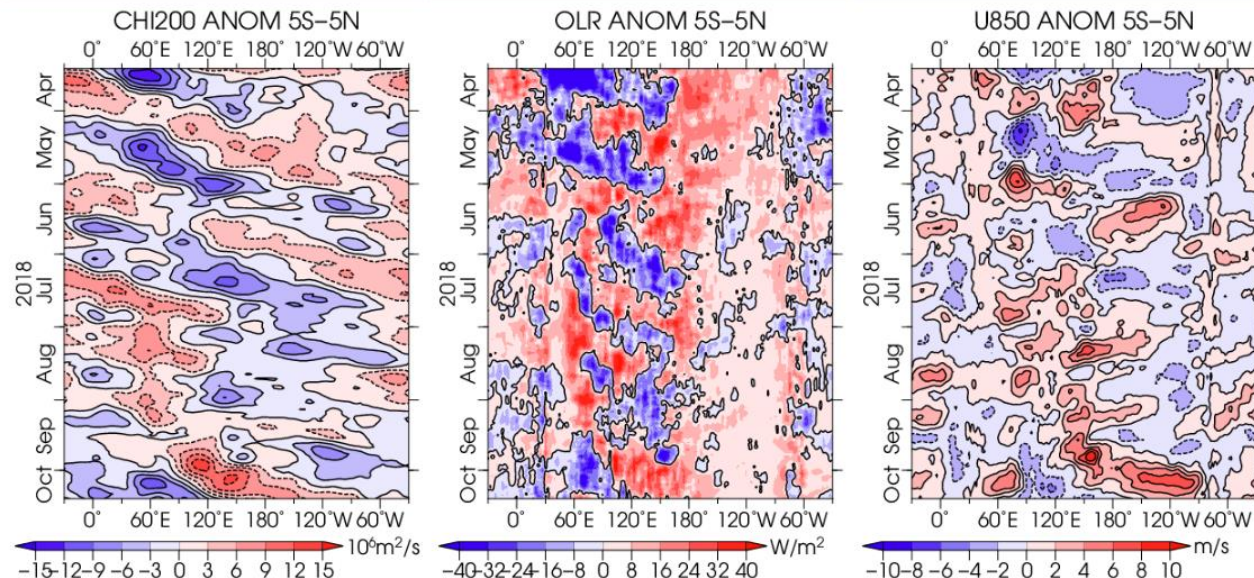
3. Time-Longitude Cross Section

This web page provides time-longitude cross sections. These charts are useful in monitoring intraseasonal oscillations such as Madden-Julian Oscillation (MJO). This web page is updated every day.

Time-Longitude cross section

Checking the right boxes will reflect selected options in the left section to all the other sections. ---> Time Elements Hist/Anom Time Mean Latitudinal Range
Clicking on the 'default' button will initialize your setting. --->

The last month to be shown: <input checked="" type="radio"/> Last month <input type="radio"/> Select -> Year 2018 Month 9 < > Elements: 200-hPa Velocity Potential <input type="radio"/> Hist <input checked="" type="radio"/> Anom <input type="radio"/> Norm Time Mean: <input type="radio"/> 3-day <input checked="" type="radio"/> 7-day Latitudinal Range: Equator (5S-5N mean)	The last month to be shown: <input checked="" type="radio"/> Last month <input type="radio"/> Select -> Year 2018 Month 9 < > Elements: Outgoing Longwave Radiation (OLR) <input type="radio"/> Hist <input checked="" type="radio"/> Anom <input type="radio"/> Norm Time Mean: <input type="radio"/> 3-day <input checked="" type="radio"/> 7-day Latitudinal Range: Equator (5S-5N mean)	The last month to be shown: <input checked="" type="radio"/> Last month <input type="radio"/> Select -> Year 2018 Month 9 < > Elements: 850-hPa Zonal Wind <input type="radio"/> Hist <input checked="" type="radio"/> Anom <input type="radio"/> Norm Time Mean: <input type="radio"/> 3-day <input checked="" type="radio"/> 7-day Latitudinal Range: Equator (5S-5N)
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Elements:

OLR, velocity potential, zonal wind and sea surface temperature

Average period:

3-day and 7-day average

Latitude Range:

15-25N, 5-15N, 5S-5N(equator) , 15-5S

4. MJO Phase and Amplitude monitor

MJO web page provides indices for MJO monitoring defined by Wheeler and Hendon (2004). MJO Phase and Amplitude monitor (last 40-day) is convenient for MJO monitoring.

Home | World Climate | **Climate System Monitoring** | El Niño Monitoring

HOME > Climate System Monitoring > Madden-Julian Oscillation (MJO)

Madden-Julian Oscillation (MJO)

- > Explanation

Time-Longitude Cross Section

- > OLR, Velocity Potential, Zonal Wind and SST

MJO Monitoring Indices

- > **Phase and Amplitude monitor (last 40-day)**
- > Time longitude cross section of phase and amplitude
- > Time series of RMM1 and RMM2

Principal components of EOF (1981-2010)

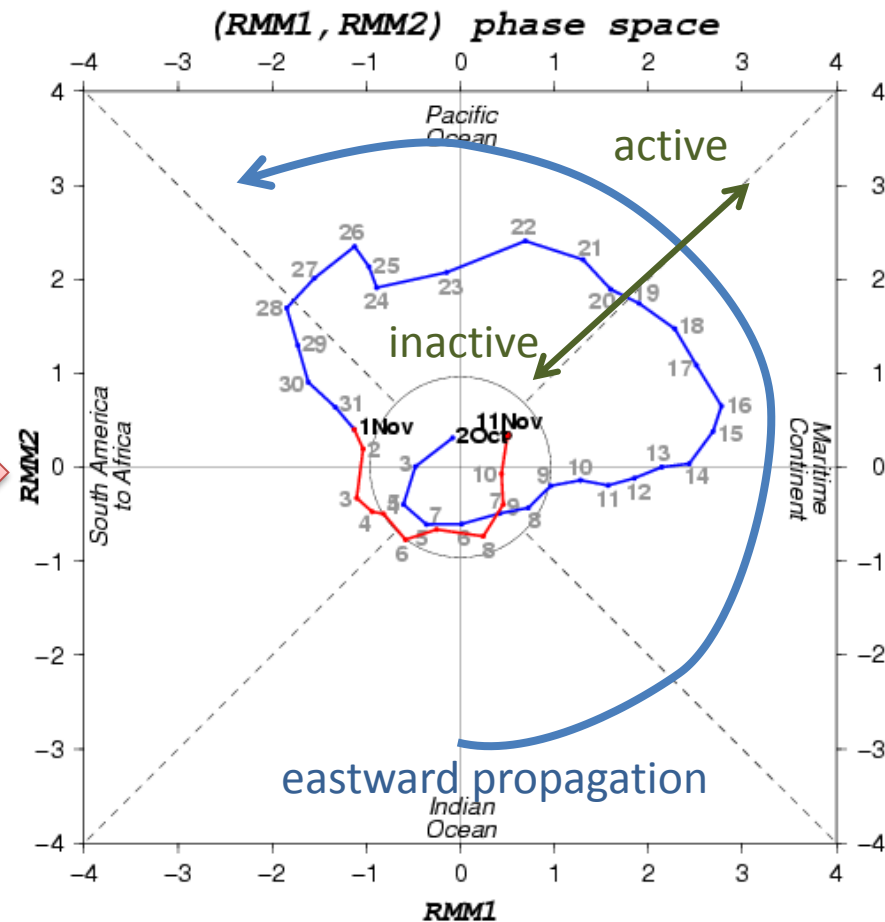
- > 1st (RMM1), 2nd (RMM2)

Composite map of anomalies

- > 8-phase (Apr. 1979 - Sep. 2012)

CSV file (1980-)

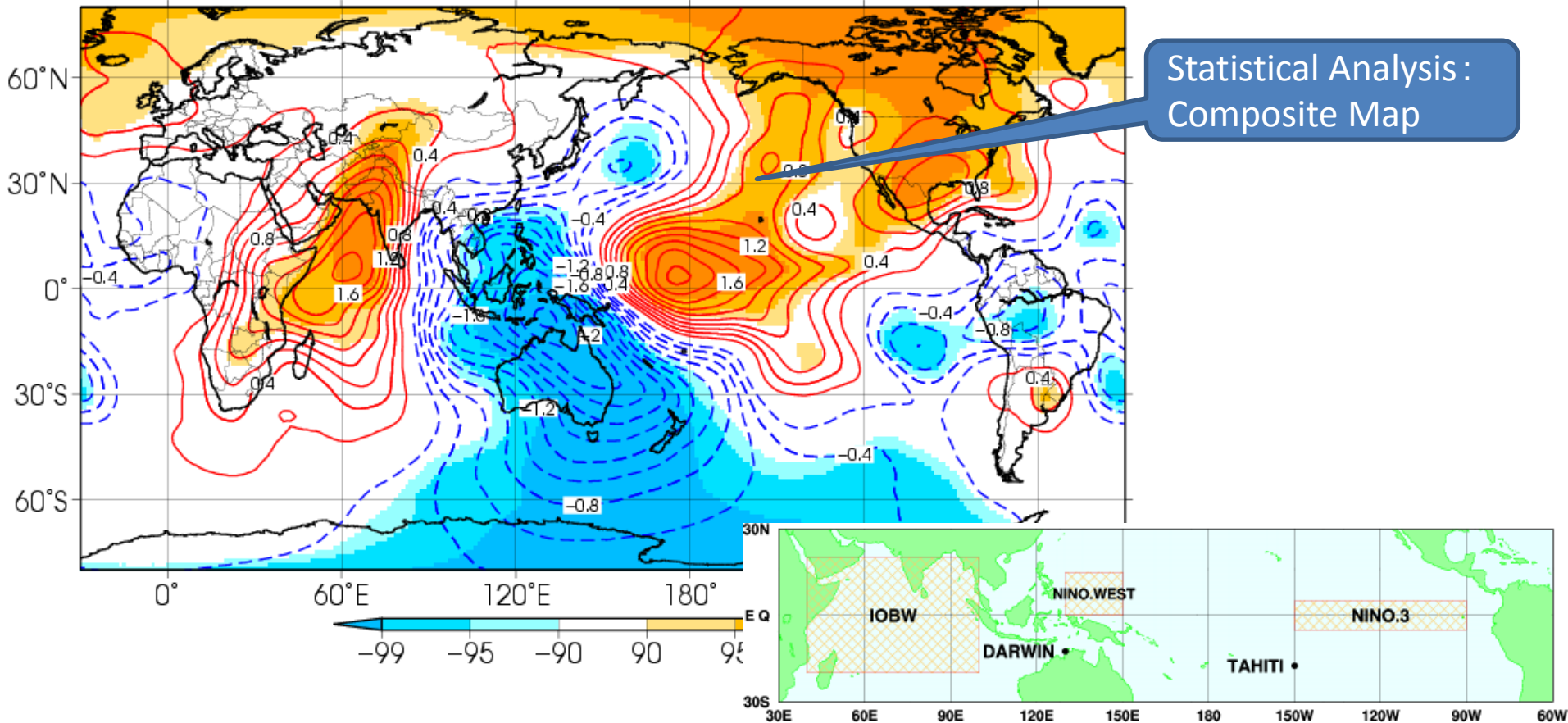
- > RMM1, RMM2, phase and amplitude (OLR+u850+u200)
- > RMM1, RMM2, phase and amplitude (chi200+u850+u200)



5. Composite map for El Niño / La Niña events

This product provides the statistical analysis on the relationship between *warmer/cooler SST event in the areas of NINO.3, NINO.WEST and IOBW* and *atmospheric circulation*.

Element:c200 Index:NINO.3(Cold) Period:Nov

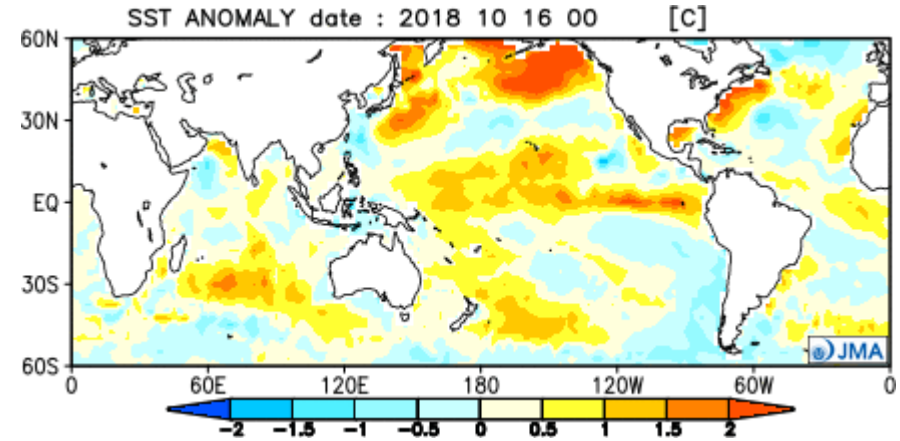
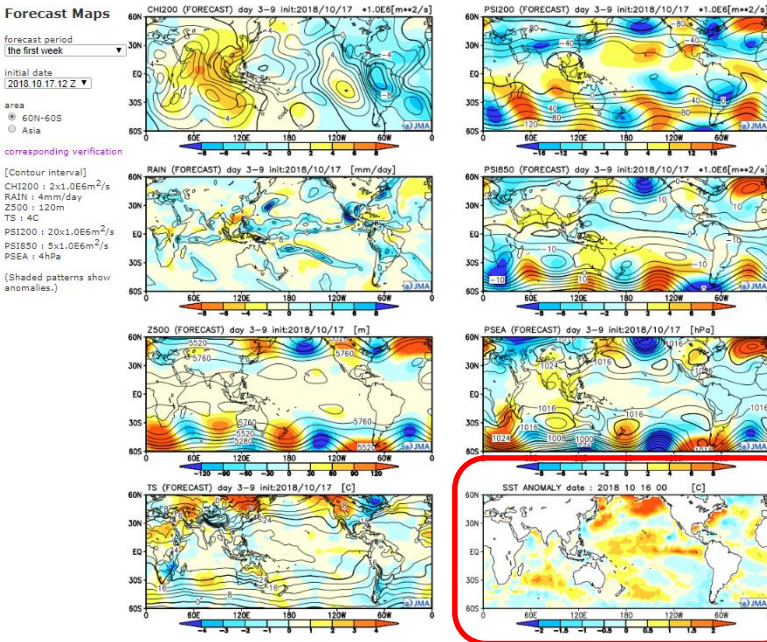


6. Sea Surface Temperature (initial time)

Chart of initial time sea surface temperature anomaly is available in the Forecast Maps for One-month Prediction web page. The sea surface temperature anomaly displayed in this map is used as the lower boundary condition of ensemble prediction systems for the one-month prediction (the atmospheric general circulation model).

One-month Prediction (Tropics and Asia)

This product is displayed for use by National Meteorological and Hydrological Services (NMHSs). It does not constitute an official forecast for any nation.



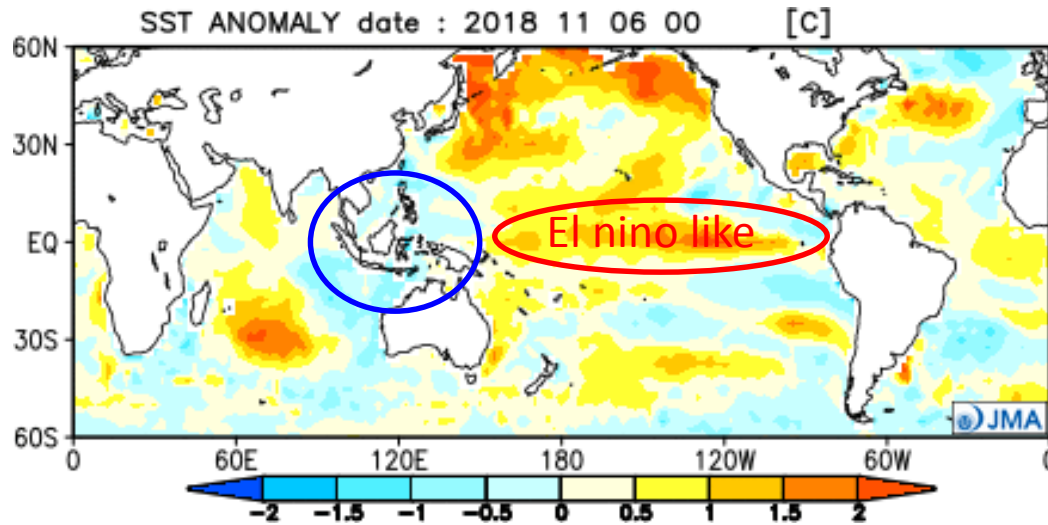
Forecast Maps for One-month Prediction (Tropics and Asia) page
(Bottom right: sea surface temperature anomaly)

<https://ds.data.jma.go.jp/tcc/tcc/products/model/map/1mE/map1/zpcmap.php>

Diagnosis of current Atmospheric and Oceanic conditions

at 6 November 2018

Sea surface temperature (SST)

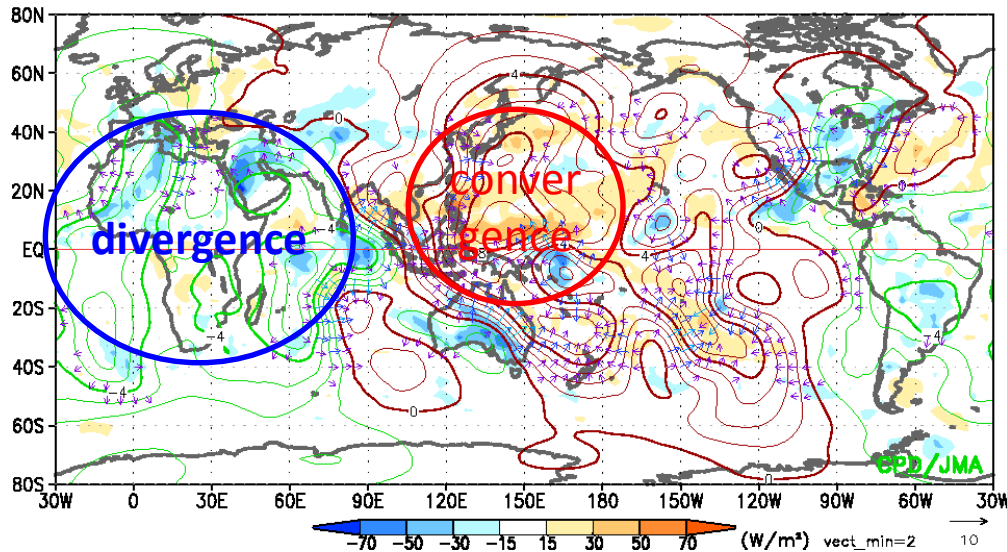


- Positive anomalies indicate warmer than normal.
- Negative anomalies indicate colder than normal.
- Positive SST anomalies were seen over a wide area of the equatorial Pacific.
- Negative SST anomalies were seen from the Maritime Continent to the Philippines.

<https://ds.data.jma.go.jp/tcc/tcc/products/model/map/1mE/map1/zpcmap.php>

OLR & 200-hPa Velocity Potential & Divergent Wind Vector (Anomaly)

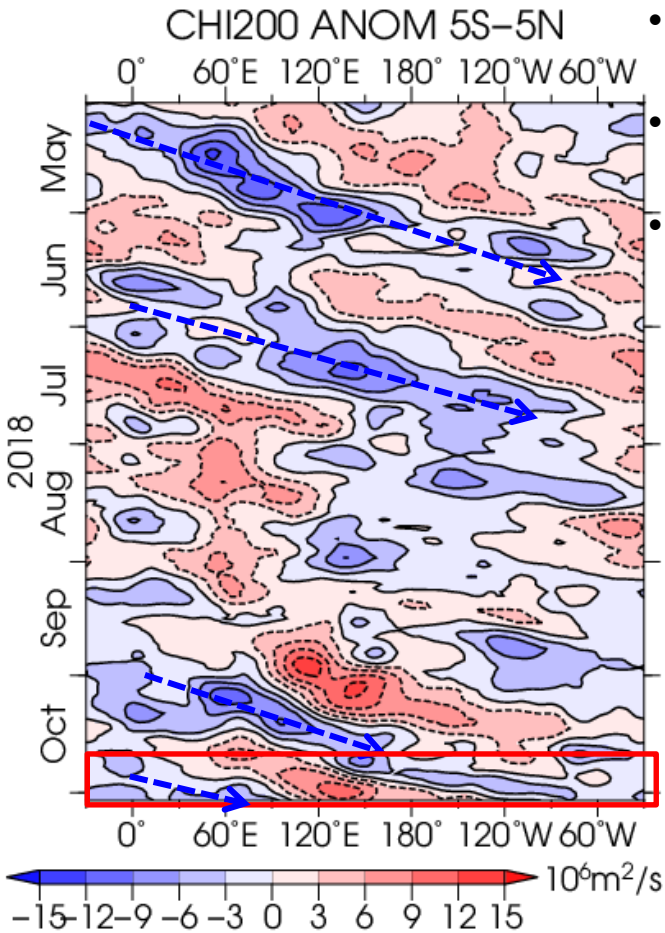
31Oct.2018 – 06Nov.2018



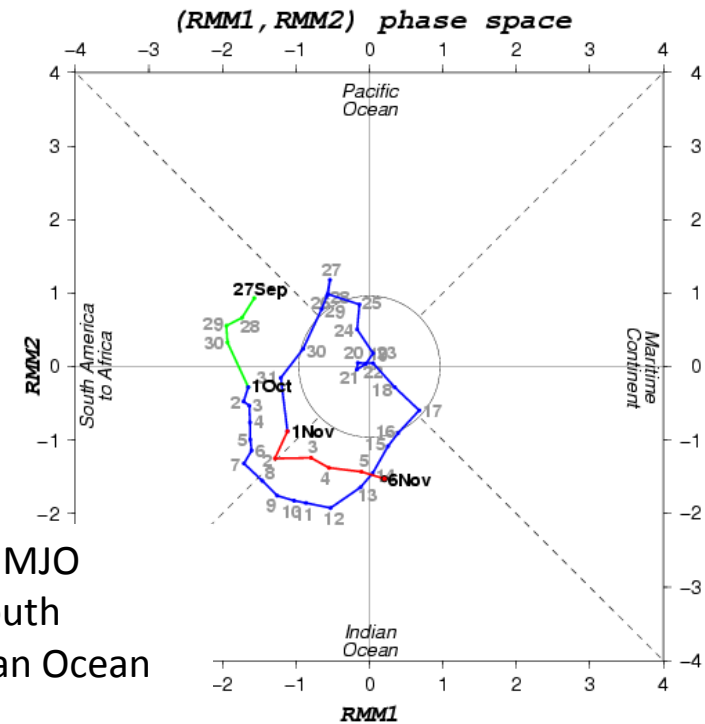
- Shading indicates OLR anomaly.
- Contours indicate large-scale divergence or convergence anomaly.
- Convective activity was enhanced and divergence anomalies were seen around Africa.
- Convective activity was suppressed and convergence anomalies were seen over the western Pacific.

https://ds.data.jma.go.jp/tcc/tcc/products/clisys/anim/anim_tp.html

Upper Velocity Potential (CHI200) anomaly along the equator



- Negative value indicates large-scale divergence anomaly at 200-hPa.
- Positive value indicates large-scale convergence anomaly at 200-hPa.
- The active phase of the MJO was seen propagating eastward from Africa to the Indian Ocean at early November.



- The active phase of MJO propagated from South America to the Indian Ocean at early November.

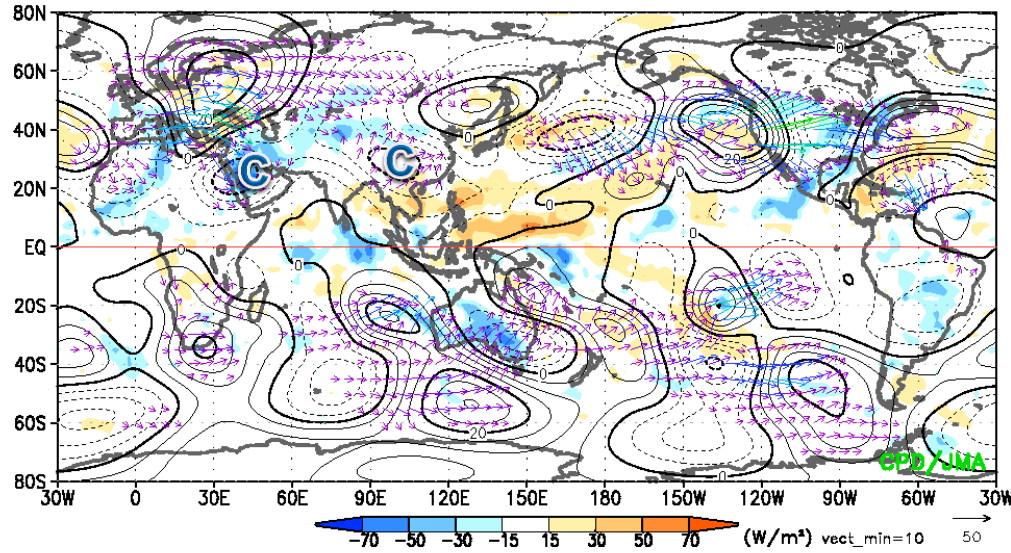
https://ds.data.jma.go.jp/tcc/tcc/products/clisys/ASIA_TCC/mjo_cross.html

<https://ds.data.jma.go.jp/tcc/tcc/products/clisys/mjo/monitor.html>

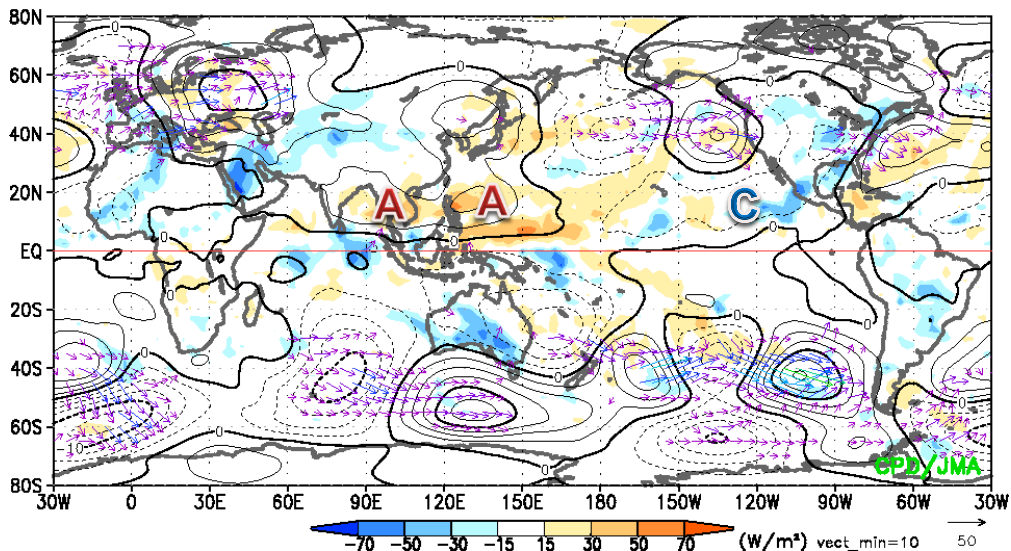
MJO Phase and Amplitude monitor (last 40-day)

OLR & Stream Function & Wave Activity Flux (Anomaly)

200-hPa 31Oct.2018 – 06Nov.2018



850-hPa 31Oct.2018 – 06Nov.2018



Stream Function

- Contours show stream function anomalies.
- Positive values (solid line) indicate anticyclone in Northern Hemisphere and cyclone in Southern Hemisphere
- Negative values (dash line) indicate cyclone in Northern Hemisphere and anticyclone in Southern Hemisphere

200-hPa

- Cyclonic circulation anomalies were seen over southern Eurasia.

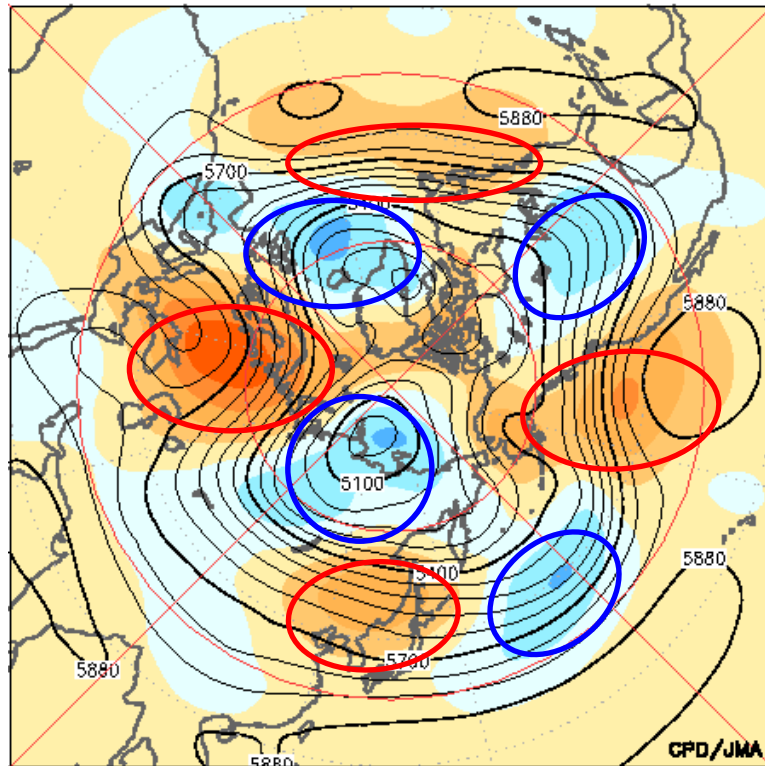
850-hPa

- Anticyclonic circulation anomalies were seen over the Bay of Bengal and around the Philippines. Cyclonic circulation anomalies were seen over the eastern part of equatorial North Pacific.

https://ds.data.jma.go.jp/tcc/tcc/products/clisys/anim/anim_tp.html

500-hPa Geopotential Height

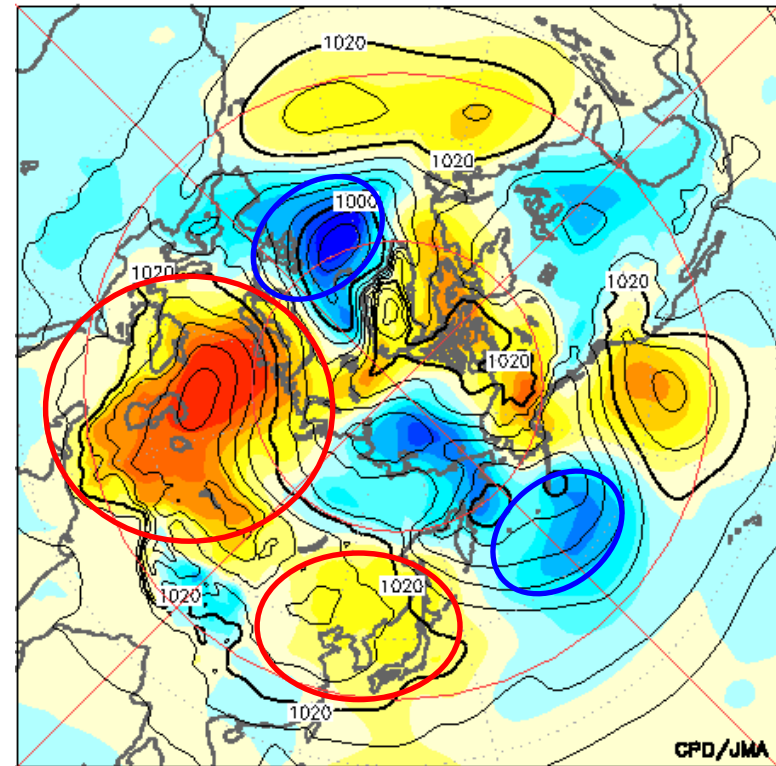
31 Oct. 2018 – 06 Nov. 2018



- Contours indicate 500-hPa geopotential height.
- Shading indicates anomaly.
- Positive anomalies were seen over the northeastern part of East Asia and negative anomalies were seen Central Siberia.

Sea Level Pressure

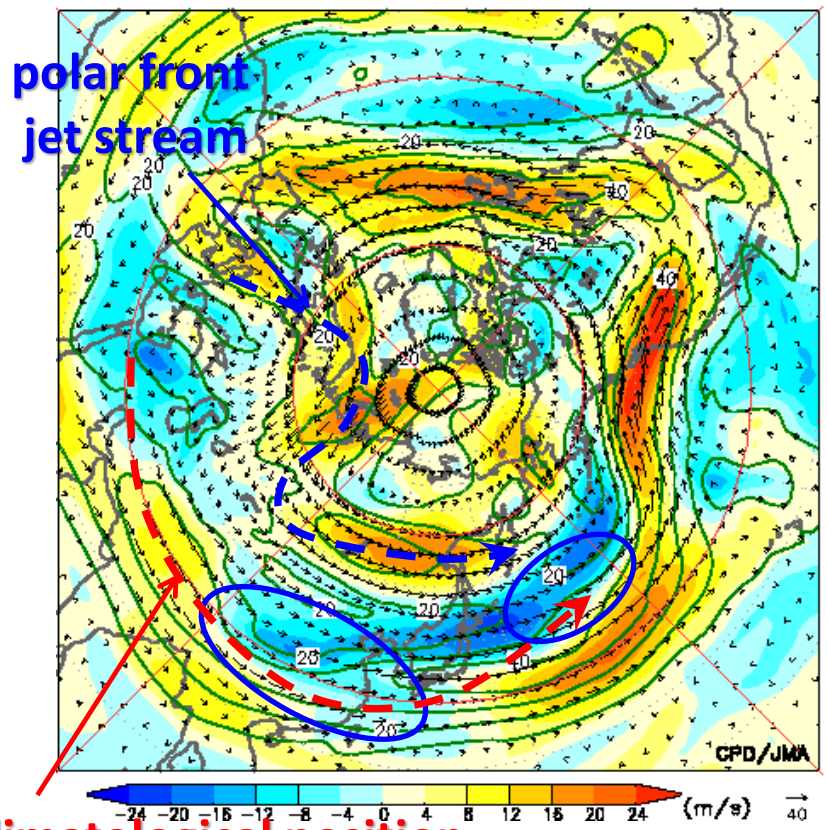
31 Oct. 2018 – 06 Nov. 2018



- Contours indicate sea level pressure.
- Shading indicates anomaly.
- Positive anomalies were seen in a wide area of Eurasia. The Aleutian Low around date line and the Iceland Low were stronger than normal.

300-Pa Wind Speed & Wind Vector (Anomaly)

31 Oct. 2018 – 06 Nov. 2018

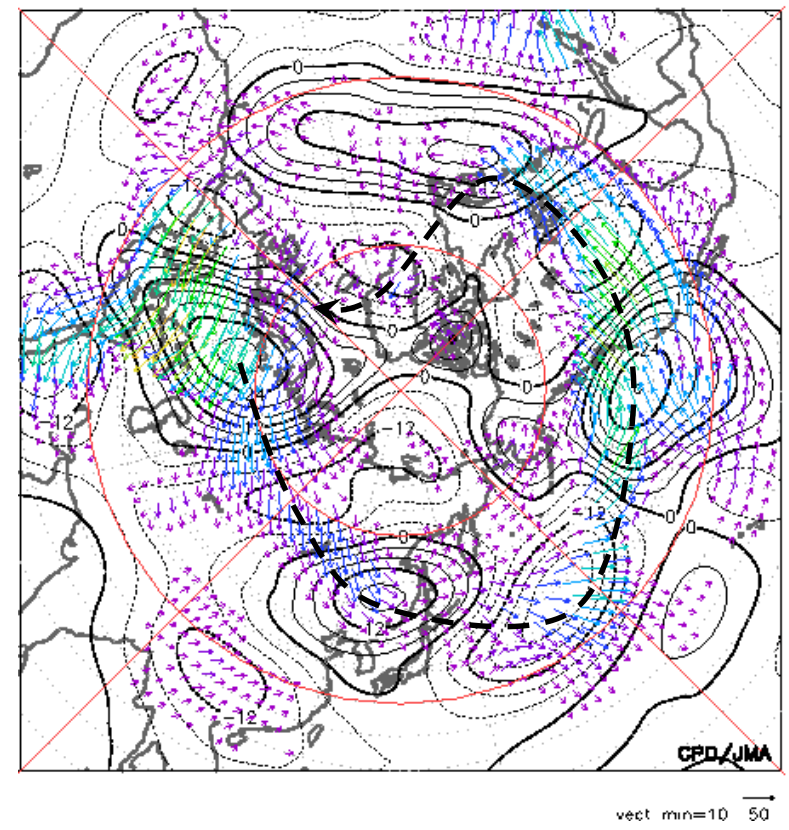


Climatological position

- Shading indicates wind speed anomaly.
- Vectors indicate wind vector anomaly.
- The subtropical jet stream shifted southward of its normal position over southern Eurasia and the North Pacific around the date line.
- The polar front jet stream was meandered over the northern Eurasia.

300-hPa Wave Activity Flux

31 Oct. 2018 – 06 Nov. 2018



- Vectors indicate wave activity flux.
- Contours indicate stream function anomalies.
- Quasi-stationary Rossby wave trains were clearly seen over the mid-latitudes in the Northern Hemisphere.

Thank you!

References

Wheeler, M.C., and H.H. Hendon, 2004: An All-Season Real-Time Multivariate MJO Index: Development of an Index for Monitoring and Prediction, Mon. Weather. Rev., **132**, 1917-1932.