

Monthly Discussion on Seasonal Climate Outlooks (No. 120)

(20 February 2024)

**Tokyo Climate Center (TCC)
Japan Meteorological Agency (JMA)**

Outline

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Notes:

- The present monthly discussion is intended to assist National Meteorological and Hydrological Services (NMHSs) in WMO RA II (Asia) in interpreting WMC Tokyo's seasonal prediction products. It does not constitute an official forecast for any nation. Seasonal outlooks for individual countries should be obtained from the relevant NMHS.
- Seasonal predictions are based on a JMA's Seasonal Ensemble Prediction System (EPS), which is based on the coupled atmosphere-ocean general circulation model (CGCM).
- JMA provides three-month prediction products around the 20th of every month with warm-season (Jun. – Aug.) prediction products in February, March and April, and with cold-season (Dec. – Feb.) prediction products in September and October.
- Unless otherwise noted, the base period for the normal is 1991 – 2020.

1. Summary and Discussion

ENSO

- El Niño conditions have persisted in the equatorial Pacific since boreal spring last year.
- It is more likely to transition to ENSO-neutral conditions by the end of boreal spring (60%) than El Niño conditions will persist (40%). ENSO-neutral conditions are likely during boreal summer (70%).

Prediction for March-April-May 2024 (MAM 2024)

- In the upper troposphere, large-scale divergence anomalies are predicted over the Indian Ocean and from South America to the Atlantic, while large-scale convergence anomalies are predicted over the subtropical Pacific in the Northern and Southern Hemisphere.
- A high probability of above-normal precipitation is predicted from the Southern Hemisphere side of the equatorial Indian Ocean to the equatorial western Pacific and from Central to East Asia. A high probability of below-normal precipitation is predicted from the Indochina Peninsula to the subtropical western North Pacific.
- A high probability of above-normal temperatures is predicted over a wide area of Asia, particularly in the tropics from the Indian Ocean to the western Pacific, implying the probability of significantly high temperatures near South Asia in the pre-monsoon period. A high probability of below-normal temperatures is predicted to the north of the Caspian sea.

1. Summary and Discussion (cont.)

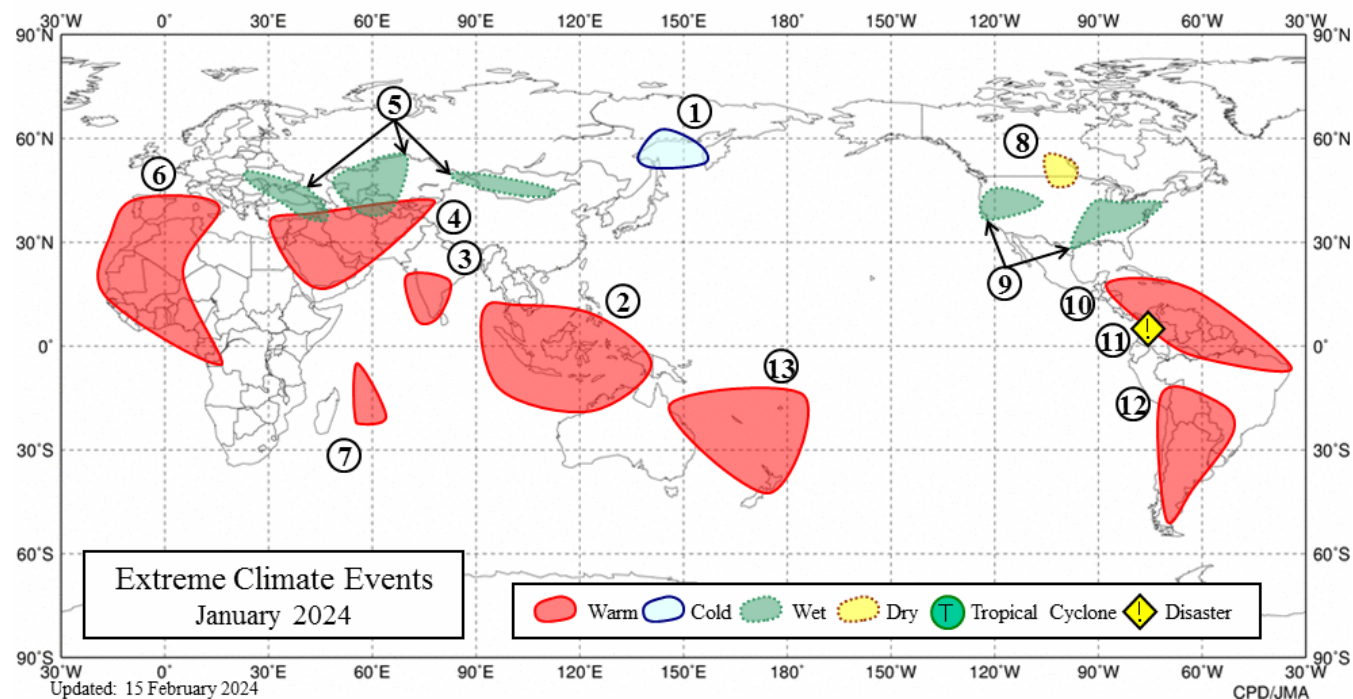
Prediction for June-July-August 2024 (JJA 2024)

- In the upper troposphere, large-scale divergence anomalies are predicted over the Indian Ocean and over the Atlantic, while large-scale convergence anomalies are predicted over the Pacific.
- A high probability of above-normal precipitation is predicted from the northeastern part of the Indian Ocean to Southeast Asia. A high probability of below-normal precipitation is predicted near the Indochina Peninsula and over the tropical western Pacific.
- A high probability of above-normal temperatures is predicted from the Middle East to the tropical western Pacific through the northern Indian Ocean. A high probability of below-normal temperatures is predicted over a part of South Asia.

2. Latest State of the Climate System

January 2024

<January 2024> Extreme Climate Events



	Type	Area
1	Cold	Central Eastern Siberia
2	Warm	Southeast Asia
3	Warm	From southern India to western Sri Lanka
4	Warm	From southeastern Central Asia to the Middle East
5	Wet	From Mongolia to southeastern Europe

	Type	Area
6	Warm	From southern Europe to northwestern Middle Africa
7	Warm	In and around Mauritius
8	Dry	From southern Canada to the northern USA
9	Wet	From the northwestern to western USA, from the northeastern to southern USA

	Type	Area
10	Warm	From southern Central America to northeastern South America
11	Heavy Rain	Northwestern Colombia
12	Warm	Southern South America
13	Warm	From southern Melanesia to northeastern Australia

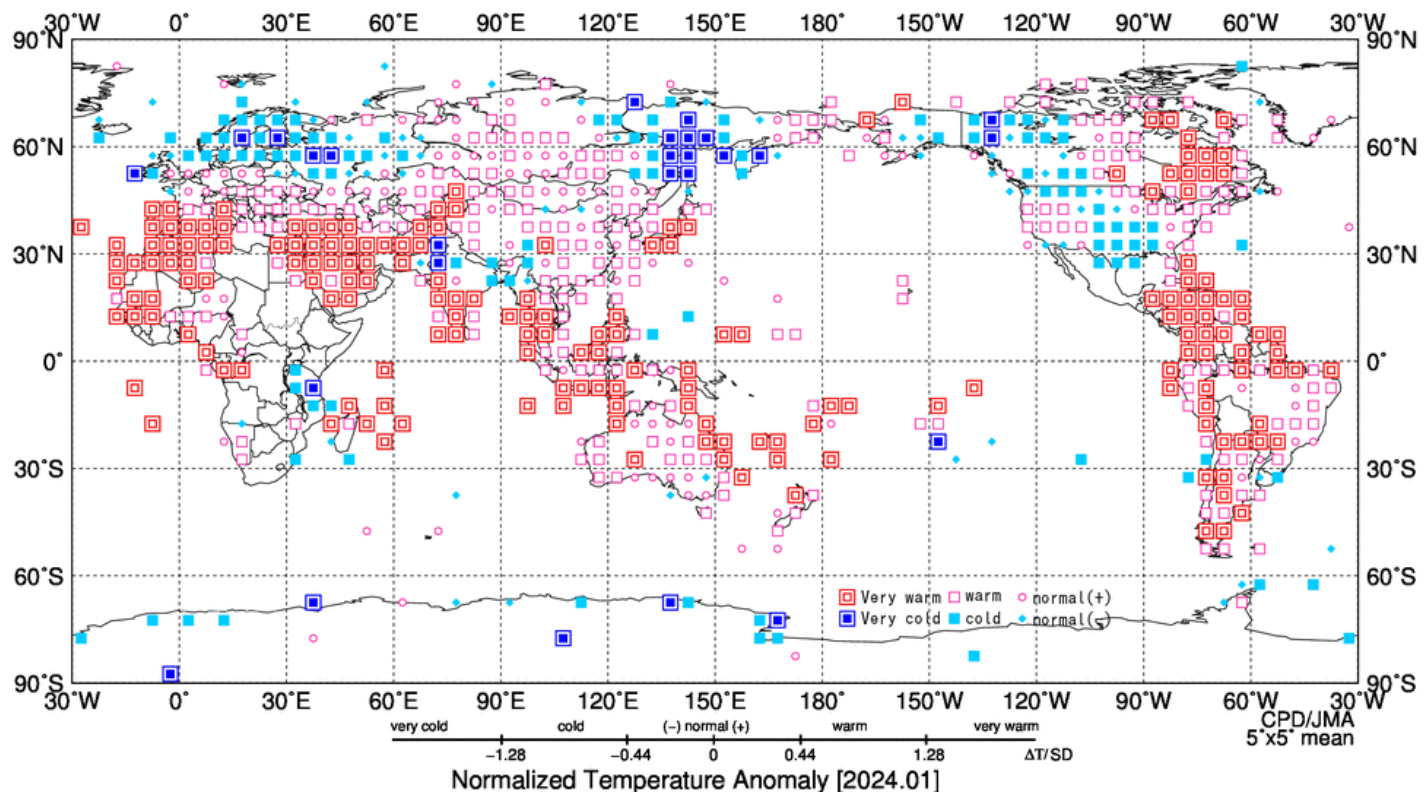
<Monthly Report on Global Extreme Climate Events>

<https://www.data.jma.go.jp/tcc/tcc/products/climate/monthly/index.html>

<January 2024> Temperature

- Monthly mean temperatures were extremely high in Southeast Asia, from southern India to western Sri Lanka, from southeastern Central Asia to the Middle East, from southern Europe to northwestern Middle Africa, in and around Mauritius, from southern Central America to northeastern South America, in southern South America, and from southern Melanesia to northeastern Australia.
- Monthly mean temperatures were extremely low in central Eastern Siberia.

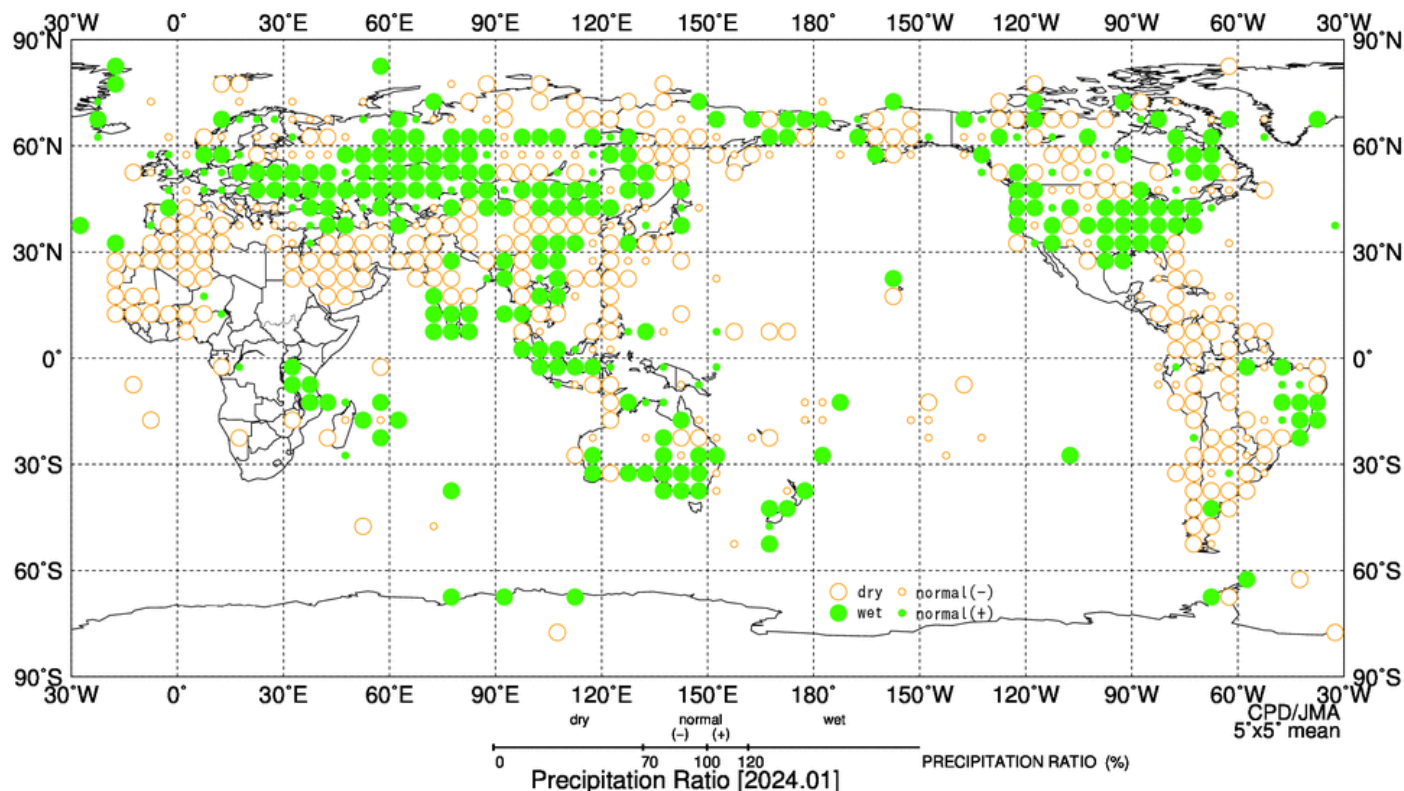
Normalized anomaly of monthly mean temperature



<January 2024> Precipitation

- Monthly precipitation amounts were extremely high from Mongolia to southeastern Europe and from the northwestern to western and from northeastern to southern USA.
- Monthly precipitation amounts were extremely low from southern Canada to the northern USA.

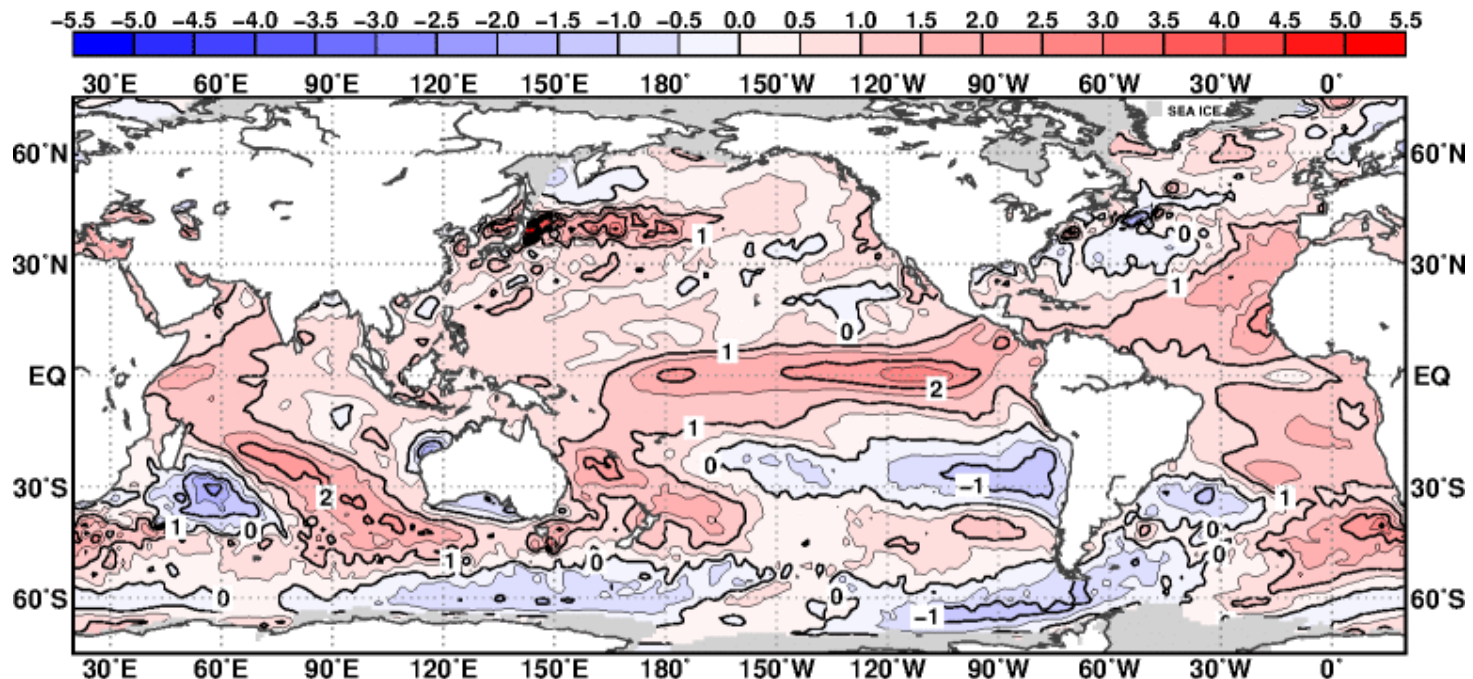
Monthly precipitation ratio



<January 2024> Sea Surface Temperature (SST)

- In the equatorial Pacific, remarkably positive SST anomalies were observed particularly from the central to eastern parts.
- In the North Pacific, remarkably positive anomalies were observed from the western to central mid-latitudes.
- In the Indian Ocean, remarkably positive anomalies were observed in the western part of the tropics.

Monthly mean SST anomaly (°C)



Monthly mean sea surface temperature anomalies based on COBE-SST2 and MGDSST* (Jan. 2024)

The contours and shading show sea surface temperature anomalies at intervals of 0.5°C.

The gray shading indicates maximum coverage of sea ice.

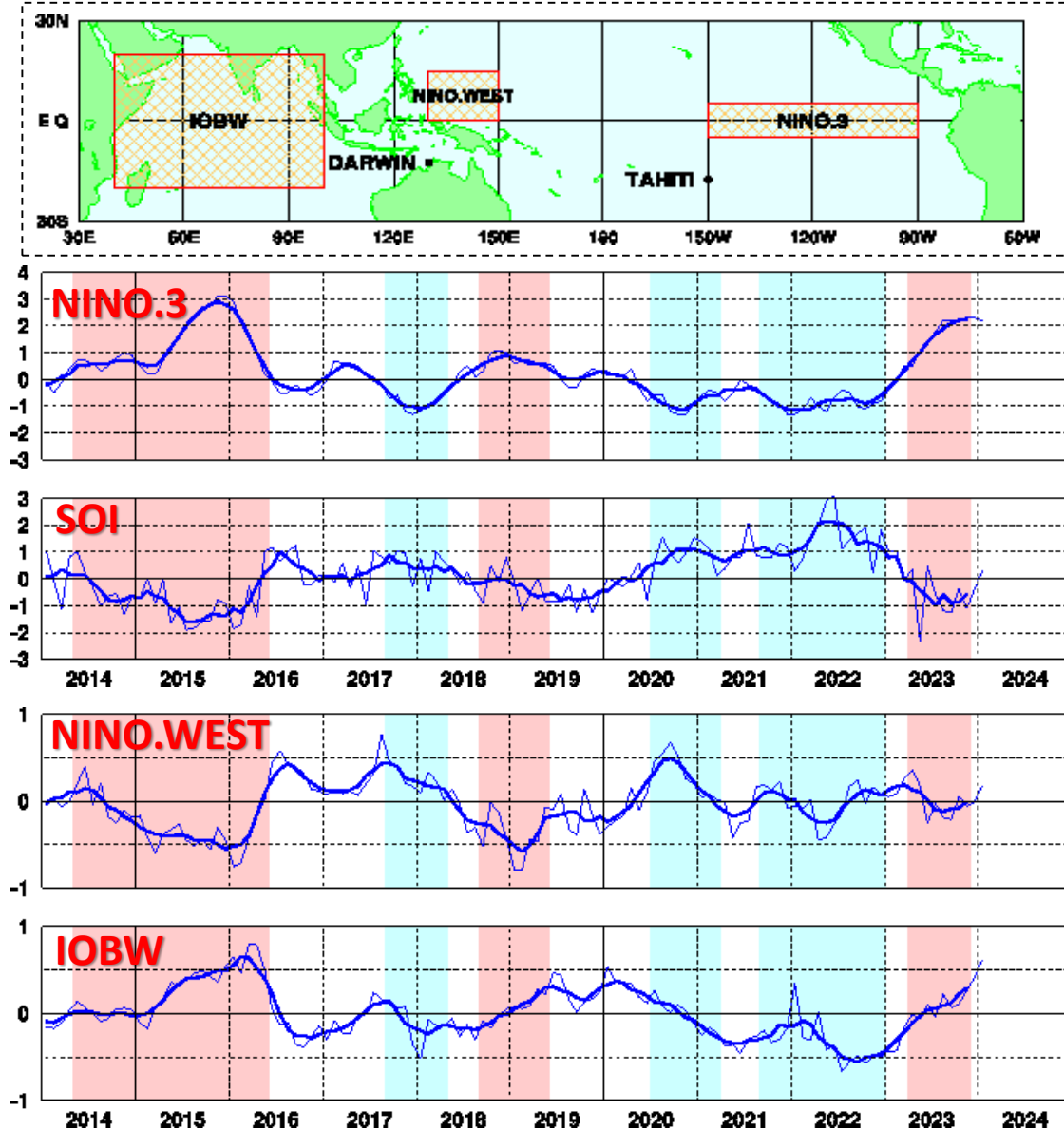
The baseline period for climatological normal is from 1991 to 2020.

(*) COBE-SST2: until 31 May 1985, MGDSST: after that date

CPD/JMA

<January 2024> ENSO Monitoring Indices

- El Niño conditions have persisted in the equatorial Pacific since boreal spring last year.
- The NINO.3 SST was above normal with a deviation of $+2.2^{\circ}\text{C}$ in January 2024.
- The Southern Oscillation Index (SOI) value was $+0.3$.
- The area-averaged SST in the tropical western Pacific (NINO.WEST) region was above normal.
- The area-averaged SST in the tropical Indian Ocean (IOBW) region was above normal.



Monthly values (thin lines) and five-month running means (thick lines). The shading indicates El Niño (red) and La Niña (blue) events.

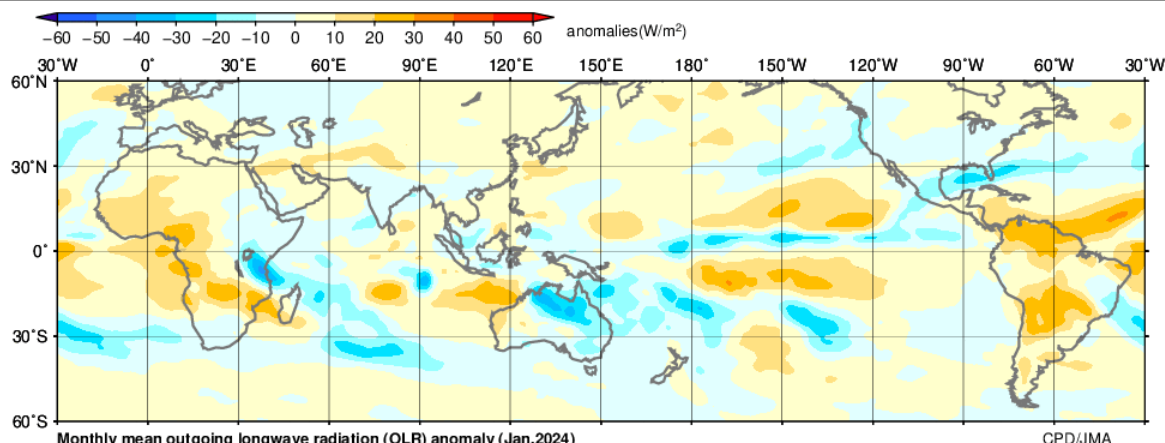
< El Niño Monitoring and Outlook> https://www.data.jma.go.jp/tcc/tcc/products/el_nino/elmonout.html

<January 2024> Convective activity in the Tropics

- Convective activity was enhanced over the southwestern part of the tropical Indian Ocean, from northern Austrasia to its east, and over the latitude band of 5°N in the central to eastern Pacific, and suppressed over the Southern Hemisphere side of the central to eastern tropical Pacific, over the latitude band of 10°N in the central Pacific, and from South America to western Africa.

Monthly mean OLR anomalies

Shading: OLR anomalies (W/m^2)



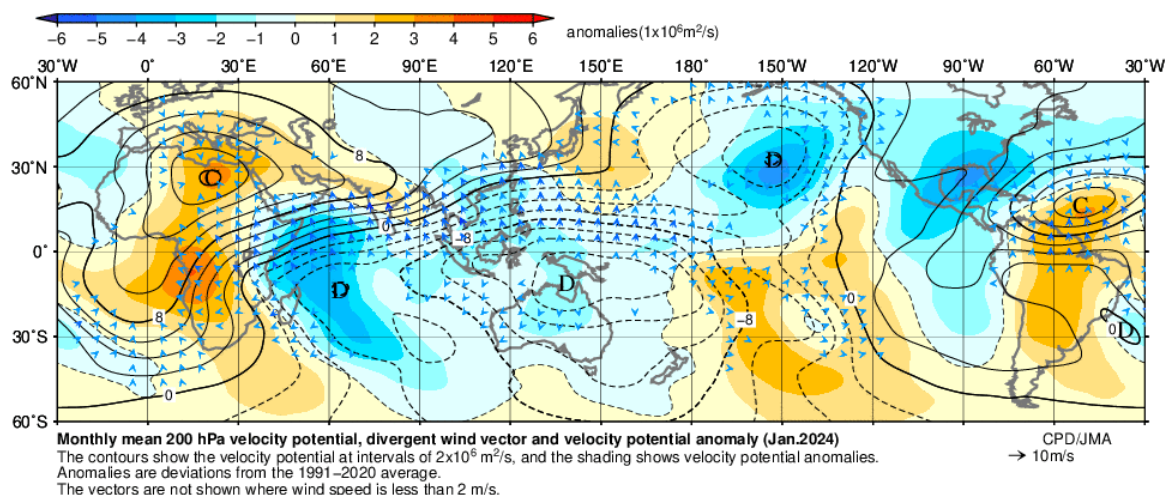
Monthly mean Velocity potential, Divergent wind vector, and Velocity potential anomalies at 200-hPa

Contour: velocity potential ($10^6 \text{m}^2/\text{s}$)

Vector: divergent wind vector (m/s)

Shading: velocity potential anomalies ($10^6 \text{m}^2/\text{s}$)

“D” and “C” indicate the centers of large-scale divergence and convergence anomalies, respectively.

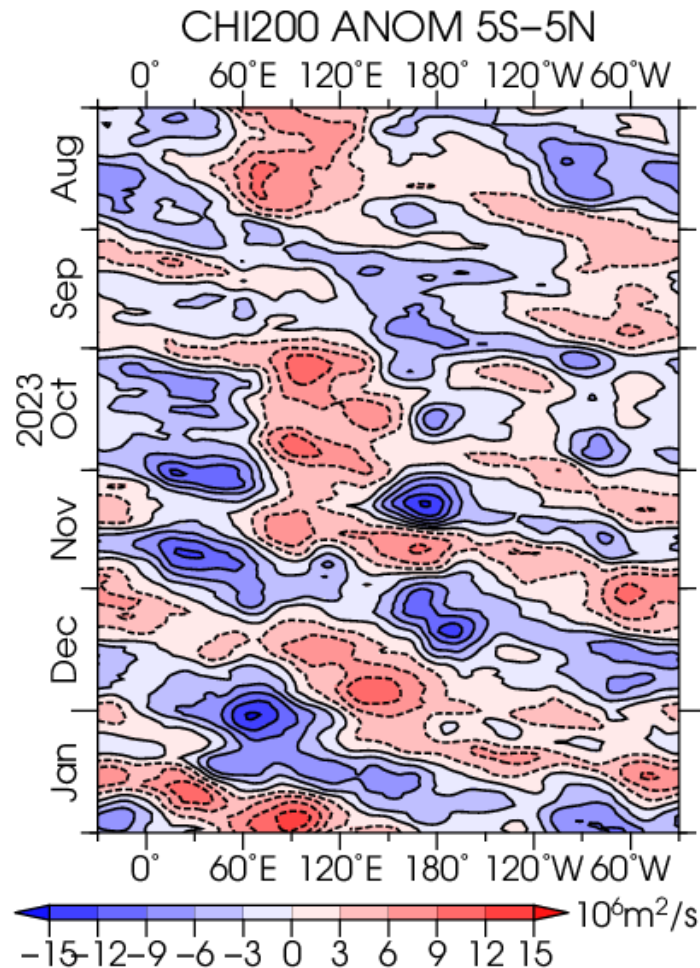


<Monthly Mean Figures> https://www.data.jma.go.jp/tcc/tcc/products/clisys/figures/db_hist_mon_tcc.html

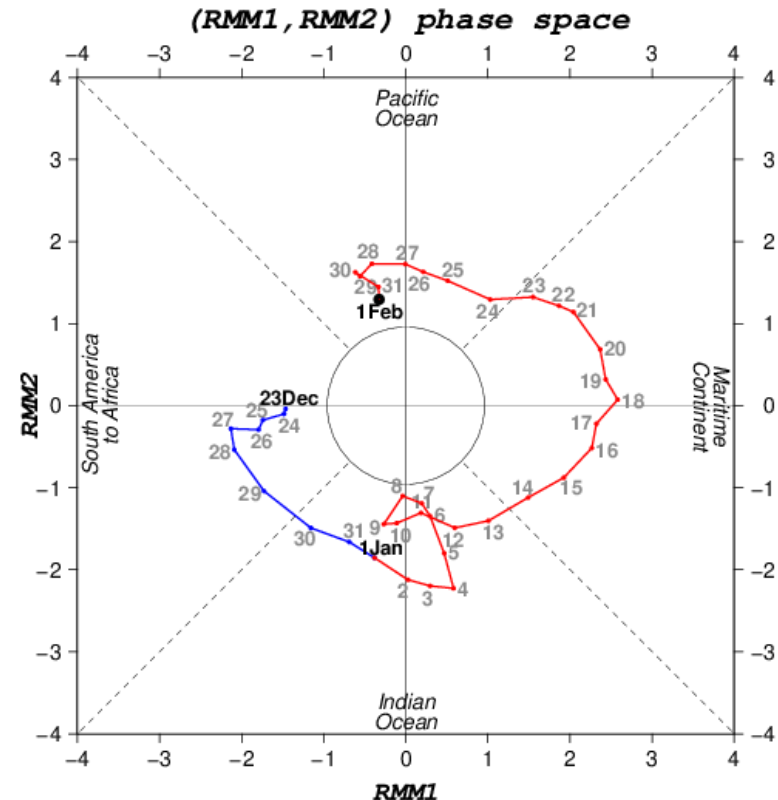
<Animation Maps (Global Area)> https://www.data.jma.go.jp/tcc/tcc/products/clisys/anim/anim_tp.html

<January 2024> Equatorial Intraseasonal Oscillation

- The active phase of equatorial intraseasonal oscillation propagated eastward from the Indian Ocean to the Pacific.



Time-longitude cross section of seven-day running mean velocity potential anomalies at 200-hPa (5°S – 5°N)



MJO diagram

<January 2024> Upper-level Circulation

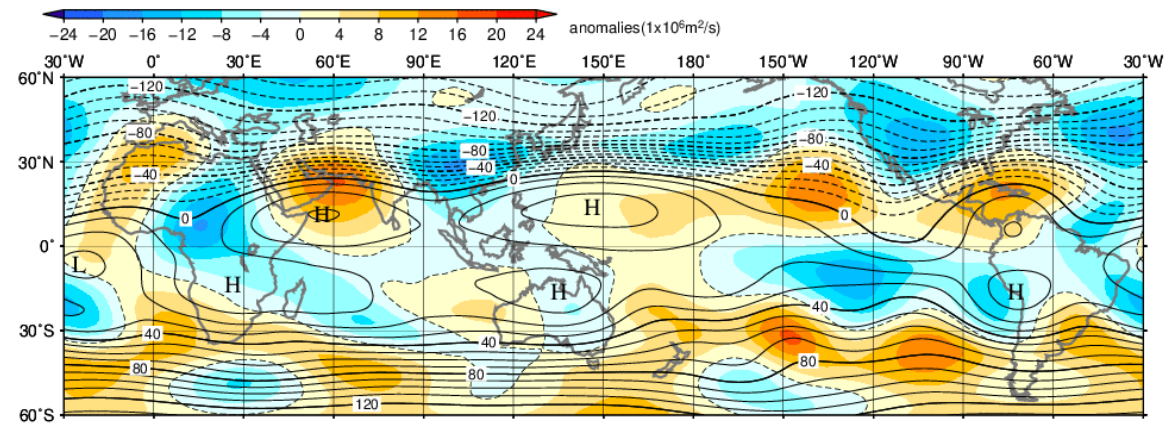
- In the upper troposphere, anti-cyclonic circulation anomalies straddling the equator were seen over the central to eastern Pacific. A wavy anomaly pattern was seen from the tropical North Pacific to southern Eurasia through the tropical North Atlantic.

Monthly mean Stream function and its anomalies at 200-hPa

Contour: stream function ($10^6 \text{m}^2/\text{s}$)

Shading: stream function anomalies ($10^6 \text{m}^2/\text{s}$)

“H” and “L” indicate the centers of anti-cyclonic and cyclonic circulations, respectively.



Monthly mean 200 hPa stream function and anomaly (Jan.2024)
The contours show the stream function at intervals of $10 \times 10^6 \text{m}^2/\text{s}$, and the shading shows stream function anomalies. Anomalies are deviations from the 1991–2020 average.

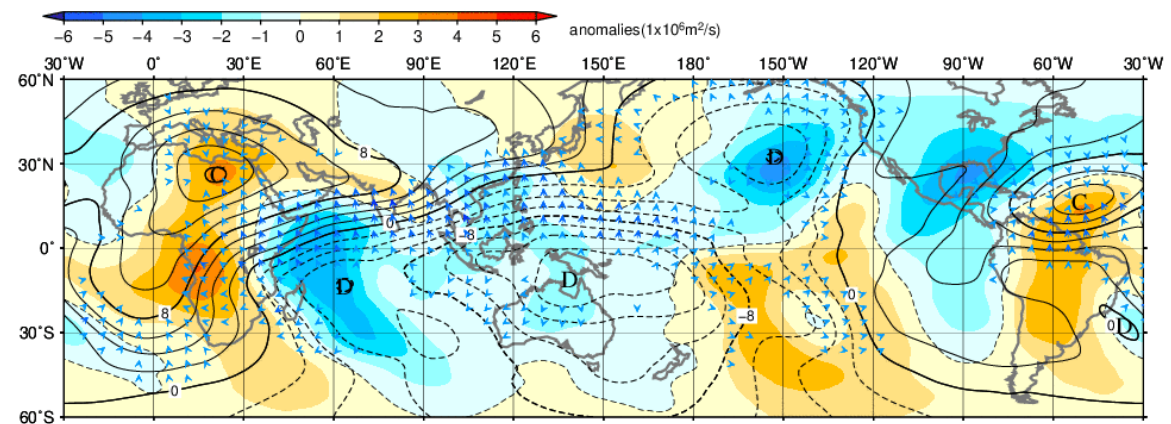
Monthly mean Velocity potential, Divergent wind vector and Velocity potential anomalies at 200-hPa

Contour: velocity potential ($10^6 \text{m}^2/\text{s}$)

Vector: divergent wind vector (m/s)

Shading: velocity potential anomalies ($10^6 \text{m}^2/\text{s}$)

“D” and “C” indicate the centers of large-scale divergence and convergence anomalies, respectively.



Monthly mean 200 hPa velocity potential, divergent wind vector and velocity potential anomaly (Jan.2024)
The contours show the velocity potential at intervals of $2 \times 10^6 \text{m}^2/\text{s}$, and the shading shows velocity potential anomalies. The vectors are not shown where wind speed is less than 2 m/s. Anomalies are deviations from the 1991–2020 average.

<Monthly Mean Figures> https://www.data.jma.go.jp/tcc/tcc/products/clisys/figures/db_hist_mon_tcc.html

<Animation Maps (Global Area)> https://www.data.jma.go.jp/tcc/tcc/products/clisys/anim/anim_tp.html

<January 2024> Low-level Circulation

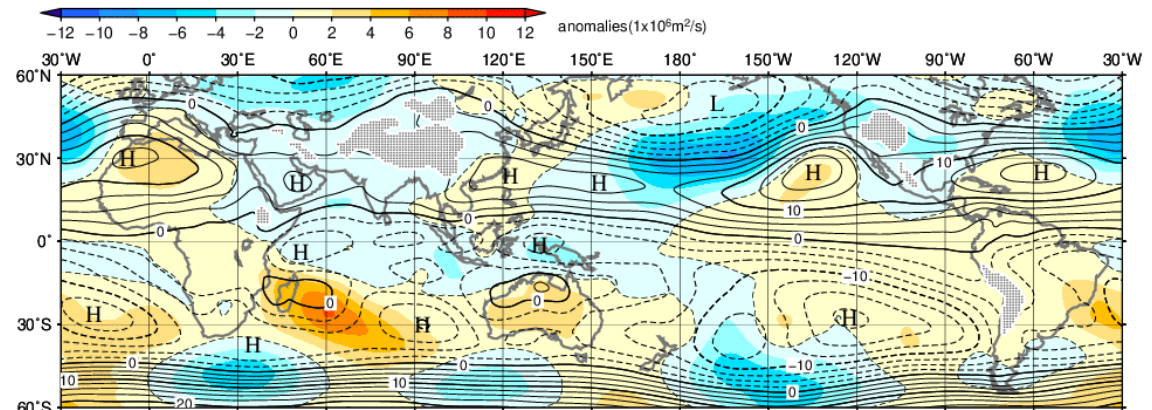
- In the lower troposphere, cyclonic circulation anomalies were seen over the central North Pacific and anti-cyclonic circulation anomalies were seen to the southeast in association with the upper-tropospheric circulation anomalies.
- In the sea level pressure field along the equator, positive anomalies were seen from the eastern Indian Ocean to the western Pacific, and negative anomalies were seen over the central to eastern Pacific.

Monthly mean Stream function and its anomalies at 850-hPa

Contour: stream function ($10^6 \text{ m}^2/\text{s}$)

Shading: stream function anomalies ($10^6 \text{ m}^2/\text{s}$)

“H” and “L” indicate the centers of anti-cyclonic and cyclonic circulations, respectively.



Monthly mean 850 hPa stream function and anomaly (Jan.2024)

The contours show the stream function at intervals of $2.5 \times 10^6 \text{ m}^2/\text{s}$, and the shading shows stream function anomalies.

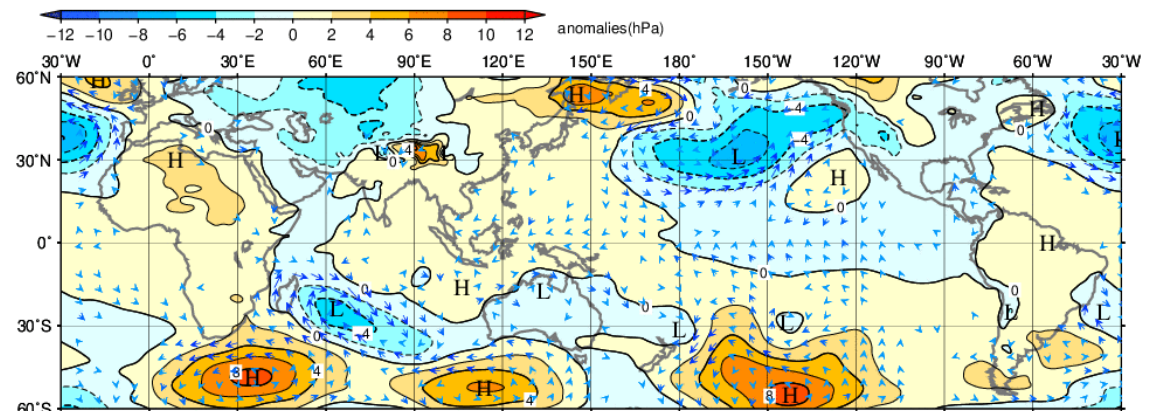
CPD/JMA

Monthly mean Sea level pressure anomalies and Surface wind vector anomalies

Contour&shading: sea level pressure anomalies (hPa)

Vector: surface wind vector anomalies (m/s)

“H” and “L” indicate the centers of anti-cyclonic and cyclonic anomalies, respectively.



Monthly mean sea level pressure anomaly and surface wind vector anomaly (Jan.2024)

The contours show sea level pressure anomalies at intervals of 2 hPa.

Anomalies are deviations from the 1991–2020 average.

The vectors are not shown where wind speed is less than 1 m/s.

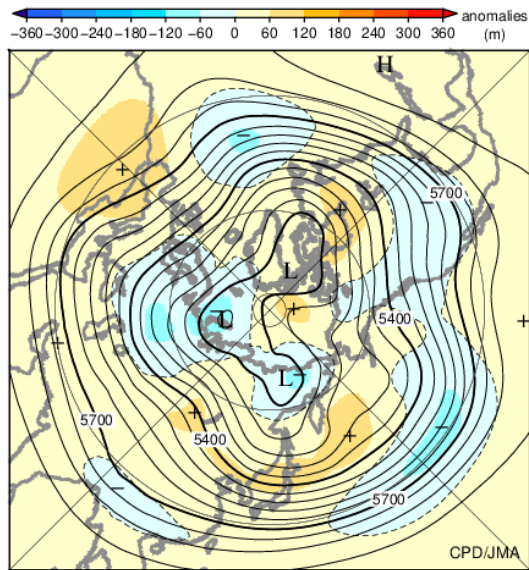
CPD/JMA
→ 5m/s

<Monthly Mean Figures> https://www.data.jma.go.jp/tcc/tcc/products/clisys/figures/db_hist_mon_tcc.html

<Animation Maps (Global Area)> https://www.data.jma.go.jp/tcc/tcc/products/clisys/anim/anim_tp.html

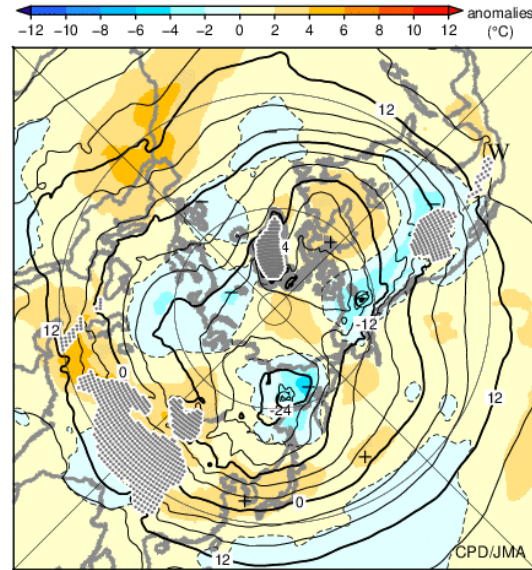
<January 2024> Northern Hemisphere Circulation

- In the 500-hPa height field, positive anomalies were seen over northern North America, over Northern Africa, and from Lake Baikal to the Aleutian Islands, and negative anomalies were seen over Western Russia and the central North Pacific.
- Temperatures at 850-hPa were above normal from Northern Africa to the mid-latitude North Pacific via Central Asia, in northeastern North America, and below normal in Eastern Siberia and from Alaska to southern North America.
- In the sea level pressure field, positive anomalies were seen over and around the Kamchatka Peninsula and negative anomalies were seen from the central to northeastern North Pacific, which indicates the Aleutian Low strongly extended southeastward than normal. Negative anomalies were also seen from eastern Europe to Central Asia.



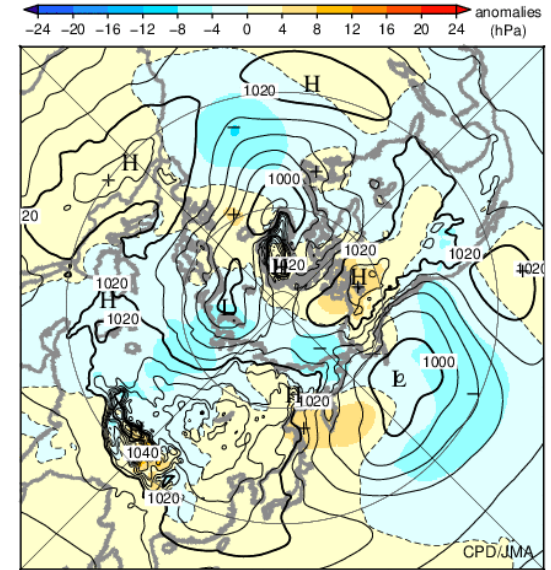
Monthly mean 500 hPa height and anomaly in the Northern Hemisphere (Jan.2024)

Monthly mean
geopotential height
and its anomalies at 500-hPa
Contour: geopotential height (m)
Shading: geopotential height anomalies (m)



Monthly mean 850 hPa temperature and anomaly in the Northern Hemisphere (Jan.2024)

Monthly mean
temperature
and its anomalies at 850-hPa
Contour: temperature ($^{\circ}\text{C}$)
Shading: temperature anomalies ($^{\circ}\text{C}$)

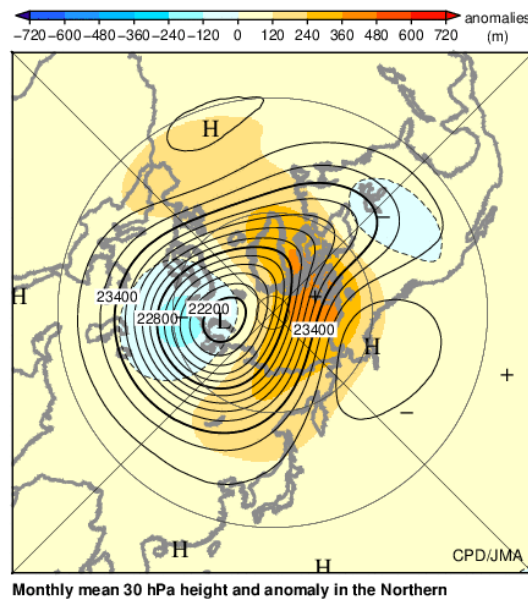


Monthly mean sea level pressure and anomaly in the Northern Hemisphere (Jan.2024)

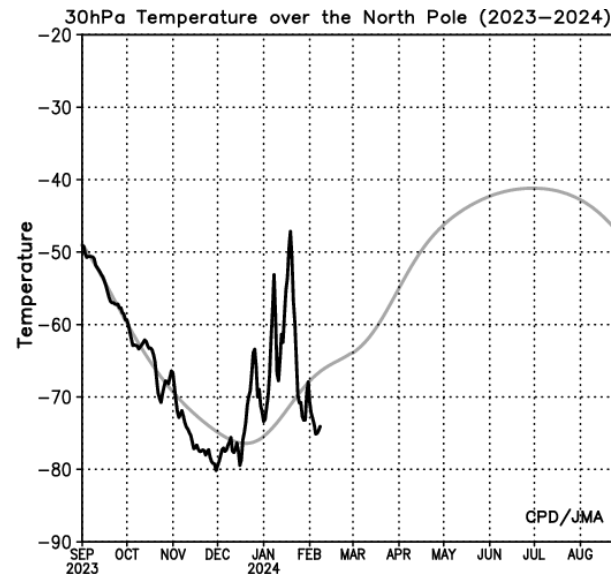
Monthly mean
sea level pressure
and its anomalies
Contour: sea level pressure (hPa)
Shading: sea level pressure anomalies (hPa)

<January 2024> Stratospheric Circulation

- In the 30-hPa height field, the polar vortex was displaced toward Western Russia in association with positive anomalies over a wide area of the Arctic region. The major stratospheric sudden warming occurred in middle January and terminated in late this month.
- The disrupted polar vortex and positive height anomalies over the Arctic region (i.e., the northward extension of the Aleutian High) in the stratosphere possibly affected the anomalous circulation in the troposphere through processes of the downward propagation of planetary waves and the thermal wind balance.



Monthly mean
geopotential height
and its anomalies at 30-hPa
Contour: geopotential height (m)
Shading: geopotential height anomalies (m)



Time-series representation
of temperatures at 30-hPa
over the North Pole
Black line: daily temperatures (°C)
Gray line: normal (°C)

<Monthly Mean Figures> https://www.data.jma.go.jp/tcc/tcc/products/clisys/figures/db_hist_mon_tcc.html

<Stratospheric Circulation> <https://www.data.jma.go.jp/tcc/tcc/products/clisys/STRAT/index.html>

3. Three-month Predictions

**March – April – May 2024
(MAM 2024)**

(Initial date for the Seasonal EPS: 7 February 2024)

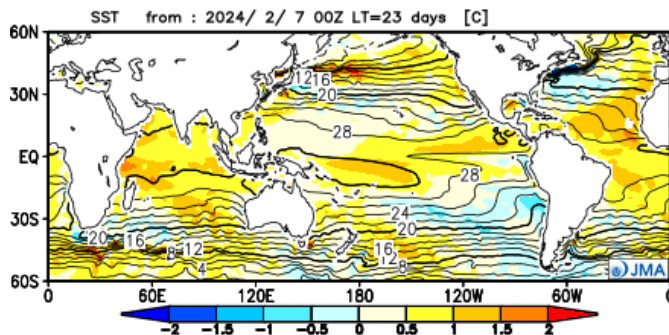
<MAM 2024> Sea Surface Temperature (SST)

- It is more likely to transition to ENSO-neutral conditions by the end of boreal spring (60%) than El Niño conditions will persist (40%).
- The NINO.WEST SST is likely to be near or below normal during boreal late winter and spring.
- The IOBW SST is likely to be above normal until boreal summer. Note that the significantly above-normal IOBW SST anomaly is predicted in boreal spring.

Three month mean Sea surface temperature (SST)

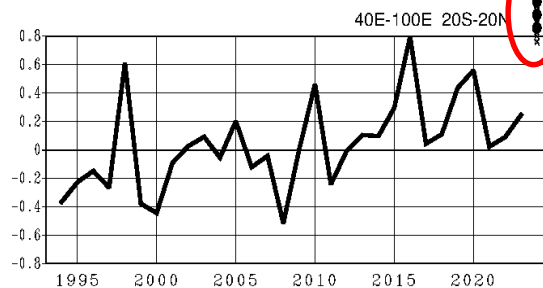
Contour: SST (°C); Shading: SST anomalies.

Ensemble forecast (3 months mean : MAR–MAY)



Inter-annual variability of IOBW SST anomaly

Outlook of MAM 2024

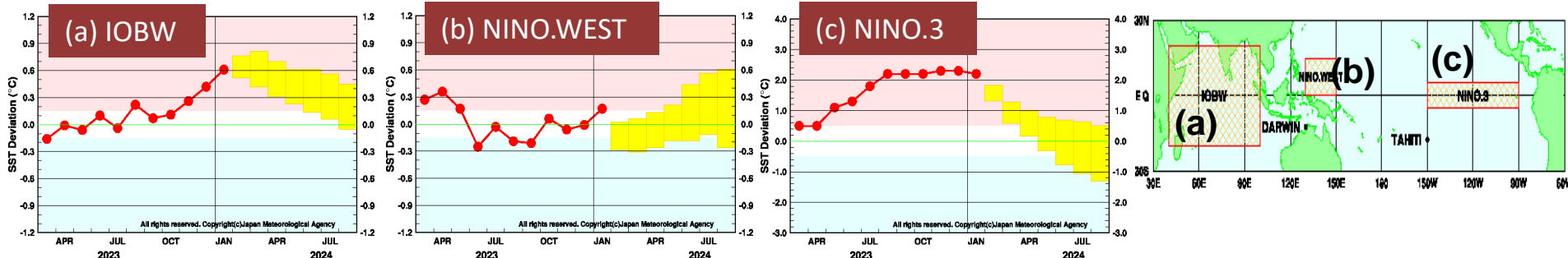


ENSO forecast probabilities

YEAR	MONTH	mean period	El Niño	ENSO neutral	La Niña
2023	DEC	OCT2023–FEB2024	100		
	JAN	NOV2023–MAR2024	100		
	FEB	DEC2023–APR2024	100		
2024	MAR	JAN2024–MAY2024	90	10	
	APR	FEB2024–JUN2024	60	40	
	MAY	MAR2024–JUL2024	40	60	
	JUN	APR2024–AUG2024	20	70	10

■ El Niño ■ ENSO neutral ■ La Niña

Outlook of the SST deviation



Verification based on hindcast

<https://www.data.jma.go.jp/tcc/tcc/products/model/hindcast/CPS3/index.html>

<https://www.data.jma.go.jp/tcc/tcc/products/model/hindcast/CPS3/shisu/shisu.html>

(See “Explanatory Notes (2)”
for the definition of the SST indices.)

<MAM 2024> Global Circulation

- In the 200-hPa velocity potential field, negative (large-scale divergence) anomalies are predicted over the Indian Ocean and from South America to the Atlantic, while positive (large-scale convergence) anomalies are predicted over the subtropical Pacific in the Northern and Southern Hemisphere.
- In the 200-hPa stream function field, anti-cyclonic circulation anomalies straddling the equator are predicted from the central to eastern tropical Pacific and over the western Indian Ocean. Cyclonic circulation anomalies are predicted over a wide area in the Northern Hemisphere, particularly over southern East Asia, corresponding to the southward shift of the subtropical jet over Eurasia.

Three month mean 200-hPa velocity potential

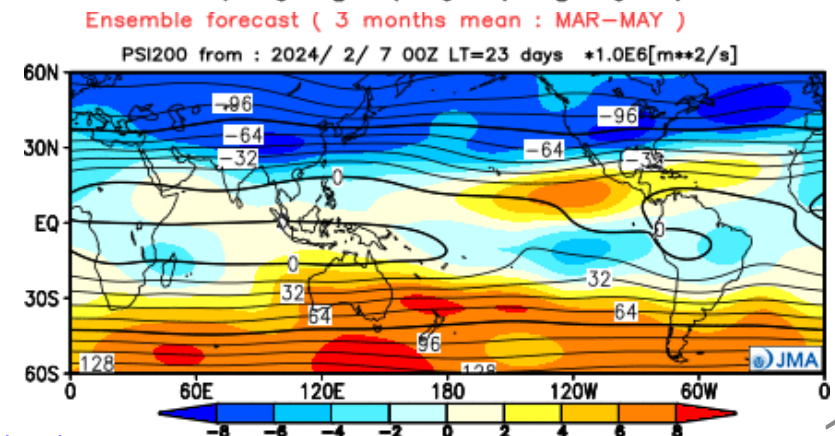
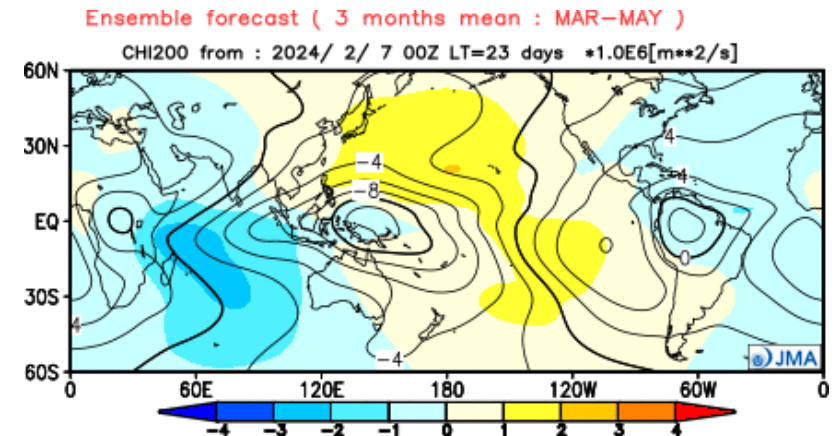
Contour: 200-hPa velocity potential ($10^6 \text{ m}^2/\text{s}$)

Shading: 200-hPa velocity potential anomalies ($10^6 \text{ m}^2/\text{s}$)

Three month mean 200-hPa stream function

Contour: 200-hPa stream function ($10^6 \text{ m}^2/\text{s}$)

Shading: 200-hPa stream function anomalies ($10^6 \text{ m}^2/\text{s}$)



Verification based on hindcast

<https://www.data.jma.go.jp/tcc/tcc/products/model/hindcast/CPS3/index.html>

<MAM 2024> Asian Circulation

- In the 850-hPa stream function field, anti-cyclonic circulation anomalies are predicted from the Bay of Bengal to the subtropical western North Pacific, which are possibly associated with the positive IOBW-related above-normal precipitation over the equatorial Indian Ocean and the below-normal precipitation over the latitude band of 10°N in the western North Pacific through the process of Kelvin-wave induced Ekman divergence.
- In the sea level pressure field, positive and negative anomalies are predicted over the subtropical western North Pacific and the equatorial Indian Ocean, respectively.
- Above-normal precipitation is predicted over the western equatorial Pacific.

Three month mean

(a) 850-hPa stream function anomalies and wind vector anomalies

Contour&Shading: 850-hPa stream function anomalies ($10^6 \text{ m}^2/\text{s}$)

Vector: wind vector anomalies (m/s)

(b) sea level pressure and its anomalies

Contour: sea level pressure (hPa)

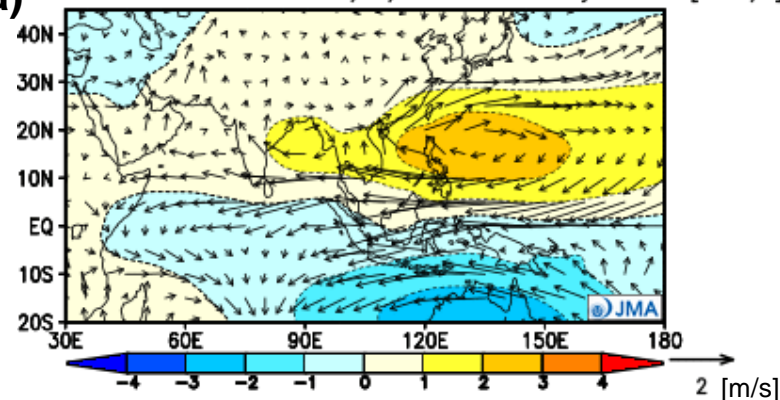
Shading: sea level pressure anomalies (hPa)

(c) precipitation and its anomalies

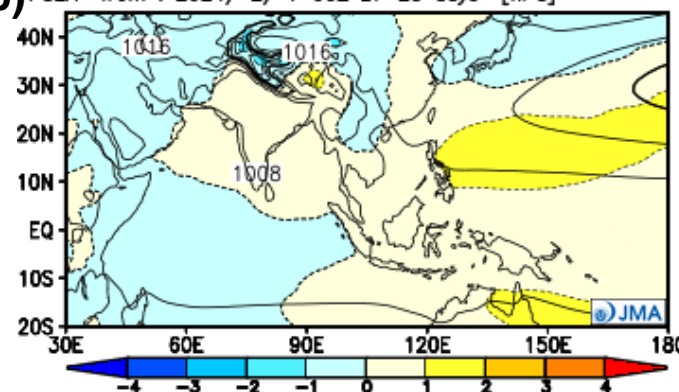
Contour: precipitation (mm/day)

Shading: precipitation anomalies (mm/day)

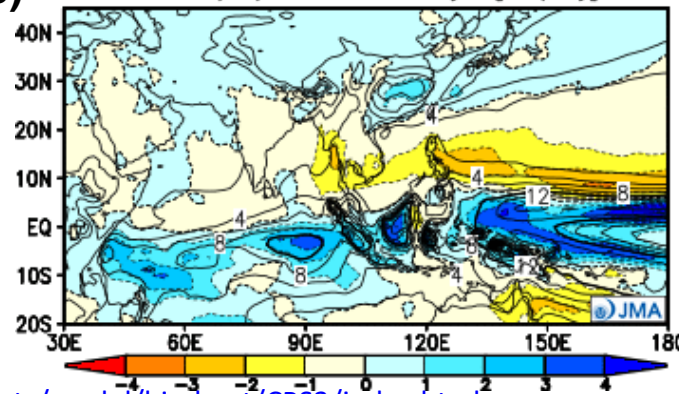
(a) PSI850 & wind850 from : 2024/ 2/ 7 00Z LT=23 days $\times 1.0E6 [\text{m}^2/\text{s}]$



(b) PSEA from : 2024/ 2/ 7 00Z LT=23 days [hPa]

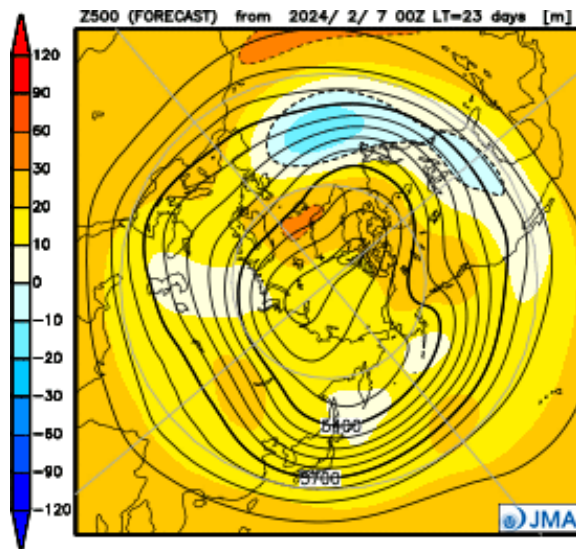


(c) RAIN from : 2024/ 2/ 7 00Z LT=23 days [mm/day]

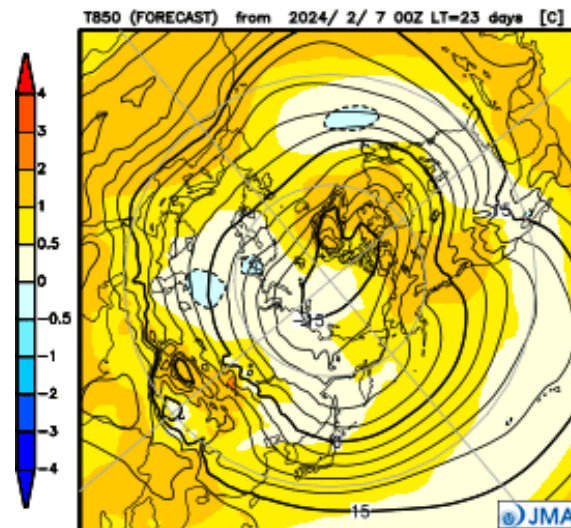


<MAM 2024> Northern Hemisphere circulation

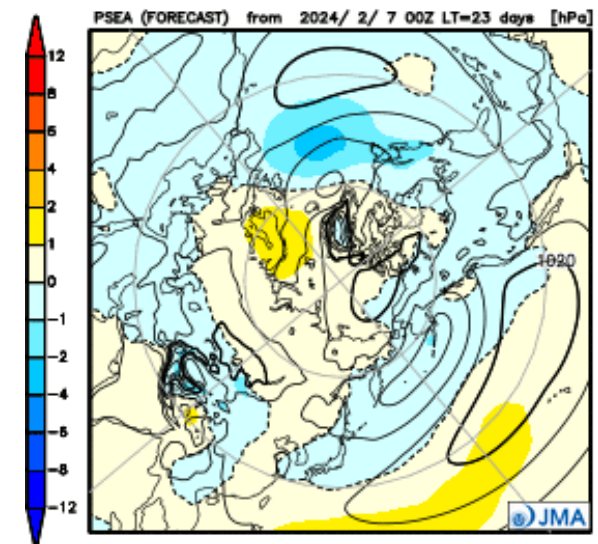
- In the 500-hPa height field, positive anomalies are predicted over a wide area of the Northern Hemisphere mid- and high-latitudes, except over the mid-latitude North Atlantic. The predicted tropospheric polar vortex is weaker than normal.
- In the 850-hPa temperature field, positive anomalies are predicted over a wide area of the Northern Hemisphere, particularly from Northern Africa to South Asia and over northern North America.
- In the sea level pressure field, the weaker-than-normal northward extensions of the subtropical highs over the North Atlantic and the North Pacific are predicted.



Three month mean
geopotential height
and its anomalies at 500-hPa
Contour: geopotential height (m)
Shading: geopotential height anomalies (m)



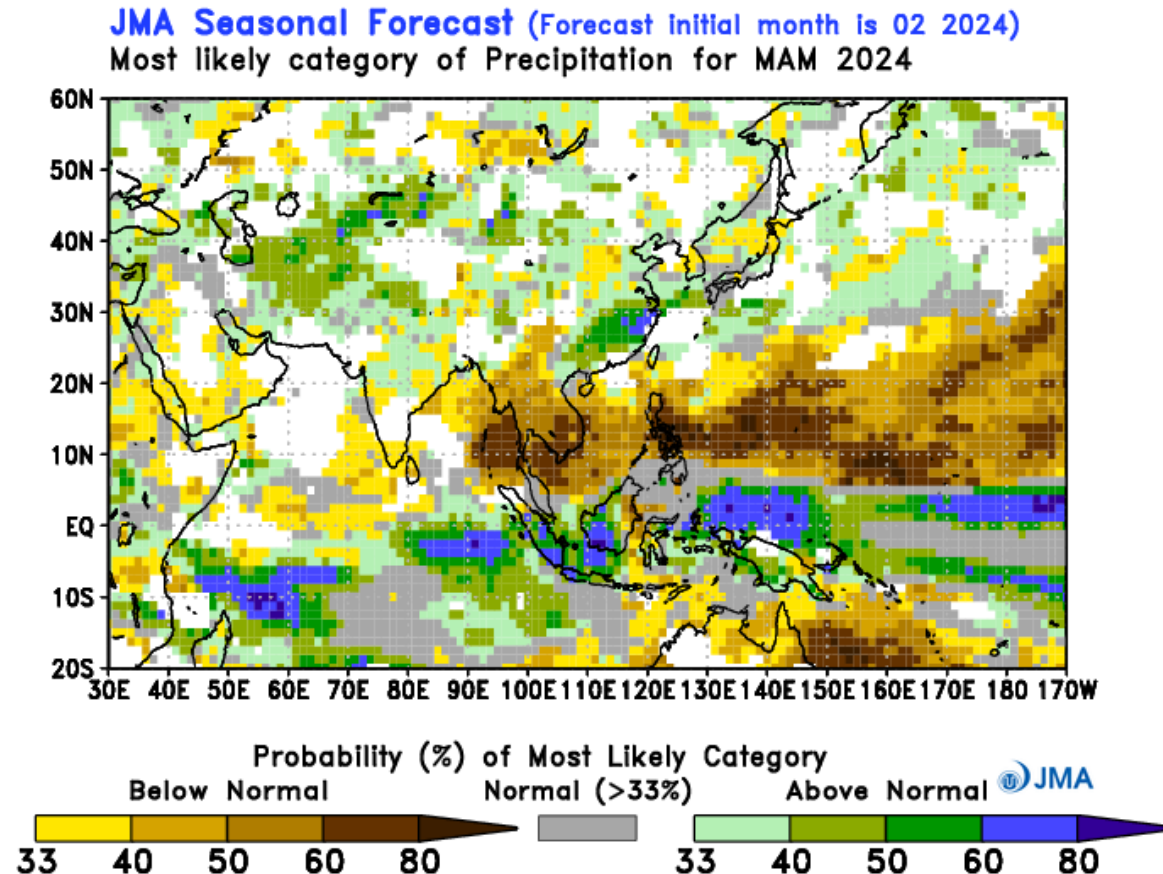
Three month mean
temperature
and its anomalies at 850-hPa
Contour: temperature (°C)
Shading: temperature anomalies (°C)



Three month mean
sea level pressure (SLP)
and its anomalies
Contour: sea level pressure (hPa)
Shading: sea level pressure anomalies (hPa)

<MAM 2024> Probability Forecasts (precipitation)

- A high probability of above-normal precipitation is predicted from the Southern Hemisphere side of the equatorial Indian Ocean to the equatorial western Pacific and from Central to East Asia.
- A high probability of below-normal precipitation is predicted from the Indochina Peninsula to the subtropical western North Pacific.



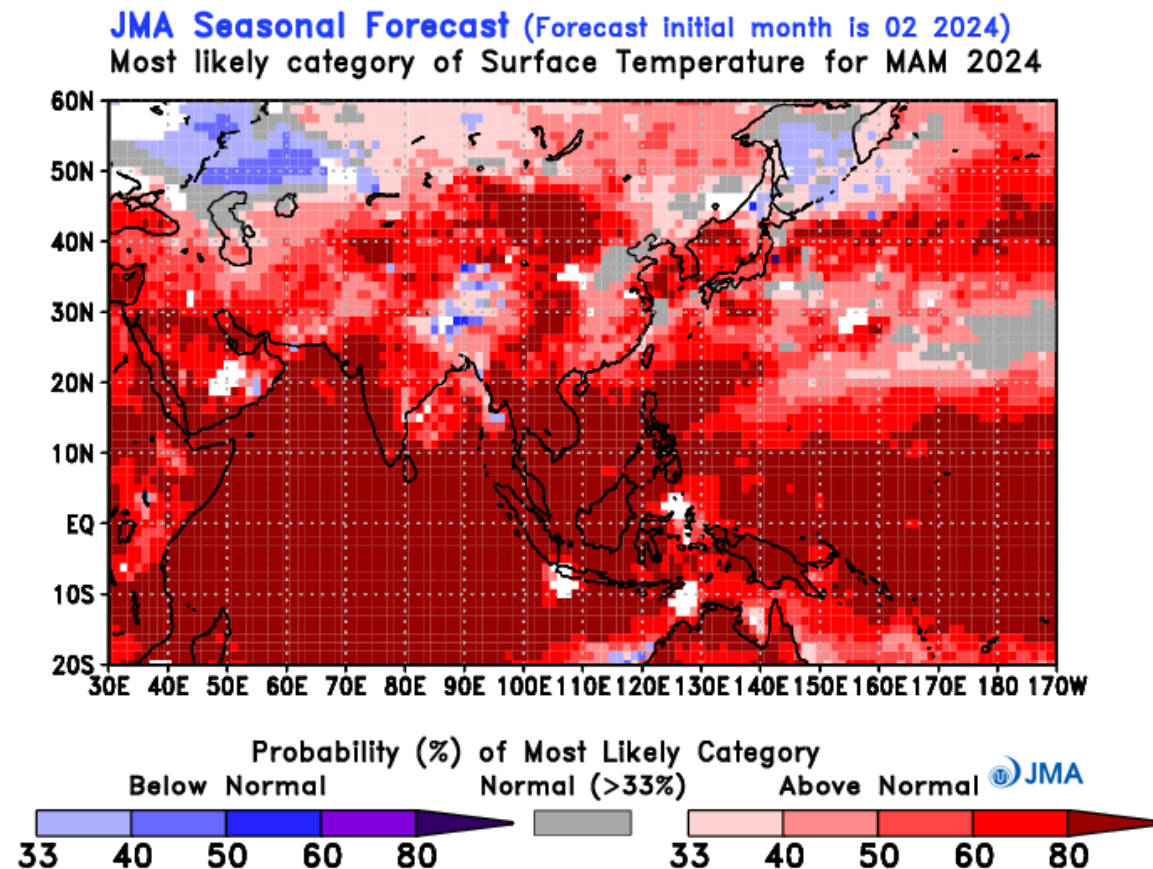
Verification based on hindcast

https://www.data.jma.go.jp/tcc/tcc/products/model/probfcst/3-mon/hind/html/skill_score_reg.html

https://www.data.jma.go.jp/tcc/tcc/products/model/probfcst/3-mon/hind/html/skill_2d_3-mon.html

<MAM 2024> Probability Forecasts (temperature)

- A high probability of above-normal temperatures is predicted over a wide area of Asia, particularly in the tropics from the Indian Ocean to the western Pacific, implying a significantly hot pre-monsoon period in South Asia and the Indochina Peninsula.
- A high probability of below-normal temperatures is predicted to the north of the Caspian sea.



Verification based on hindcast

https://www.data.jma.go.jp/tcc/tcc/products/model/probfcst/3-mon/hind/html/skill_score_reg.html

https://www.data.jma.go.jp/tcc/tcc/products/model/probfcst/3-mon/hind/html/skill_2d_3-mon.html

4. Warm Season Predictions

**June – July – August 2024
(JJA 2024)**

(Initial date for the Seasonal EPS: 7 February 2024)

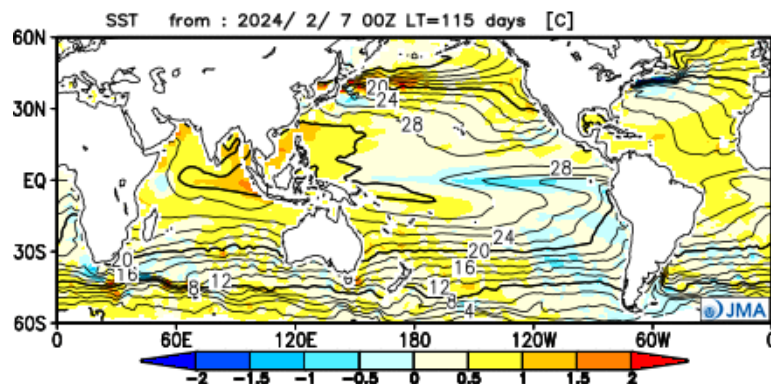
<JJA 2024> Sea Surface Temperature (SST)

- ENSO-neutral conditions are likely during boreal summer (70%).
- The NINO.WEST SST is likely to be almost near normal during boreal summer.
- The IOBW SST is likely to be above normal until boreal summer.

Three month mean Sea surface temperature (SST)

Contour: SST (°C); Shading: SST anomalies.

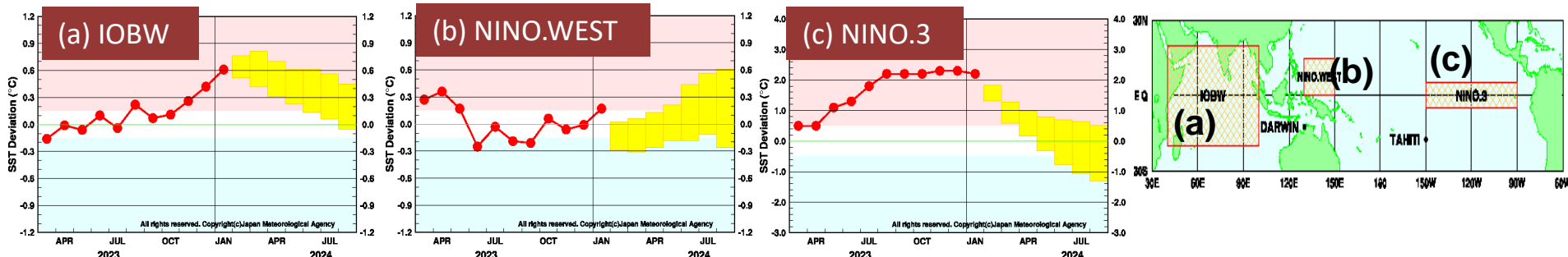
Ensemble forecast (3 months mean : JUN–AUG)



Outlook of the SST deviation

ENSO forecast probabilities

YEAR	MONTH	mean period			
2023	DEC	OCT2023–FEB2024	100		
	JAN	NOV2023–MAR2024	100		
	FEB	DEC2023–APR2024	100		
2024	MAR	JAN2024–MAY2024	90	10	
	APR	FEB2024–JUN2024	60	40	
	MAY	MAR2024–JUL2024	40	60	
	JUN	APR2024–AUG2024	20	70	10
			■ El Niño ■ ENSO neutral ■ La Niña		



Verification based on hindcast

<https://www.data.jma.go.jp/tcc/tcc/products/model/hindcast/CPS3/index.html>

<https://www.data.jma.go.jp/tcc/tcc/products/model/hindcast/CPS3/shisu/shisu.html>

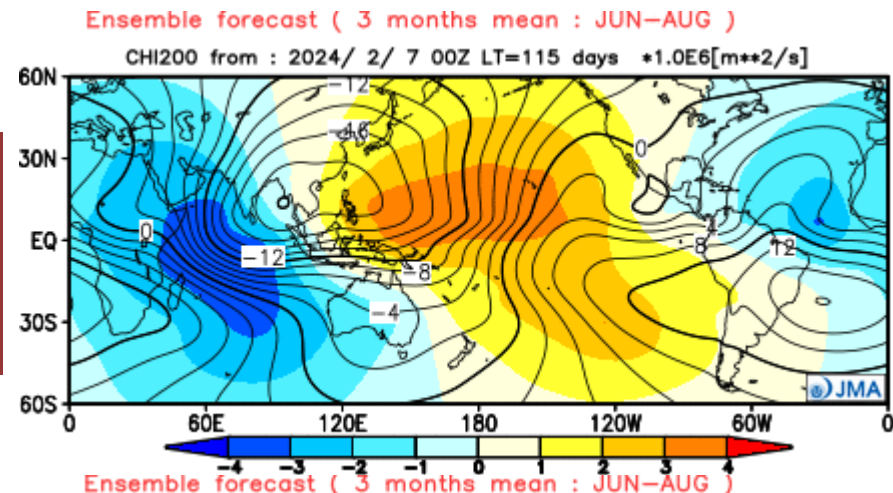
(See “Explanatory Notes (2)”
for the definition of the SST indices.)

<JJA 2024> Global Circulation

- In the 200-hPa velocity potential field, negative (large-scale divergence) anomalies are predicted over the Indian Ocean and over the Atlantic, while positive (large-scale convergence) anomalies are predicted over the Pacific.
- In the 200-hPa stream function field, anti-cyclonic circulation anomalies straddling the equator are predicted from the tropical eastern Pacific to Africa, and cyclonic circulation anomalies straddling the equator are predicted from the Southeast Asia to the western Pacific.

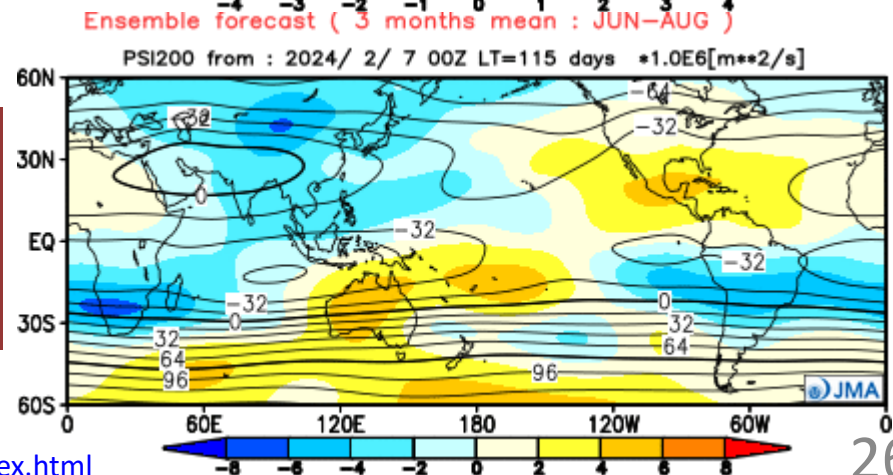
Three month mean 200-hPa velocity potential

Contour: 200-hPa velocity potential ($10^6 \text{ m}^2/\text{s}$)
Shading: 200-hPa velocity potential anomalies ($10^6 \text{ m}^2/\text{s}$)



Three month mean 200-hPa stream function

Contour: 200-hPa stream function ($10^6 \text{ m}^2/\text{s}$)
Shading: 200-hPa stream function anomalies ($10^6 \text{ m}^2/\text{s}$)



Verification based on hindcast

<https://www.data.jma.go.jp/tcc/tcc/products/model/hindcast/CPS3/index.html>

<JJA 2024> Asian Circulation

- In the 850-hPa stream function field, anti-cyclonic circulation anomalies straddling the equator are predicted over Southeast Asia in association with the below-normal precipitation near the tropical western Pacific and possibly the positive IOBW-related above-normal precipitation over the Indian Ocean through the process of Kelvin-wave induced Ekman divergence.
- In the sea level pressure field, positive and negative anomalies are predicted over the subtropical western North Pacific and the Indian Ocean, respectively.

Three month mean

(a) 850-hPa stream function anomalies and wind vector anomalies

Contour&Shading: 850-hPa stream function anomalies ($10^6 \text{ m}^2/\text{s}$)

Vector: wind vector anomalies (m/s)

(b) sea level pressure and its anomalies

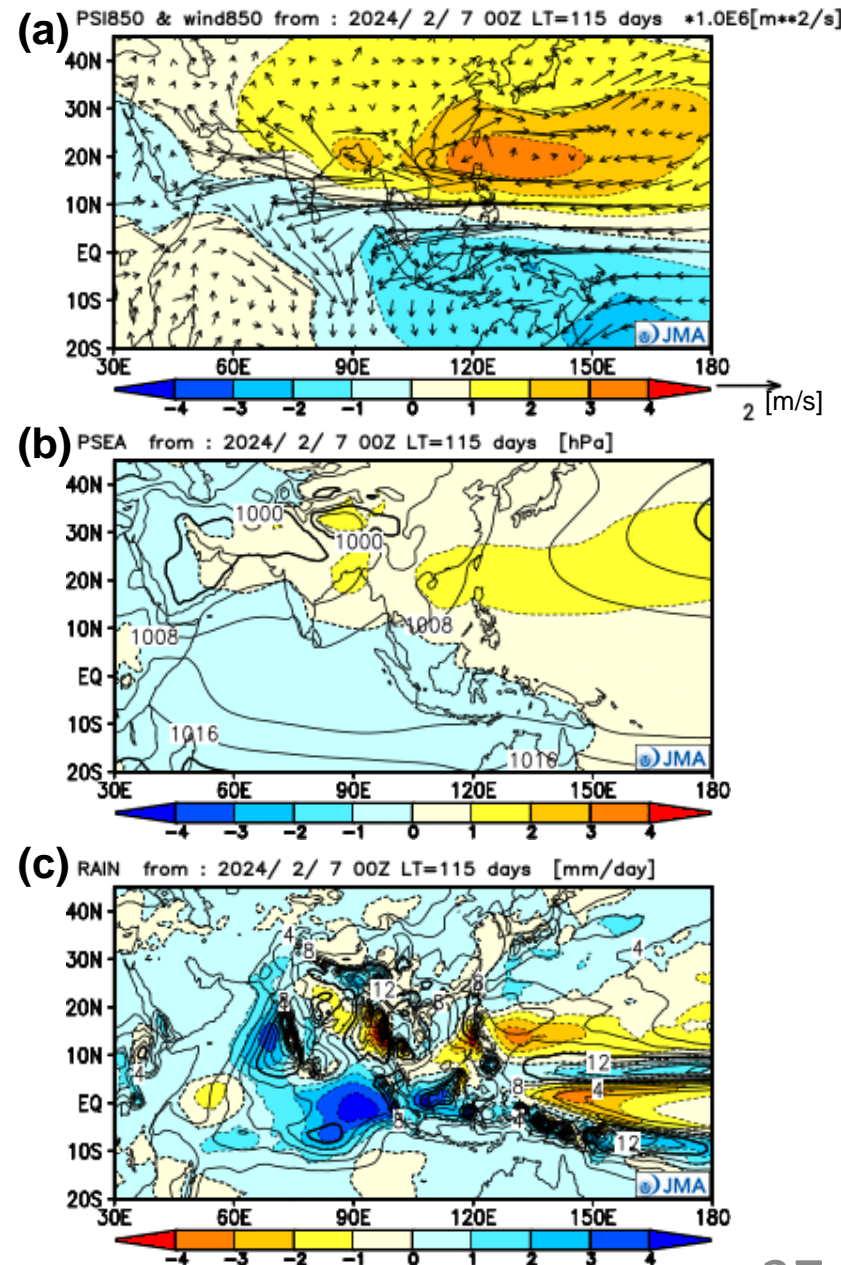
Contour: sea level pressure (hPa)

Shading: sea level pressure anomalies (hPa)

(c) precipitation and its anomalies

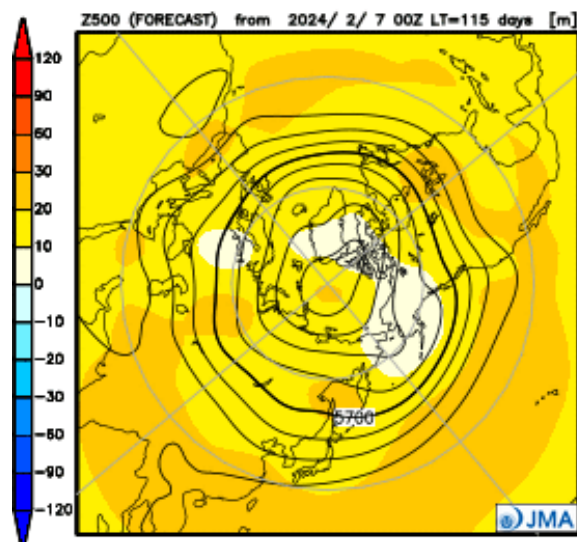
Contour: precipitation (mm/day)

Shading: precipitation anomalies (mm/day)

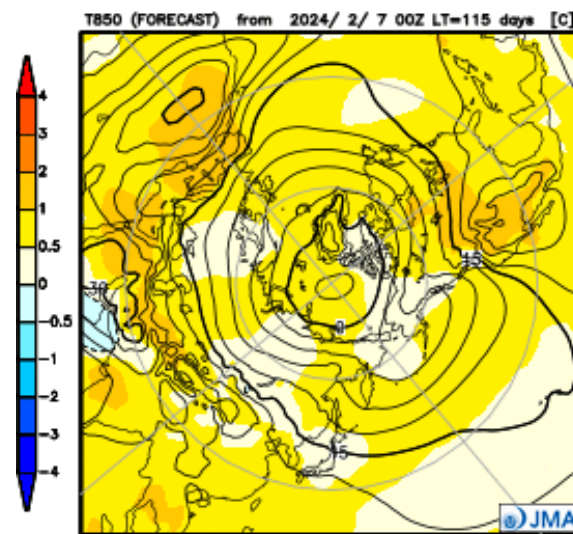


<JJA 2024> Northern Hemisphere circulation

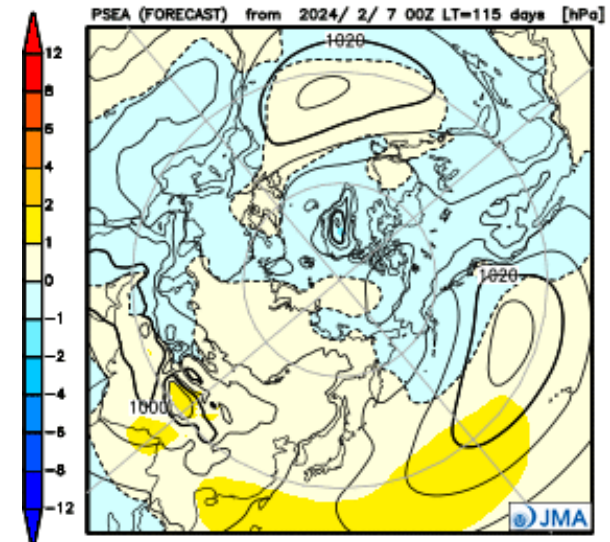
- In the 500-hPa height field, positive anomalies are predicted over a wide area of the Northern Hemisphere, particularly from South Asia to the subtropical Pacific, implying the southward shift of the subtropical jet from its normal position over the region.
- In the 850-hPa temperature field, positive anomalies are predicted over a wide area of the Northern Hemisphere.
- In the sea level pressure field, positive anomalies are predicted over the subtropical western North Pacific, indicating the southwestward extension of the North Pacific subtropical high.



Three month mean
geopotential height
and its anomalies at 500-hPa
Contour: geopotential height (m)
Shading: geopotential height anomalies (m)



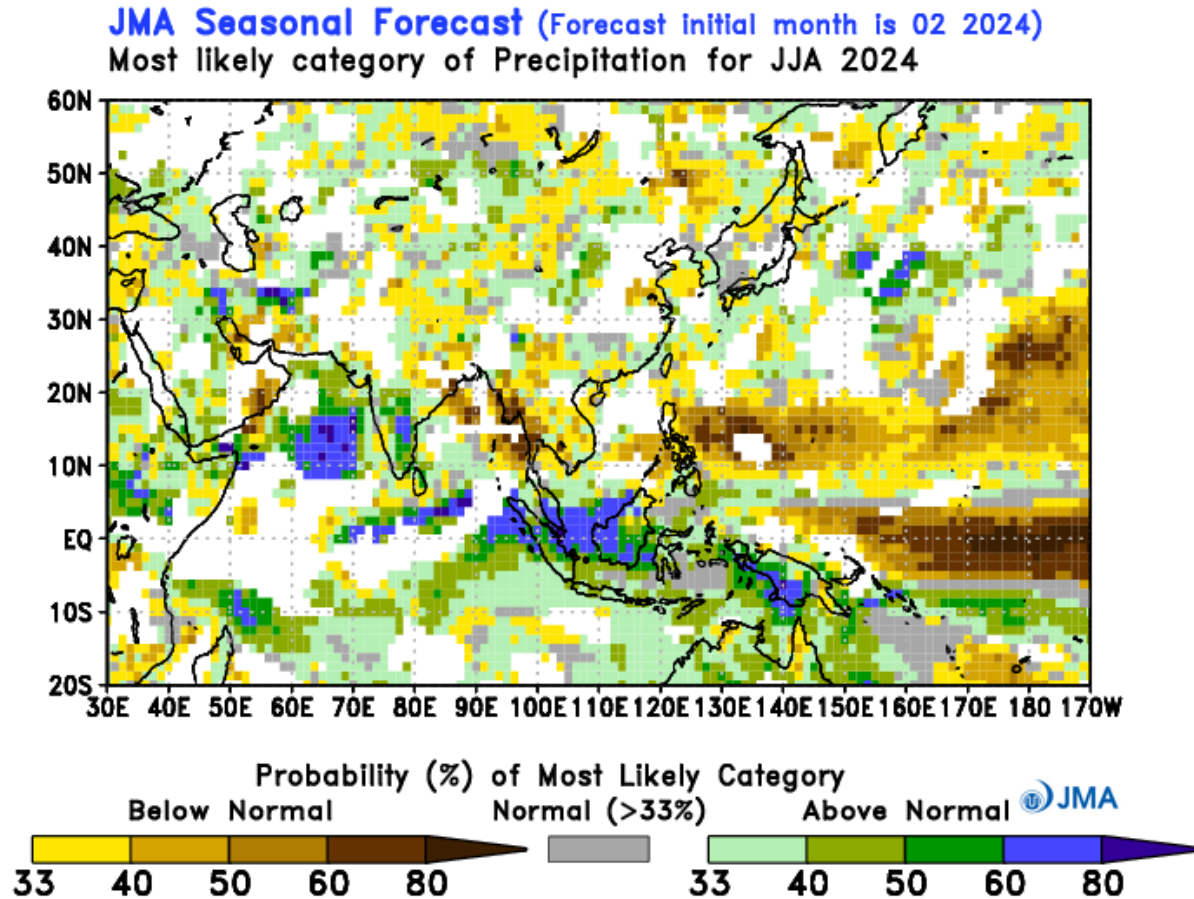
Three month mean
temperature
and its anomalies at 850-hPa
Contour: temperature (°C)
Shading: temperature anomalies (°C)



Three month mean
sea level pressure (SLP)
and its anomalies
Contour: sea level pressure (hPa)
Shading: sea level pressure anomalies (hPa)

<JJA 2024> Probability Forecasts (precipitation)

- A high probability of above-normal precipitation is predicted from the northwestern part of the Indian Ocean to the Maritime Continent.
- A high probability of below-normal precipitation is predicted near the Indochina Peninsula and over the tropical western Pacific.



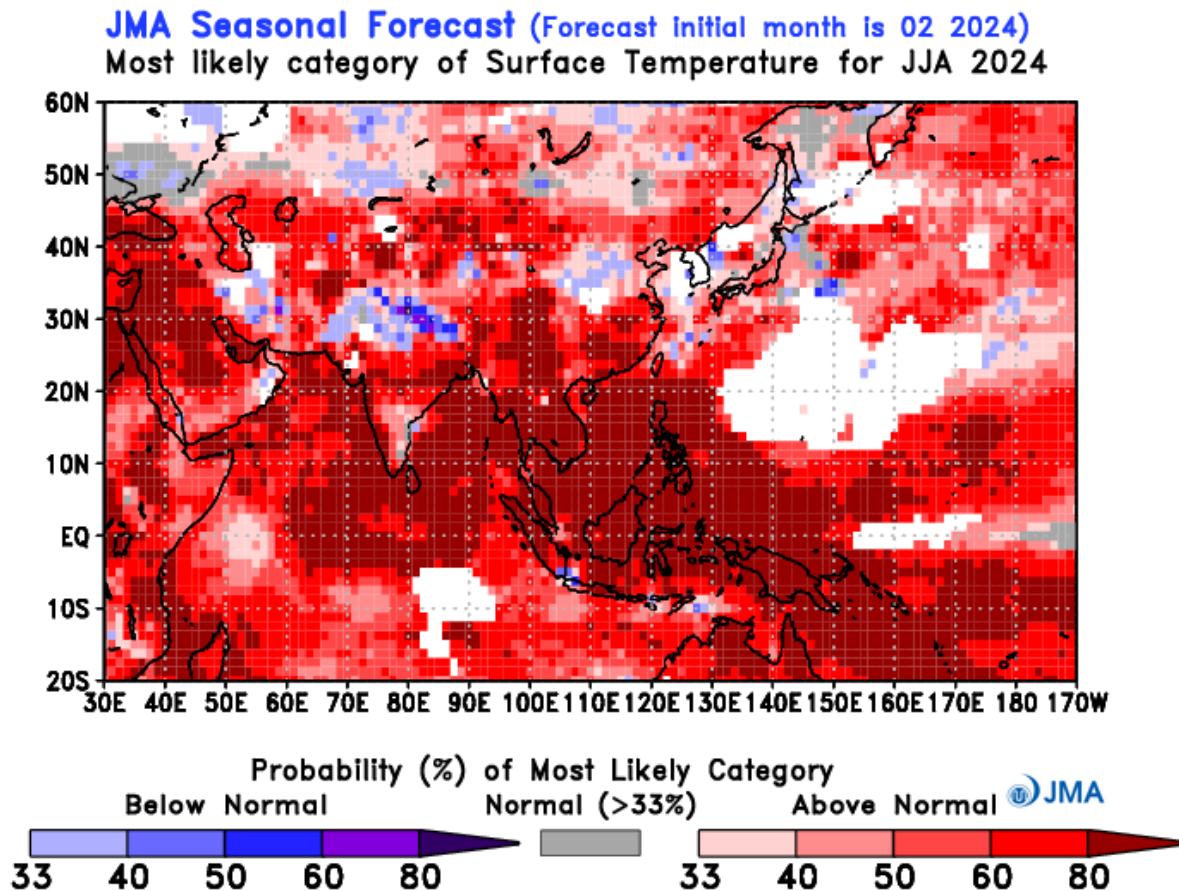
Verification based on hindcast

https://www.data.jma.go.jp/tcc/tcc/products/model/probfcst/warm_cold_season/hind/html/skill_score_reg.html

https://www.data.jma.go.jp/tcc/tcc/products/model/probfcst/warm_cold_season/hind/html/skill_2d_warm_cold_season.html

<JJA 2024> Probability Forecasts (temperature)

- A high probability of above-normal temperatures is predicted from the Middle East to the tropical western Pacific through the northern Indian Ocean.
- A high probability of below-normal temperatures is predicted over a part of South Asia.



Verification based on hindcast

https://www.data.jma.go.jp/tcc/tcc/products/model/probfcst/warm_cold_season/hind/html/skill_score_reg.html

https://www.data.jma.go.jp/tcc/tcc/products/model/probfcst/warm_cold_season/hind/html/skill_2d_warm_cold_season.html

Explanatory Notes (1)

Latest state of the climate system

- Extreme climate events and surface climate conditions are based on CLIMAT messages.
For details, see <https://www.data.jma.go.jp/tcc/tcc/products/climate/index.html>
- SST products are based on MGDSSST and COBE-SST2 data.
For details, see
MGDSST https://www.data.jma.go.jp/goos/data/rrtdb/jma-pro/mgd_sst_glb_D.html
COBE-SST2 https://www.data.jma.go.jp/tcc/tcc/products/elnino/cobesst2_doc.html
- Atmospheric circulation products are based on JRA-3Q data:
https://jra.kishou.go.jp/JRA-3Q/index_en.html
For details, see <https://www.data.jma.go.jp/tcc/tcc/products/clisys/index.html>
- The base period for the normal is 1991 – 2020.

Three-month predictions and warm/cold season predictions

- Products are generated using JMA's seasonal EPS which is based on the CGCM.
For details, see <https://www.data.jma.go.jp/tcc/tcc/products/model/index.html>
- Unless otherwise noted, atmospheric circulation prediction products are based on the ensemble mean, and anomalies are deviations from the 1991 – 2020 average for hindcasts.

Contact: tcc@met.kishou.go.jp

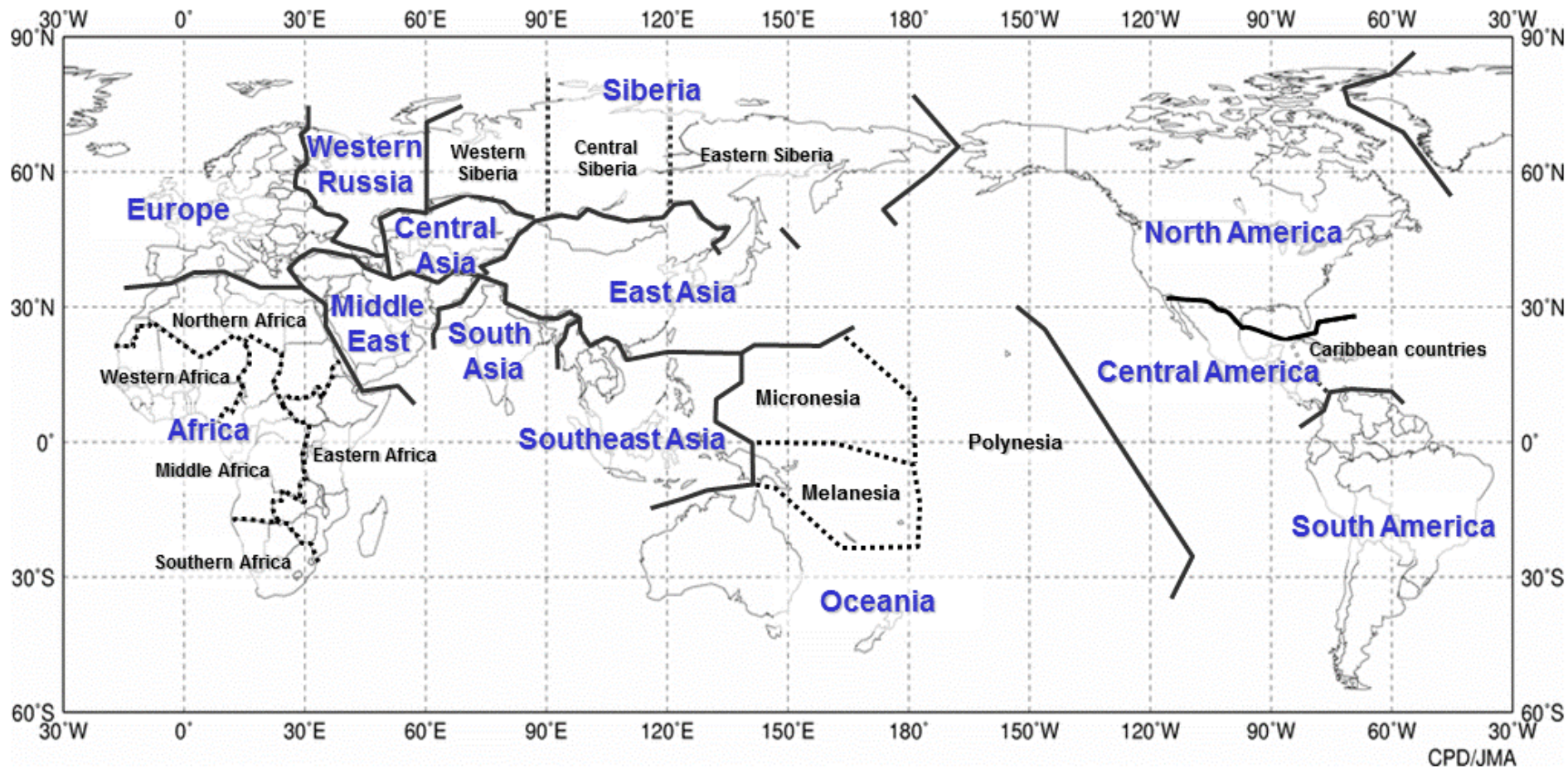
Explanatory Notes (2)

SST monitoring indices (NINO.3, NINO.WEST and IOBW)

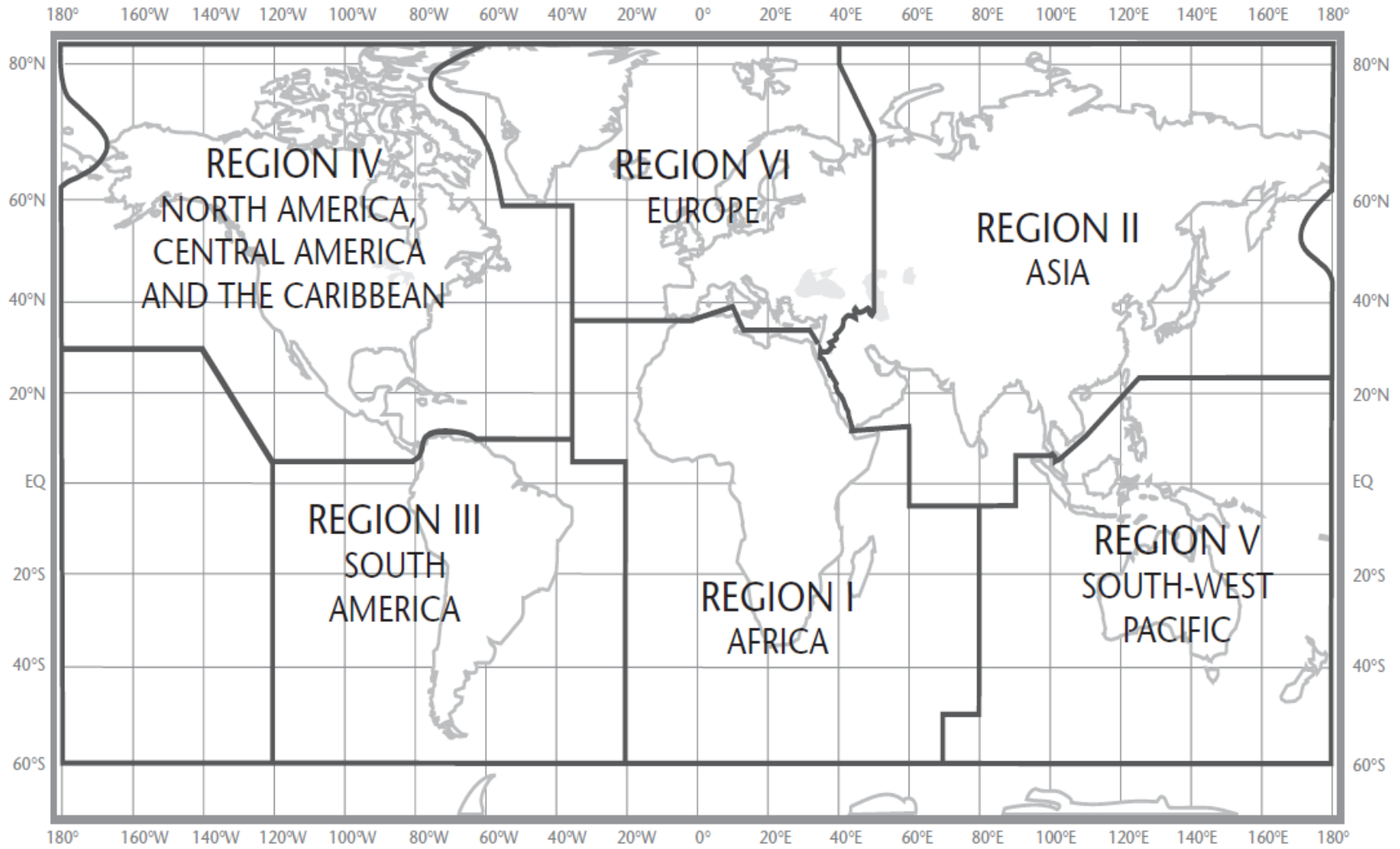
- The SST baseline for NINO.3 region ($5^{\circ}\text{S} - 5^{\circ}\text{N}$, $150^{\circ}\text{W} - 90^{\circ}\text{W}$) is defined as a monthly average over a sliding 30-year period (e.g., 1994 – 2023 for 2024). The thresholds of above the baseline, near the baseline, and below the baseline categories are +0.5 and -0.5.
- The SST baselines for the NINO.WEST region ($\text{Eq.} - 15^{\circ}\text{N}$, $130^{\circ}\text{E} - 150^{\circ}\text{E}$) and the IOBW region ($20^{\circ}\text{S} - 20^{\circ}\text{N}$, $40^{\circ}\text{E} - 100^{\circ}\text{E}$) are defined as linear extrapolations with respect to a sliding 30-year period in order to remove the effects of significant long-term warming trends observed in these regions. The thresholds of above the baseline, near the baseline, and below the baseline categories are +0.15 and -0.15.
- These SST indices are derived from MGD SST datasets after June 2015 and those of COBE-SST2 before this.

Contact: tcc@met.kishou.go.jp

Names of world regions



WMO Regional Association regions



Reference: WMO General Regulations

TCC website

Home	World Climate	Climate System Monitoring	El Niño Monitoring	NWP Model Prediction	Global Warming	Climate in Japan	Training Module	Press release	Links
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HOME

What are WMO RCCs

WMO RCCs are centres of excellence...

RCC Functions

Operational Activities for Long-range Forecasting (LRF)

Operational Activities for Climate Monitoring

Operational Data Services, to support operational LRF and climate monitoring

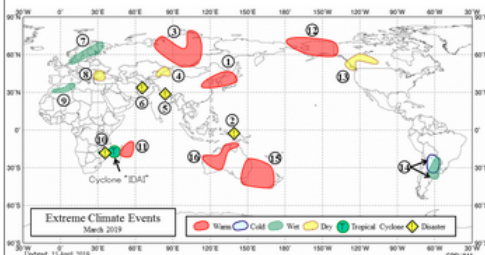
Training in the use of operational RCC products and services

Latest Updates

World Climate

Updated: 15 April 2019

The latest monthly report is issued on 15 April 2019.



Distribution of Extreme Climate Event (March 2019)

Climate System Monitoring

Updated 15 April 2019

El Niño Monitoring

Updated: 10 April 2019

Monthly Discussion

Updated: 25 March 2019

Global Warming

Updated: 15 April 2019

Climate in Japan

Updated: 10 April 2019

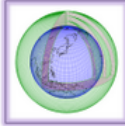
STRATALERT TOKYO

Main Products



iTacs

iTacs, Interactive Tool for Analysis of the Climate System, is a web-based application to assist NMHSs to analyses extreme climate events and to monitor climate status.



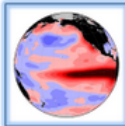
WMC Tokyo

Products of long-range forecast from World Meteorological Centre (WMC) Tokyo are available. These products are based on JMA's ensemble prediction system.



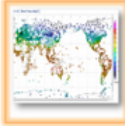
Monthly Discussion on Seasonal Climate Outlook

This is intended to assist NMHSs in the Asia-Pacific region in interpreting WMC Tokyo's three-month prediction and warm/cold season prediction products.



El Niño Monitoring

"El Niño Outlook" consists of a diagnosis of current condition and prediction of El Niño/Southern Oscillation. This is issued every month around 10th.



ClimatView

The ClimatView tool enables viewing and downloading of monthly world climate data, including monthly temperature/precipitation statistics and 30-year climate normals.



TCC News

TCC News, a quarterly newsletter from Tokyo Climate Center, acquaints with significant climate disasters and events, forecaster's commentaries on seasonal outlooks, besides topics on the renewal and the usage of TCC products.

What's New



19 March 2019 [IW NE](#)

Announcement: Incorporation of [Standardized Precipitation Index \(SPI\)](#) into the [ClimatView](#) tool.

14 March 2019 [IW NE](#)

Announcement: [New JMA's One-month Guidance Tool](#) (password required) is launched. Please refer to [the commentary](#) for details.

1 March 2019 [IW NE](#)

TCC News No. 55 (Winter 2019: PDF)

- Global surface temperature for 2018 the fourth highest since 1891
- Highlights of the Global Climate in 2018
- Summary of Japan's Climatic Characteristics for 2018
- TCC Activity Report for 2018
- TCC contribution to WMO International Workshop on RCC Operations

21 December 2018 [IW NE](#)

Press release: Global temperature for 2018 to be the 4th highest since 1891 (Preliminary)

[» Previous news](#)

[» Press release](#)

Links

Regional Climate Centers

- RA II Regional Climate Center (RCC) Network Homepage
- Beijing Climate Center
- National Climate Centre, Pune [IW NE](#)
- North Eurasian Climate Center (NEACC)
- WMO RA VI RCC-Network

Regional Climate Outlook Forum (RCOF)

- Forum on Regional Climate Monitoring-Assessment-Prediction for Asia (FOCRAII)
- East Asia winter Climate Outlook Forum (EASCOF)
- South Asian Climate Outlook Forum (SASCOF)
- ASEAN Climate Outlook Forum (ASEANCOF)

WMO RA II Climate Services

<https://www.data.jma.go.jp/tcc/tcc/index.html>