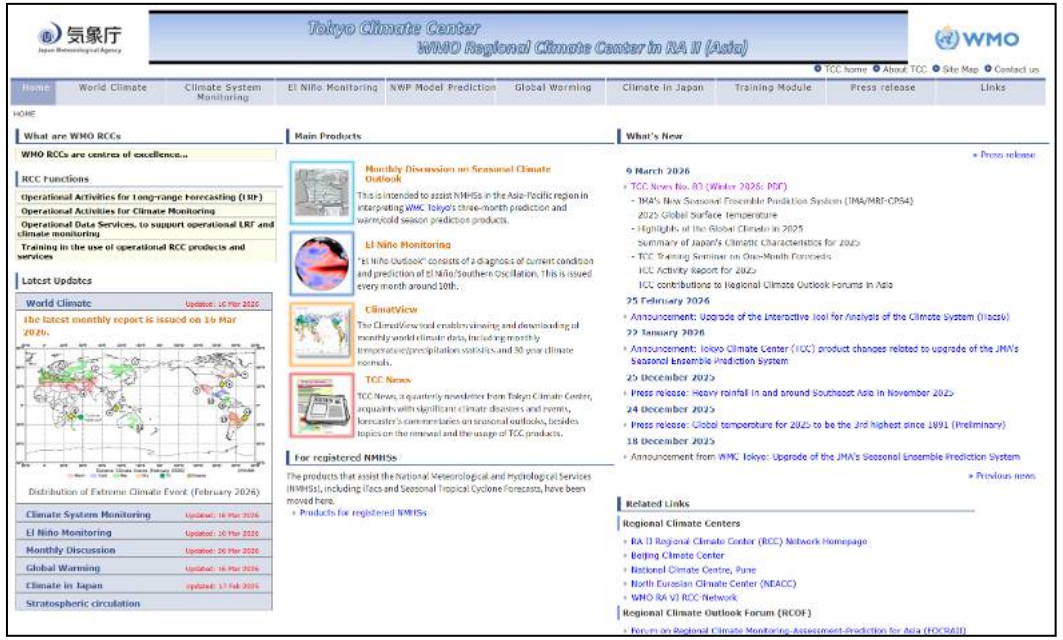
気象庁
Japan Meteorological Agency

Introduction of Recent Updates of Tokyo Climate Center (TCC)'s Services



TCC Website
https://www.data.jma.go.jp/tcc/tcc/index.html

YAMADA Ken

Tokyo Climate Center (TCC)
Japan Meteorological Agency (JMA)
tcc@met.kishou.go.jp

SASCOF-34
28 – 30 Apr. 2026, Male, Maldives

Today's topic

Overview of TCC/GPC's Products

Recent Updates of TCC/GPC's products

- New version of iTacs (version6) has been launched!
- Prediction System Update for One-month Guidance Tool
- TCC Advisory Panel on Extreme Climate Events
- Information of heavy rain in Southeast Asia
- Efforts toward the implementation of OSFs in EASCOF

For Reference: WMO Youth Action Plan

Today's topic

Overview of TCC/GPC's Products

Recent Updates of TCC/GPC's products

- New version of iTacs (version6) has been launched!
- Prediction System Update for One-month Guidance Tool
- TCC Advisory Panel on Extreme Climate Events
- Information of heavy rain in Southeast Asia
- Efforts toward the implementation of OSFs in EASCOF

For Reference: WMO Youth Action Plan

Overview of TCC/GPC's Products

- **RCC Tokyo (TCC; Tokyo Climate Center)** and **GPC-LRF/SSF (WMC) Tokyo** are collaborating to provide **various climate information/Tools** for National Meteorological and Hydrological Services (NMHSs) in Asia-Pacific region.

Sub-Seasonal(1,2,3-4week) forecasts

Long-range(1,3,6month) forecasts

Reanalysis data

El Niño Monitoring and Outlook

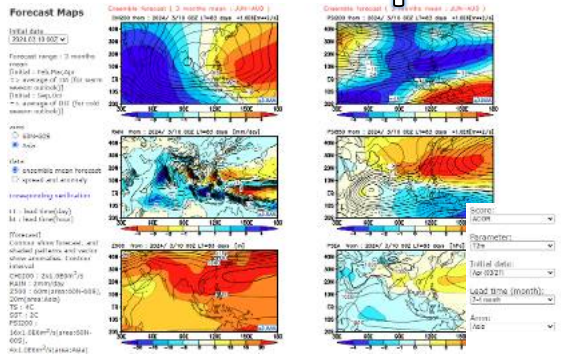
Climate System Monitoring

Global Warming Monitoring and Projection

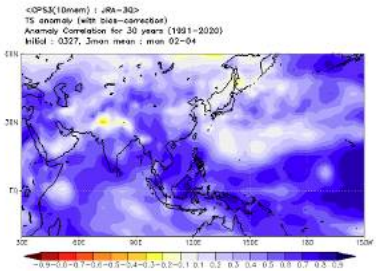
Climate Risk Management

TCC(RCC Tokyo), NWP(GPC-LRF/SSF Tokyo)

Forecast Maps

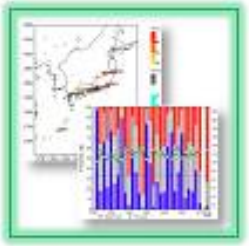


Verification Maps

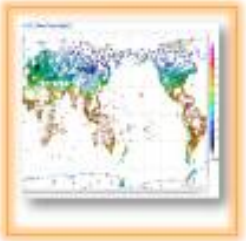


iTacs

Guidance Tool



ClimatView



Etc...

Today's topic

Overview of TCC/GPC's Products

Recent Updates of TCC/GPC's products

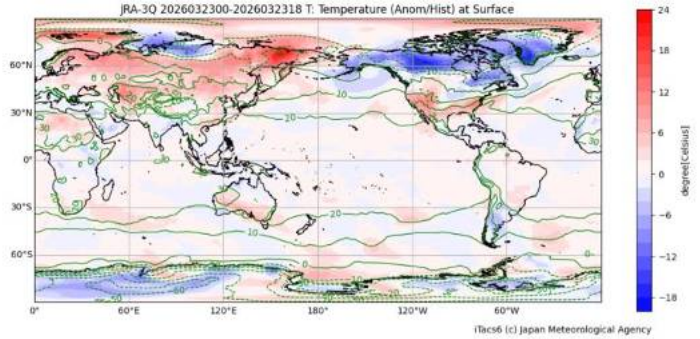
- New version of iTacs (version6) has been launched!
- Prediction System Update for One-month Guidance Tool
- TCC Advisory Panel on Extreme Climate Events
- Information of heavy rain in Southeast Asia
- Efforts toward the implementation of OSFs in EASCOF

For Reference: WMO Youth Action Plan

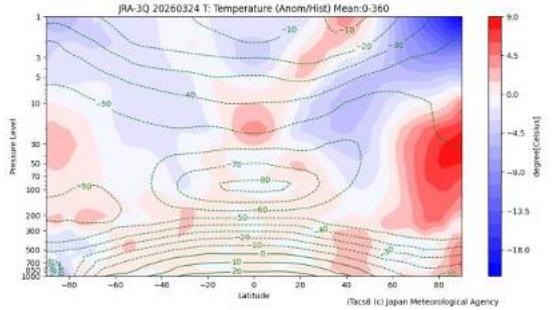
New version of iTacs (version6) has been launched!

- TCC provide iTacs, a **web-based application for climate data visualization and analysis**, offering a wide range of figures and statistical analyses.
- New iTacs (iTacs6) offers a more **intuitive drawing experience with an improved UI** and is built on a Python-based framework.
- Although iTacs6's functions are limited at first (e.g. Regression, Trend analysis), **full functionality of iTacs6 is expected to be released in mid-2026**.

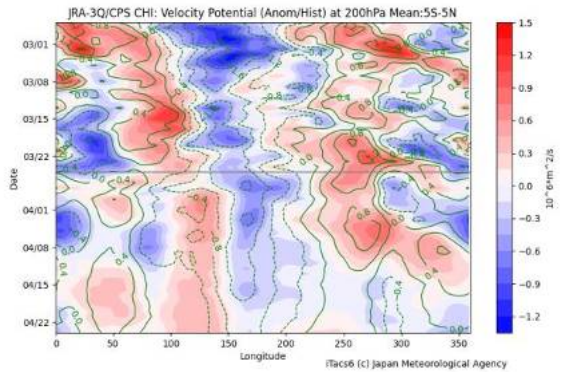
Horizontal map



https://extreme.kishou.go.jp/itacs6/itacs.html



Vertical cross section

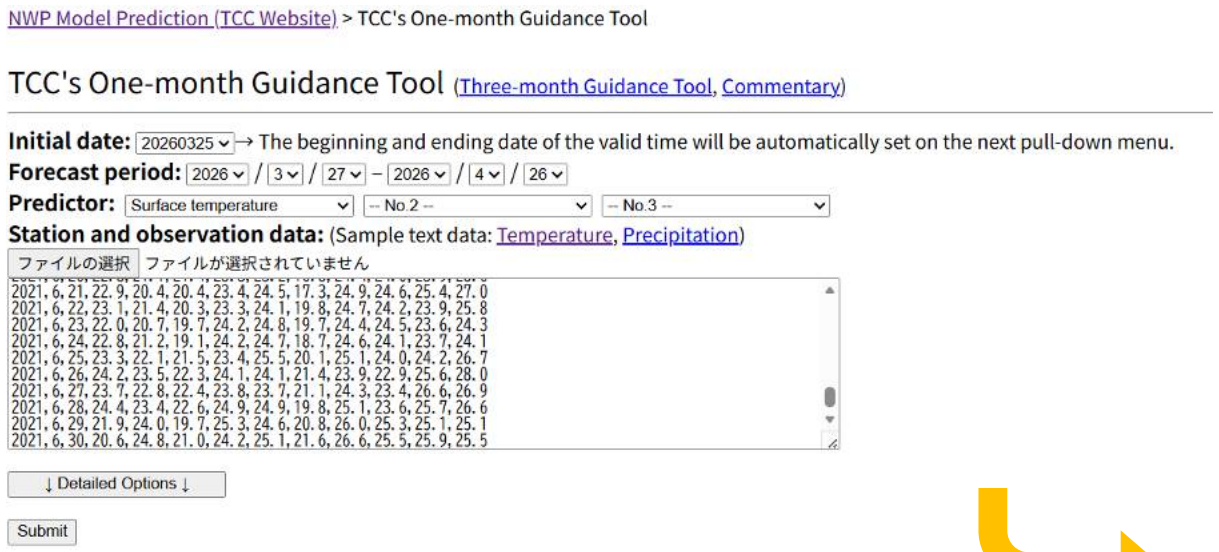


Time cross section

NOTE: iTacs5 ID/password is no longer usable. **To use iTacs6, please contact us for the new ID/password**.

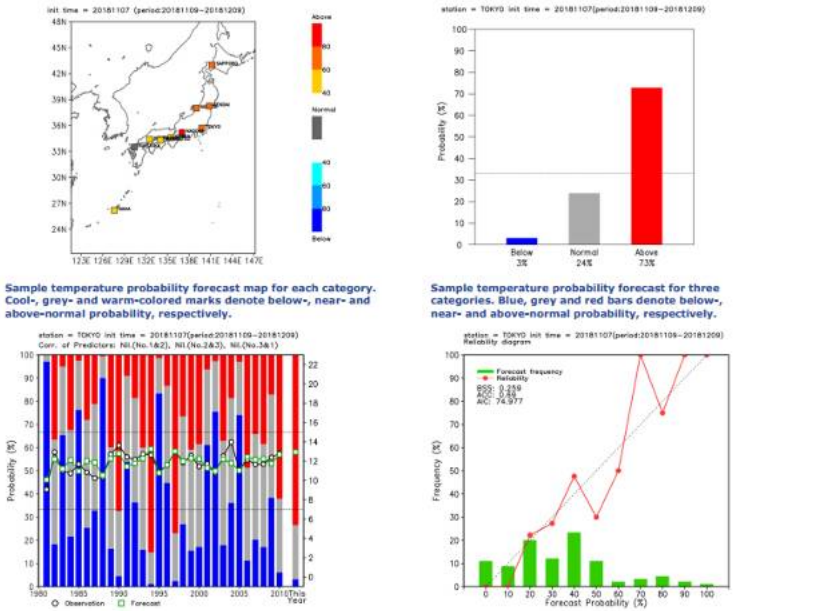
Prediction System Update for One-month Guidance Tool

- TCC provide One/Three-month Guidance Tool, which enables guidance (statistical post-processing) calculation in simple steps.
- **The prediction system used for One-month Guidance Tool has been changed** from the JMA's Global Ensemble Prediction System (GEPS) to the JMA's Seasonal Ensemble Prediction System (JMA/MRI-CPS4), which is based on the coupled ocean-atmosphere general circulation model.



https://extreme.kishou.go.jp/cgi-bin/simple_guidance/index.cgi

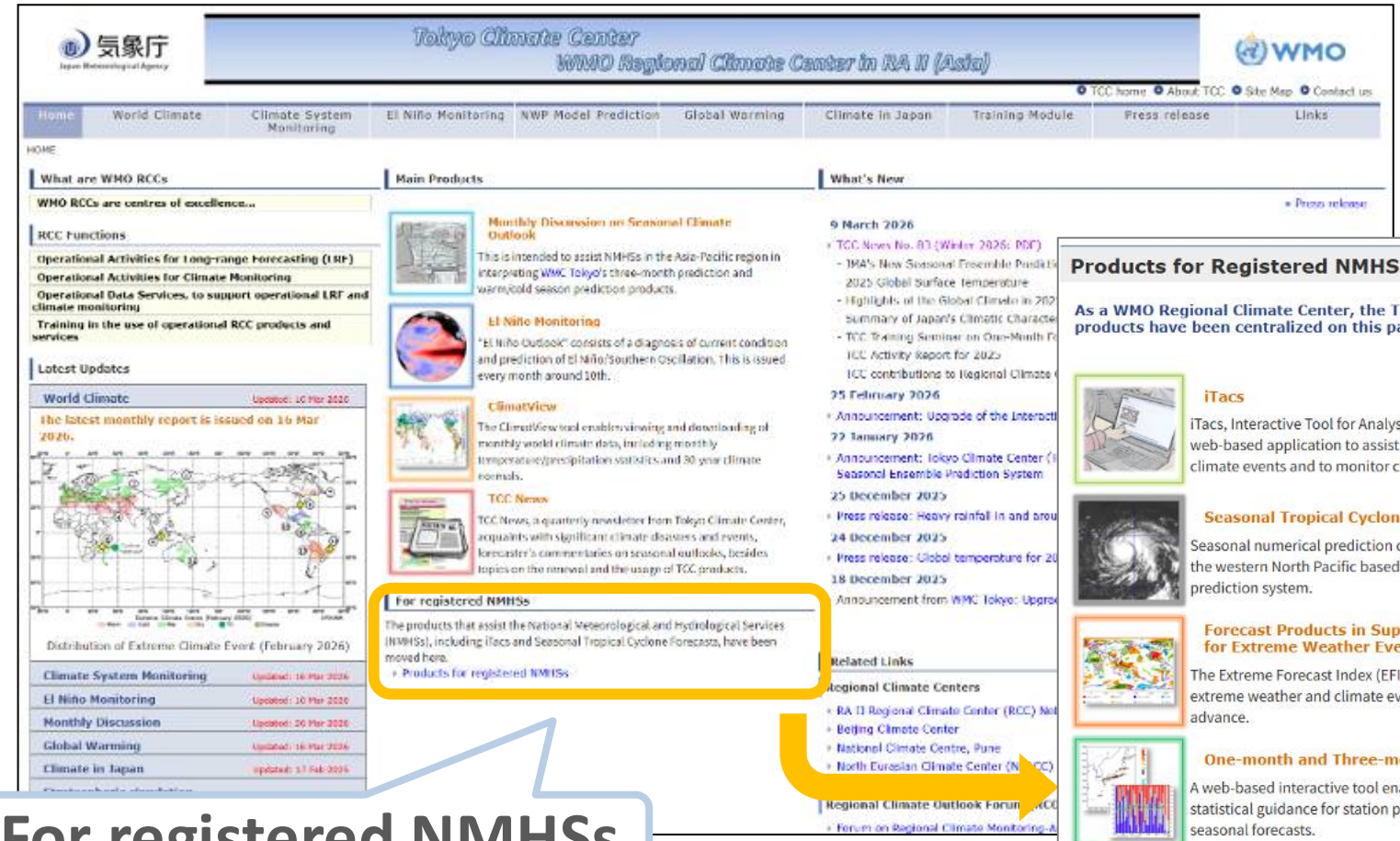
Probability : Temperature, Precipitation



Verification: Time series of probability, Reliability diagram

How to access iTacs6 and Guidance Tool

- TCC Website layout has been slightly updated.



iTacs

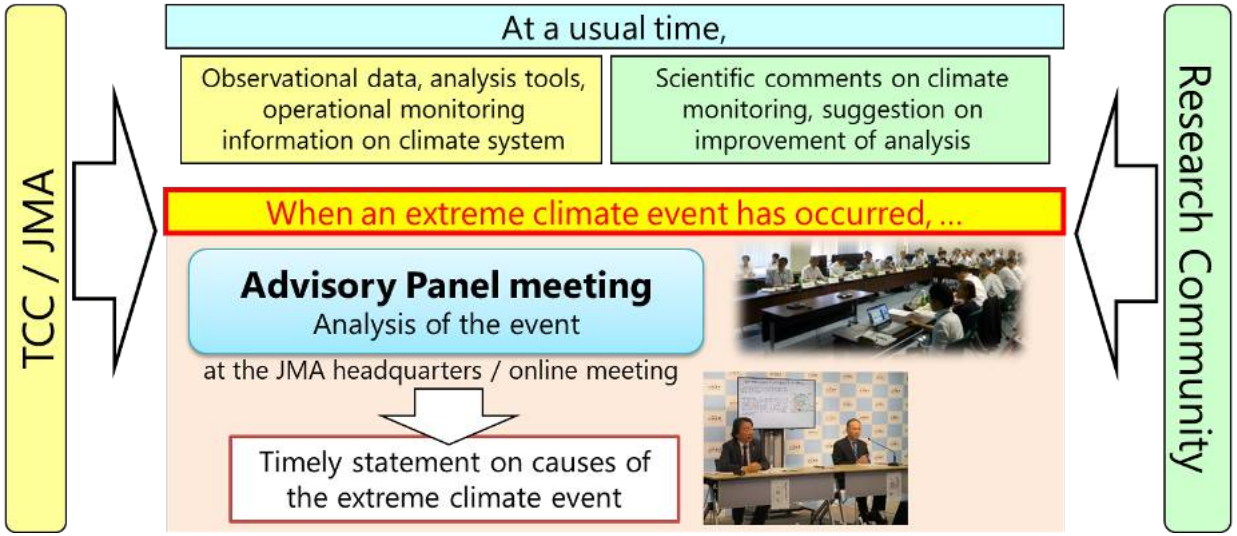
Guidance Tool

For registered NMHSs

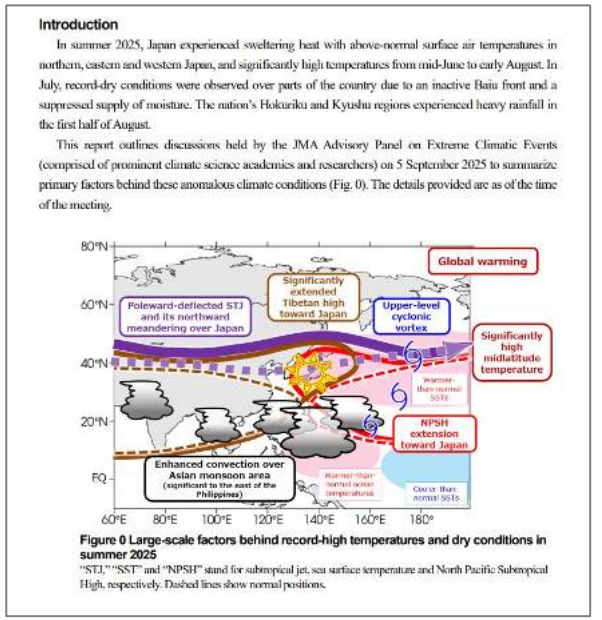
TCC Website
https://www.data.jma.go.jp/tcc/tcc/index.html

TCC Advisory Panel on Extreme Climate Events

- The TCC Advisory Panel on Extreme Climatic Events is a JMA body composed of prominent climate science experts.
  - **Routine phase:** Information sharing on the climate system
  - **Event-driven phase:** Advisory panel meeting and provision of a timely assessment
  - **Post-event phase:** Publication of analysis results as a paper (e.g., Takemura *et al.*, 2025, Sato *et al.*, 2024, etc.)
- In 2025, an extraordinary meeting was held regarding **record-high summer temperatures over Japan**, etc., and a special report was issued.



https://ds.data.jma.go.jp/tcc/tcc/news/index.html
https://ds.data.jma.go.jp/tcc/tcc/products/clisys/reports/index.html


Introduction

In summer 2025, Japan experienced sweltering heat with above-normal surface air temperatures in northern, eastern and western Japan, and significantly high temperatures from mid-June to early August. In July, record-dry conditions were observed over parts of the country due to an inactive Baiu front and a suppressed supply of moisture. The nation's Hokuriku and Kyushu regions experienced heavy rainfall in the first half of August.

This report outlines discussions held by the JMA Advisory Panel on Extreme Climatic Events (comprised of prominent climate science academics and researchers) on 5 September 2025 to summarize primary factors behind these anomalous climate conditions (Fig. 0). The details provided are as of the time of the meeting.

Figure 0 Large-scale factors behind record-high temperatures and dry conditions in summer 2025

"STJ," "SST" and "NPSH" stand for subtropical jet, sea surface temperature and North Pacific Subtropical High, respectively. Dashed lines show normal positions.

Special report

Information of heavy rain in Southeast Asia

- **TCC issued a special report on Heavy rainfall in and around Southeast Asia in November 2025** for supporting NMHSs in the region with the support of the TCC Advisory Panel.

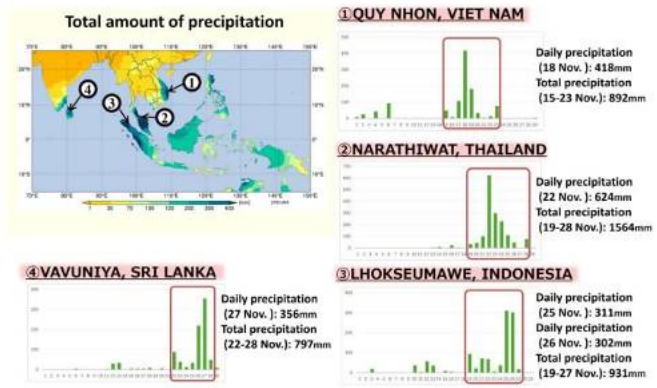


Figure 1. Precipitation over Southeast and South Asia in late November 2025
Top left: Total precipitation (unit: mm) from 15 to 29 November 2025. Right/bottom left: Time-series representation of daily precipitation at individual observation stations, together with observed precipitation amounts. Red boxes: periods of approx. 10 mm+ precipitation. Days based on 00:00 UTC. Based on SYNOP reports submitted from NMHSs around the world.

Table 1. Observed precipitation
Based on SYNOP reports submitted from NMHSs around the world.

Country	Observation Station	Period	Total Precipitation (mm)	Maximum Daily Precipitation (mm)
VIET NAM	QUY NHON	15-23 Nov.	892	418
	NHA TRANG	15-21 Nov.	537	172
THAILAND	NARATHIWAT	19-28 Nov.	1564	624
	PATTANI	18-28 Nov.	1510	338
	HAT YAI AIRPORT	19-26 Nov.	1282	370
MALAYSIA	KOTA BHARU	19-25 Nov.	1188	486
	KUALA LUMPUR	20-28 Nov.	374	128
INDONESIA	LHOKSEUMAWE	19-27 Nov.	931	311
	BANDA ACEH	21-27 Nov.	290	147
SRI LANKA	VAVUNIYA	22-28 Nov.	797	356
	TRINCOMALEE	20-27 Nov.	583	236

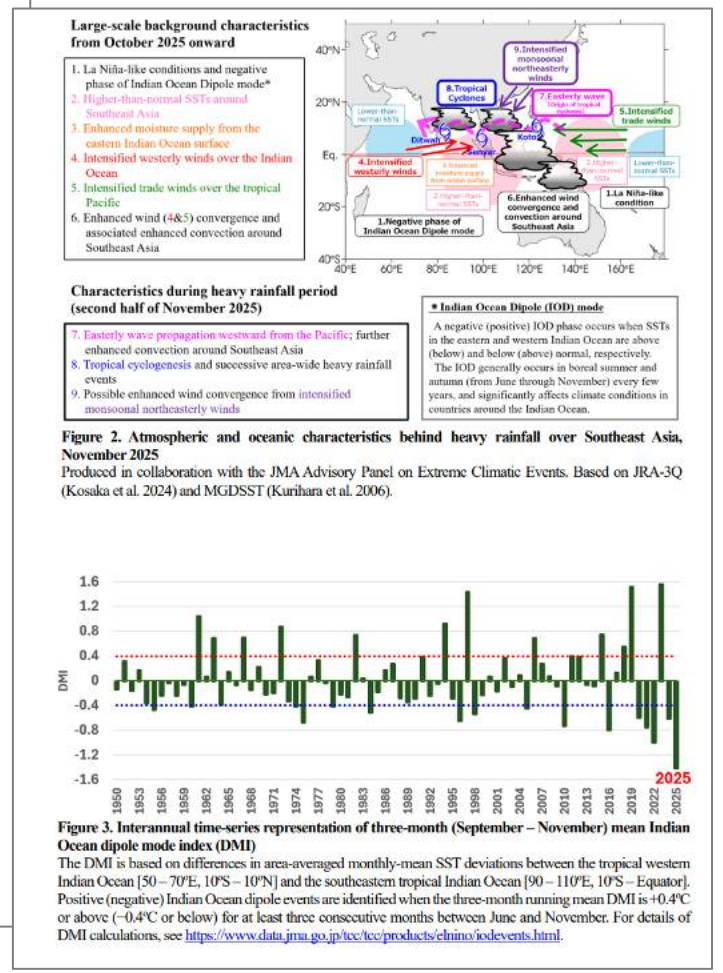


Figure 2. Atmospheric and oceanic characteristics behind heavy rainfall over Southeast Asia, November 2025
Produced in collaboration with the JMA Advisory Panel on Extreme Climatic Events. Based on JRA-3Q (Kosaka et al. 2024) and MGDSST (Kurihara et al. 2006).

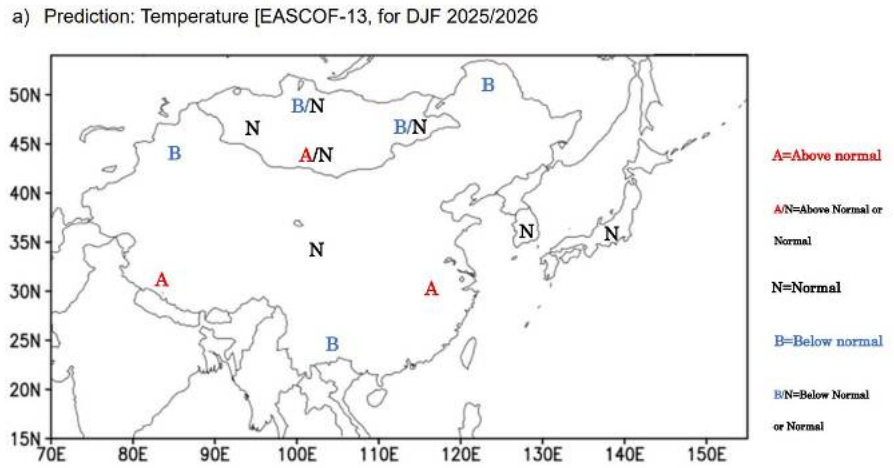
Figure 3. Interannual time-series representation of three-month (September – November) mean Indian Ocean dipole mode index (DMI)
The DMI is based on differences in area-averaged monthly-mean SST deviations between the tropical western Indian Ocean [50 – 70°E, 10°S – 10°N] and the southeastern tropical Indian Ocean [90 – 110°E, 10°S – Equator]. Positive (negative) Indian Ocean dipole events are identified when the three-month running mean DMI is +0.4°C or above (−0.4°C or below) for at least three consecutive months between June and November. For details of DMI calculations, see https://www.data.jma.go.jp/tcc/tcc/products/elnino/iodevents.html.

https://www.data.jma.go.jp/tcc/data/news/press_20251225.pdf

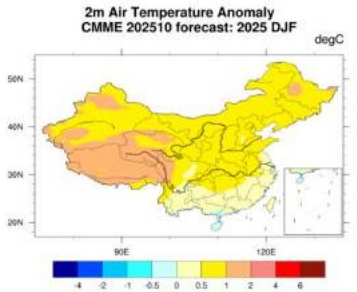
Efforts toward the implementation of OSFs in EASCOF

- EASCOF (East Asia winter Climate Outlook Forum) has been seeking the optimal style of objective seasonal forecasts (OSF), taking into account the circumstances specific to EASCOF.
- To ensure a certain level of traceability and reproducibility of seasonal outlook, **forecast maps based on numerical models are included in summary report of EASCOF-13**, held in Mongolia in November 2025.
- The EASCOF-14 is scheduled to be held in Tokyo in autumn 2026.

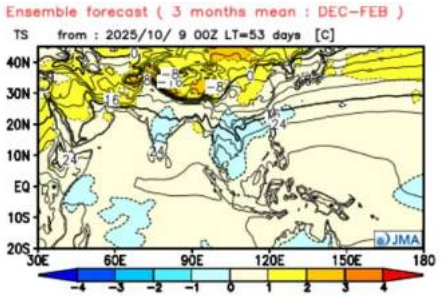
Seasonal Prediction of the East Asian Winter Monsoon (temperature)



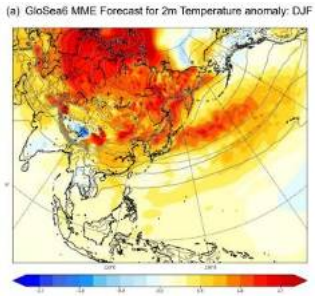
Forecast maps provided by each organization



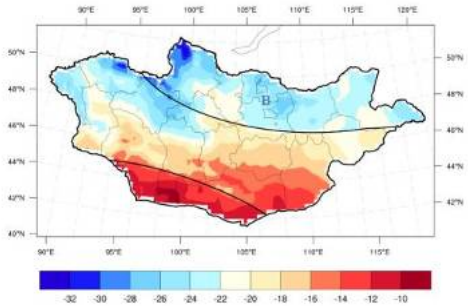
CMA (China)



JMA (Japan)



KMA (Republic of Koria)



NAMEM (Mongolia)

https://www.data.jma.go.jp/tcc/tcc/library/EASCOF/2025/index.html

Today's topic

Overview of TCC/GPC's Products

Recent Updates of TCC/GPC's products

- New version of iTacs (version6) has been launched!
- Prediction System Update for One-month Guidance Tool
- TCC Advisory Panel on Extreme Climate Events
- Information of heavy rain in Southeast Asia
- Efforts toward the implementation of OSFs in EASCOF

For Reference: WMO Youth Action Plan

For Reference: WMO Youth Action Plan

- The 1st WMO Youth Focal Point Coordination Meeting was held in January 2026 at JMA Headquarters in Tokyo.
- The gathering followed the adoption of the WMO Youth Action Plan at the extraordinary Congress in October 2025, seeking to enhance productive youth engagement in the activities of WMO and NMHSs.
- The event served as a platform for discussions on concrete action toward the plan's implementation.

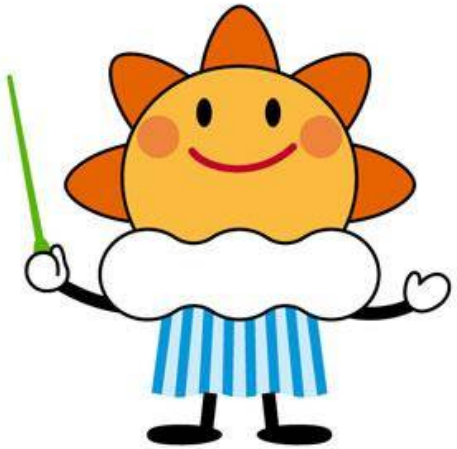
Thank You !!

Information on Tokyo Climate Center

Mailing Address : Tokyo Climate Center
Climate Prediction Division
Atmosphere and Ocean Department
Japan Meteorological Agency
3-6-9 Toranomon, Minato City, Tokyo 105-8431
Japan

Web Site : https://ds.data.jma.go.jp/tcc/tcc/index.html

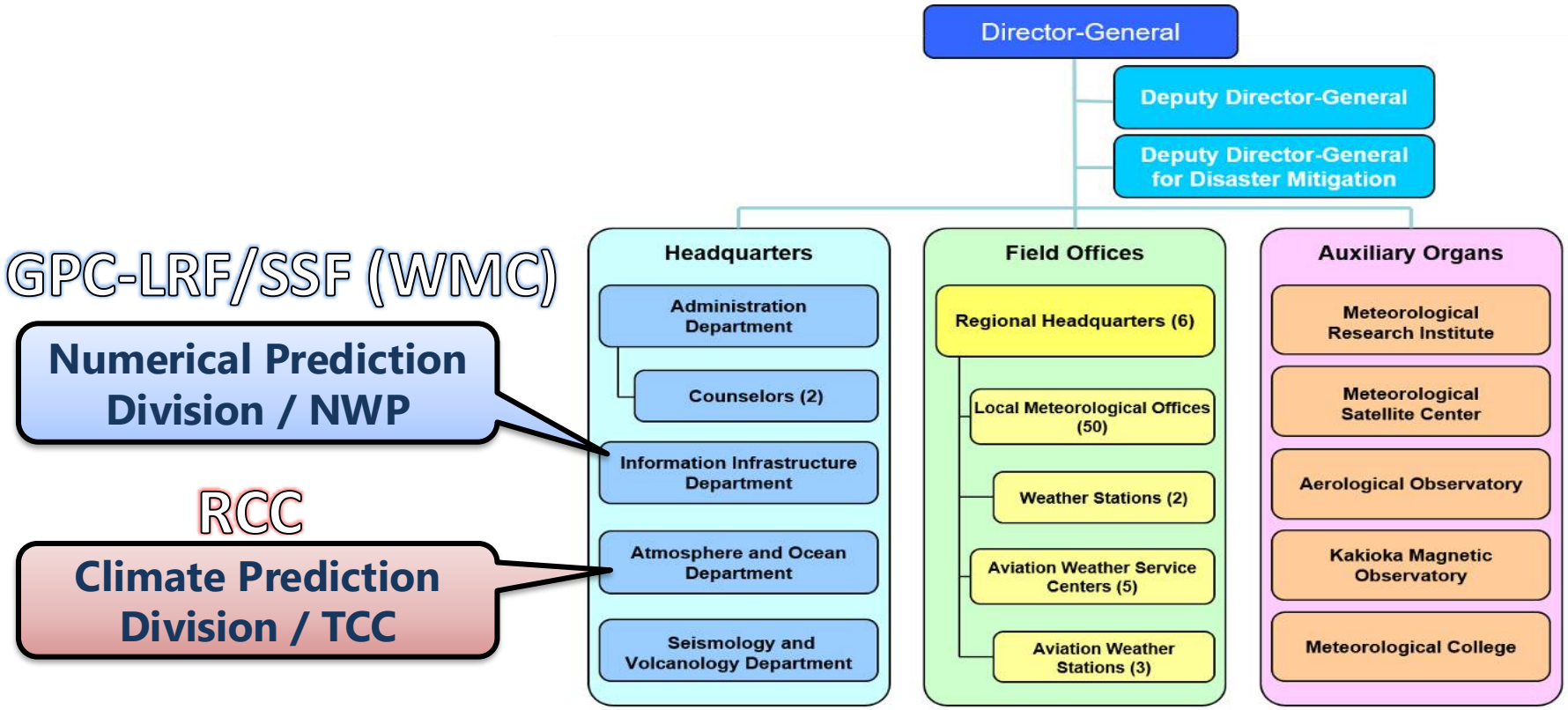
E-mail : tcc@met.kishou.go.jp



SUPPLEMENTAL MATERIAL

Structure of the Japan Meteorological Agency

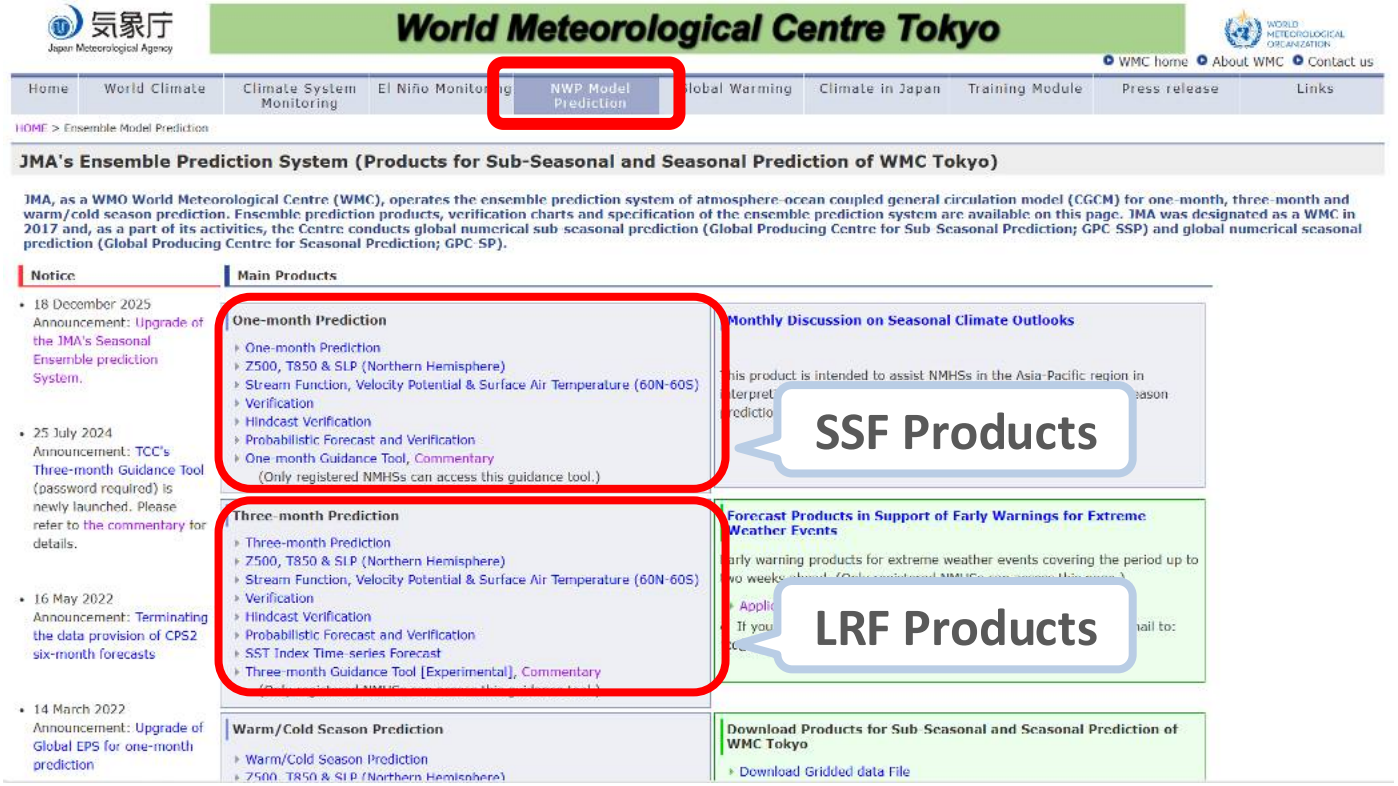
- **GPC-LRF/SSF(WMC) Tokyo** and **RCC Tokyo** belong to the different divisions of the "**NWP, Information Infrastructure Department**" and "**TCC, Atmosphere and Ocean Department**", respectively.
- **GPC-LRF/SSF(WMC) Tokyo** and **RCC Tokyo** are collaborating to provide climate information.



https://www.jma.go.jp/jma/en/Background/organization.html

GPC-LRF/SSF's forecast products

- JMA serves as a WMO Global Producing Centre for Long-range/Sub-Seasonal Forecasts (GPC-LRF/SSF Tokyo).
- LRF products consist of 3-month and warm/cold season forecasts, SSF products is composed of 1,2,3-4week forecasts.
- Forecast and verification products of GPC-LRF/SSF Tokyo are accessible from the TCC website.

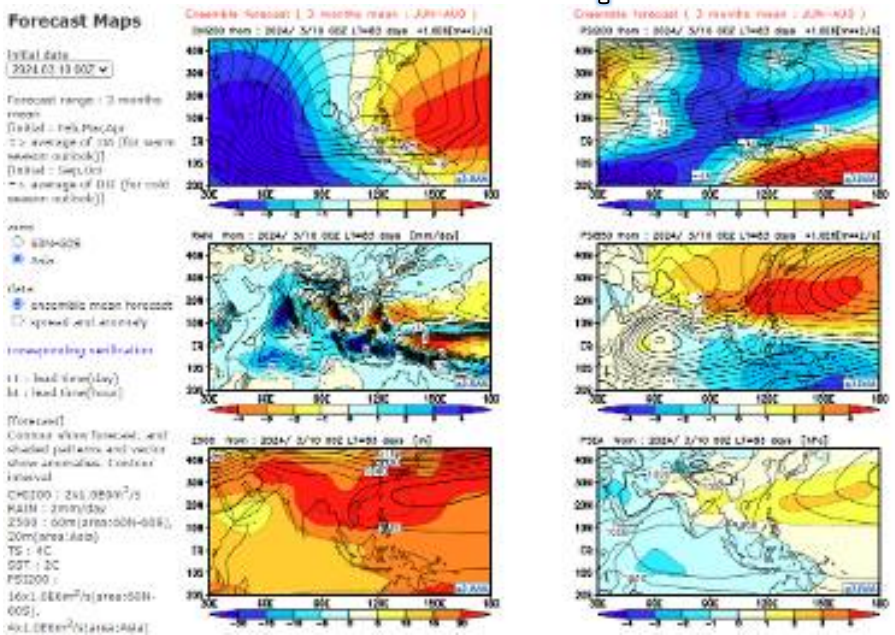


https://www.data.jma.go.jp/wmc/products/model/index.html

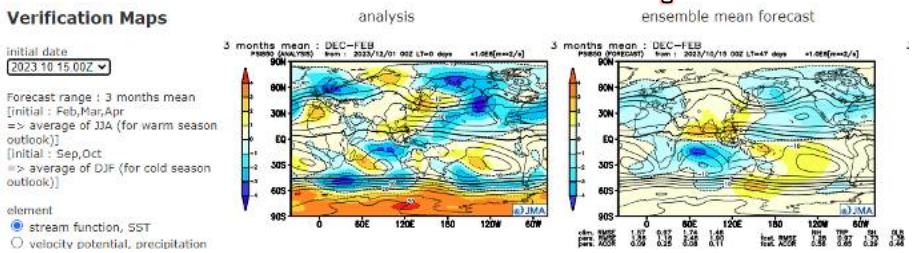
Forecast and verification maps

- JMA provides ensemble forecasts and the related verification maps. The verification results using the re-forecast (hindcast) dataset are also available to conduct **the predictability assessments**.

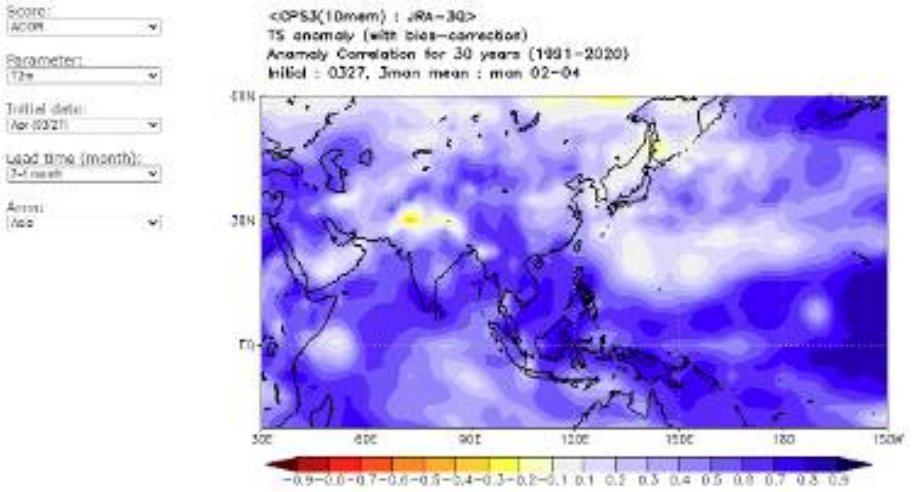
Forecast Maps



Verification Maps



Re-forecast Verification



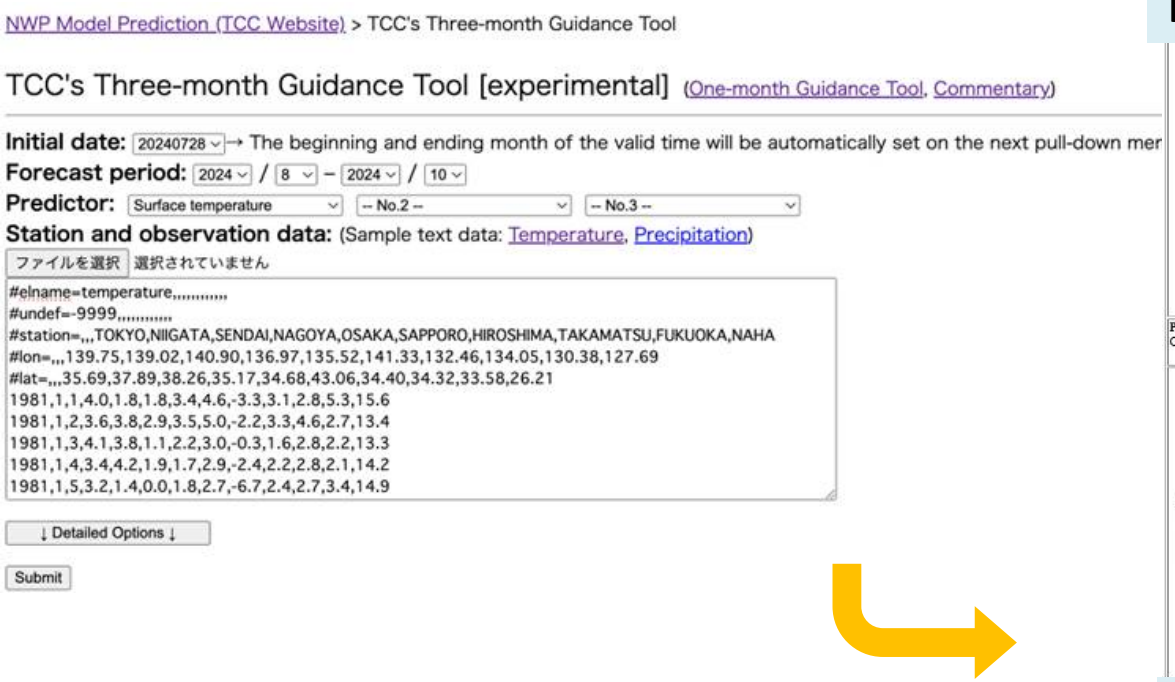
Update Date of forecast maps

- One-month Forecast: Every Thursday
- Three-month Forecast: Every month
- Warm season Forecast: Feb., Mar. and Apr.
- Cold season Forecast: Sep. and Oct.

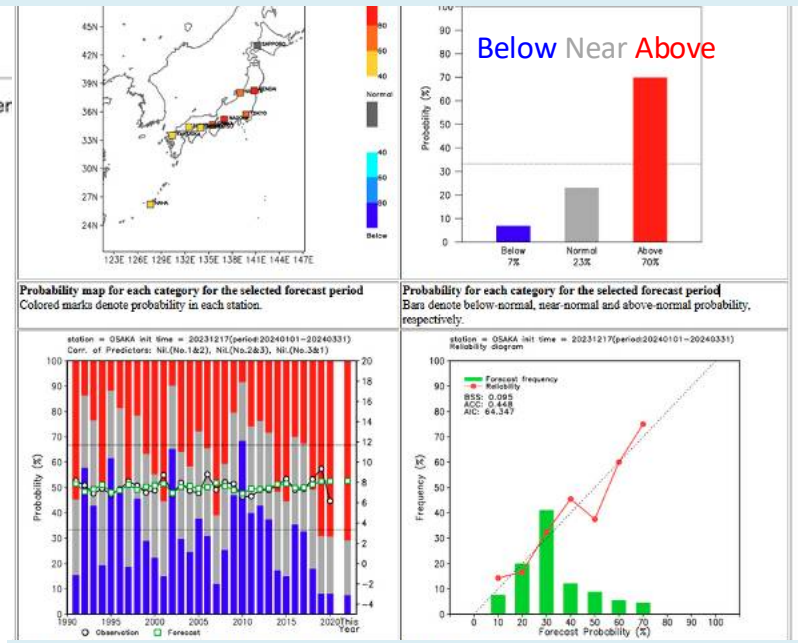
https://www.data.jma.go.jp/wmc/products/model/index.html

Three-month Guidance Tool (Experimental)

- Time-series data from past observations (temperature and precipitation) and previous CPS3 forecasts (i.e., hindcasts) are used to produce the guidance.
- Statistical relations are estimated by multiple linear regression modeling using these two data types for the verification period (30-year period from 1991 to 2020 by default). The results are used to calculate current values in real-time forecasts.



Probability : Temperature, Precipitation



Verification: Time series of probability, Reliability diagram

Capacity Development

TCC conducts annual training seminars as part of capacity-development activities related to its role as an RCC in RA II.

- TCC held a training seminar on one-month forecasts in late January (online) and from 3 to 6 February (in-person at JMA headquarters) 2026. It was attended by 13 trainees from NMHSs in Asia.
- The seminar focused on climate system expertise and on skills in the analysis of atmospheric circulation fields and generation of one-month forecasts using the Interactive Tool for Analysis of the Climate System (iTacs) and the one-month guidance tool provided by TCC.
- All attendees gave final presentations on one-month forecasting in their respective countries and engaged in fruitful discussions with TCC staff.


(FY2025 Seminar)

(FY2025 Seminar)

TCC also arranges expert visits to and hosts visitors from NMHSs to support exchanges of views on climate services and the effective transfer of technology.

- (Aug. 2024) Experts Visit to NCHM Bhutan.
  Content encompassed training on medium-to-long range forecasts and use of TCC resources, including iTacs and TCC's Three-month Guidance Tool.
- These activities are planned to continue in 2026.


(NCHM Bhutan in Aug. 2024)

JRA-3Q: Reanalysis for Three Quarters of a Century

- JMA is currently conducting the Japanese Reanalysis for Three-Quarters of a Century (JRA-3Q; Kosaka et al. 2024), which covers the period from September 1947 onward.
- JRA-3Q data are provided to users from several sites such as DIAS (https://search.diasjp.net/en/dataset/JRA3Q) and NCAR.

History of JMA Reanalysis data

JRA-25 (Co-project with CRIEPI)
(1979-2004)

JRA-55 (JRA Go! Go!) (1958-2022)

JRA-3Q (Three quarters)(1947-)

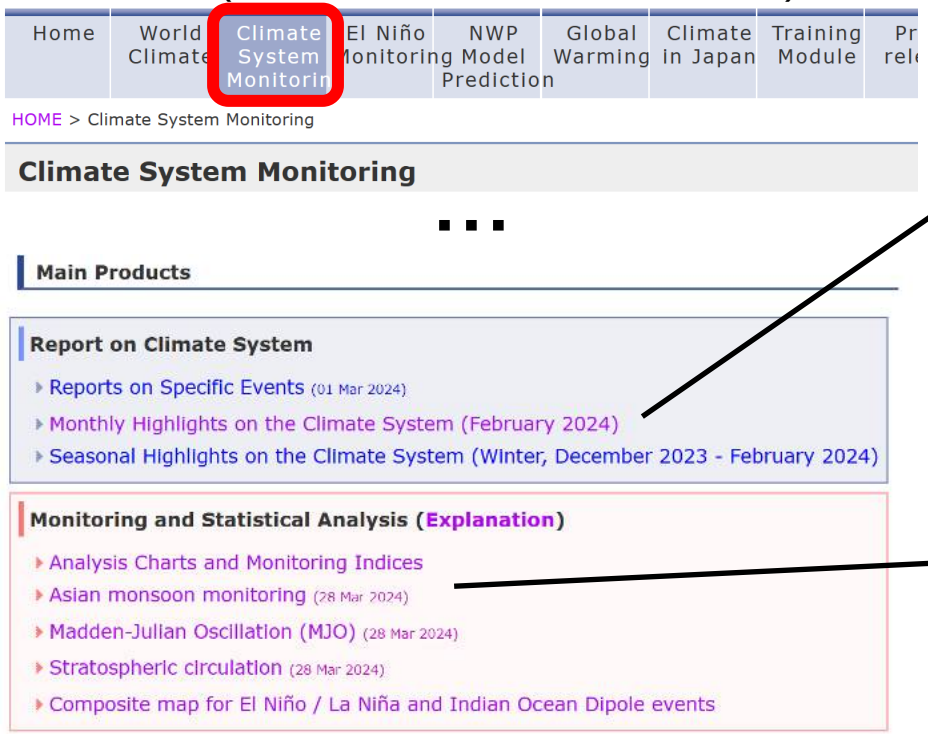
サン(3)キュー(Q)!
Thank you!

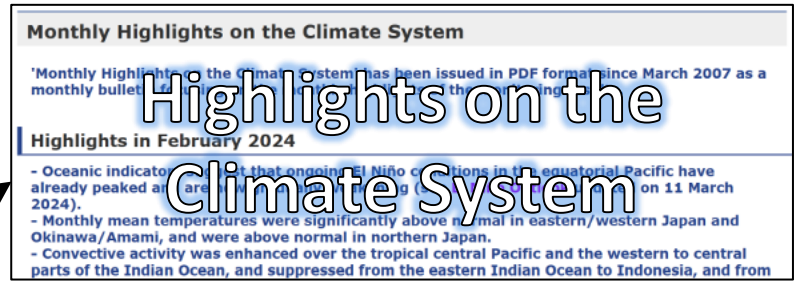
	JRA-55	JRA-3Q
Period	1958~	1947~
System	JMA's as of Dec2009	JMA's as of Dec. 2018
H. resol.	T_L319 (~55 km)	T_L479 (~40 km)
Levels	60 levels up to 0.1 hPa	100 levels up to 0.01 hPa
Scheme	4D-Var (T106 inner)	4D-Var (T_L319 inner res.)
Rad. temp. bias corr.	~2006: RAOBCORE V1.4 2007~: RAOBCORE V1.5	RISE (RICH with solar elevation dependent) v1.7.2
Sat. Rad	RTTOV-9.3	RTTOV-10.2
Land surf,	Offline SiB	Cycle of land surf. forecast
SST and sea ice	COBE-SST: 1deg	MGDSST (0.25-degree): 1985~ COBE-SST2 (1deg): ~1990
Ozone	MRI-CCM1(T42L68)1979~ Climatology: ~1978	MRI-CCM2(T_L159L64) offline

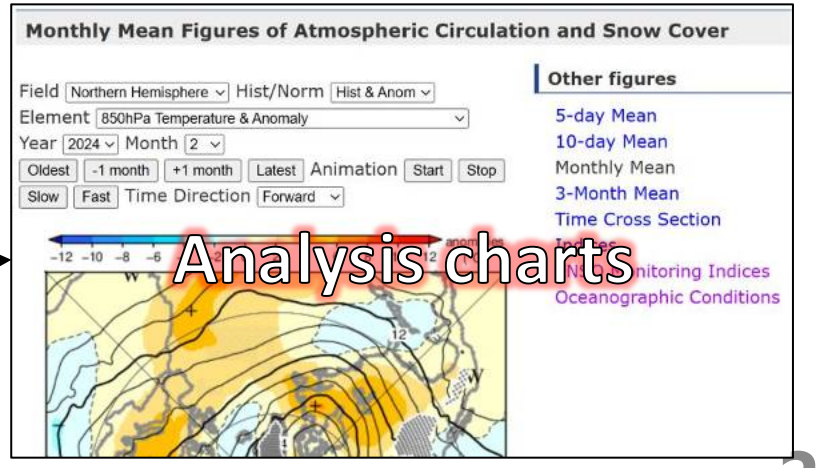
https://jra.kishou.go.jp/JRA-3Q/index_en.html

Climate System Monitoring using JRA-3Q

- JMA monitors the climate system focusing on atmospheric circulation, tropical convection, oceanographic conditions, and snow cover to understand/explain background factors of the present climate conditions.
- In May 2023, the products were refined to those based on **JRA-3Q** and the related oceanographic dataset (COBE-SST2 (Hirahara et al. 2014), MGDSST (Kurihara et al. 2006), and MOVE/MRI.COM-G3). The products based on the outgoing longwave radiation (OLR) were also updated to those based on the new dataset (NOAA/CPC Blended OLR).







https://www.data.jma.go.jp/tcc/tcc/products/clisys/

Climate Change in Japan 2025

- In March 2025, Ministry of Education, Culture, Sports, Science and Technology（MEXT) and JMA published **Climate Change in Japan 2025** summarizing a physical science basis to serve as essential information for climate change action by the public, commercial enterprises and local/national government bodies.
- The main publication provides an **overview of observed/projected climate change.** Related content (in Japanese) includes:

➢ Details: More detailed information (including evidence and references) intended for use by researchers and experts considering countermeasures in individual fields

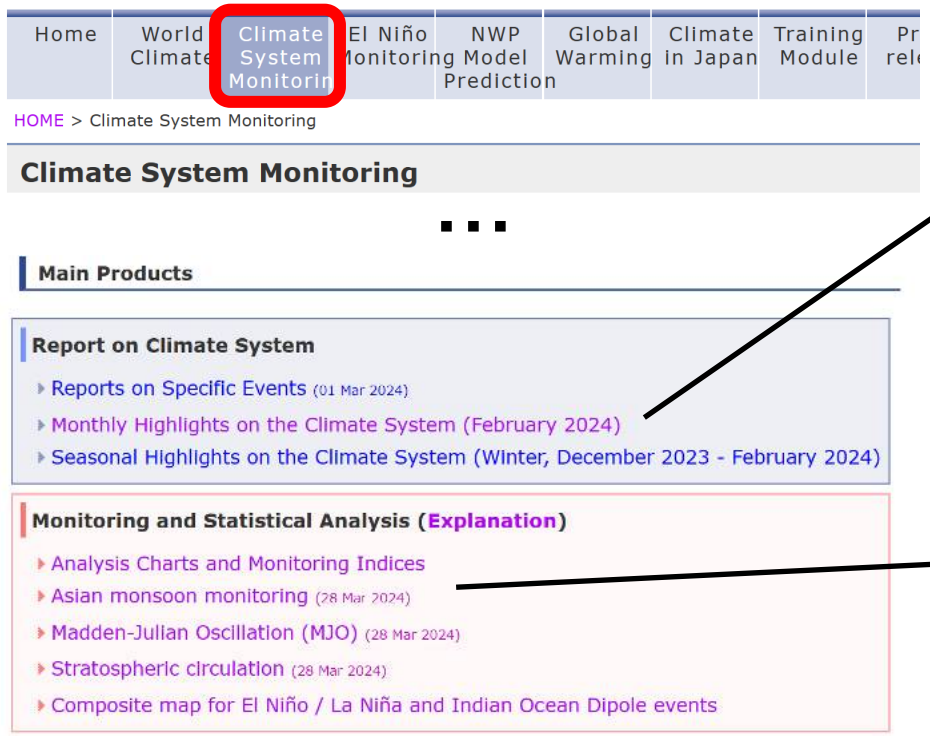
➢ Summary : Simplified slides of the main publication intended for use as-is in study sessions, presentations and other work

➢ Leaflets by prefecture: Double-page leaflets providing overviews of observed/projected climate change for individual regions

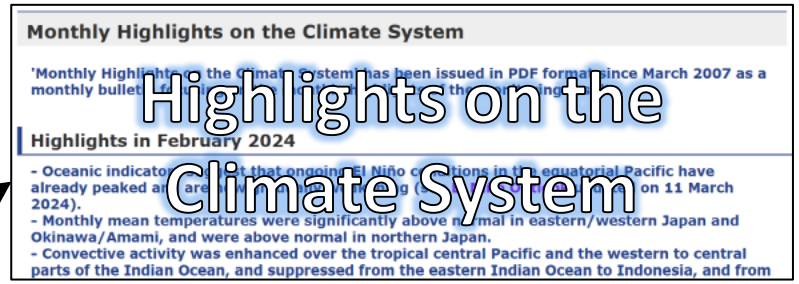
https://www.data.jma.go.jp/cpdinfo/ccj/2025/pdf/cc2025_gaiyo_en.pdf

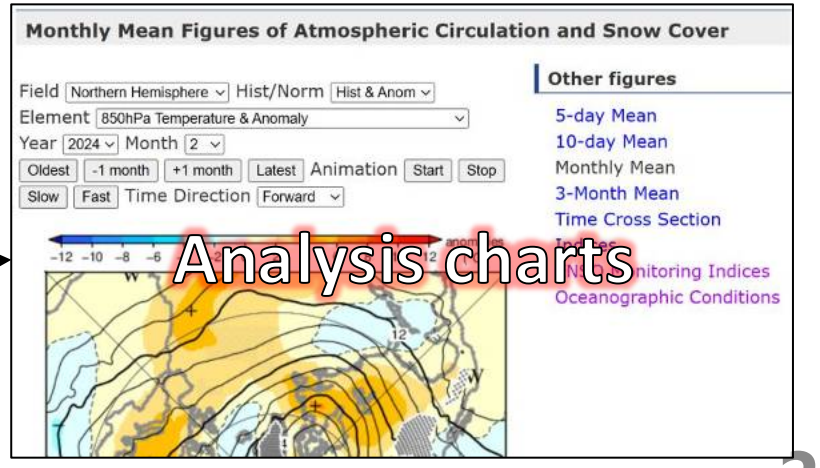
Climate System Monitoring

- JMA monitors the climate system focusing on atmospheric circulation, tropical convection, oceanographic conditions, and snow cover to understand background factors of the present climate conditions.
- In 2023, the products based on JRA-3Q and the related oceanographic dataset (COBE-SST2 (Hirahara et al. 2014), MGDSST (Kurihara et al. 2006), and MOVE/MRI.COM-G3) were launched in May 2023. The products based on the outgoing longwave radiation (OLR) from January 1991 were also updated to those based on the new dataset (NOAA/CPC Blended OLR).



https://www.data.jma.go.jp/tcc/tcc/products/clisys/



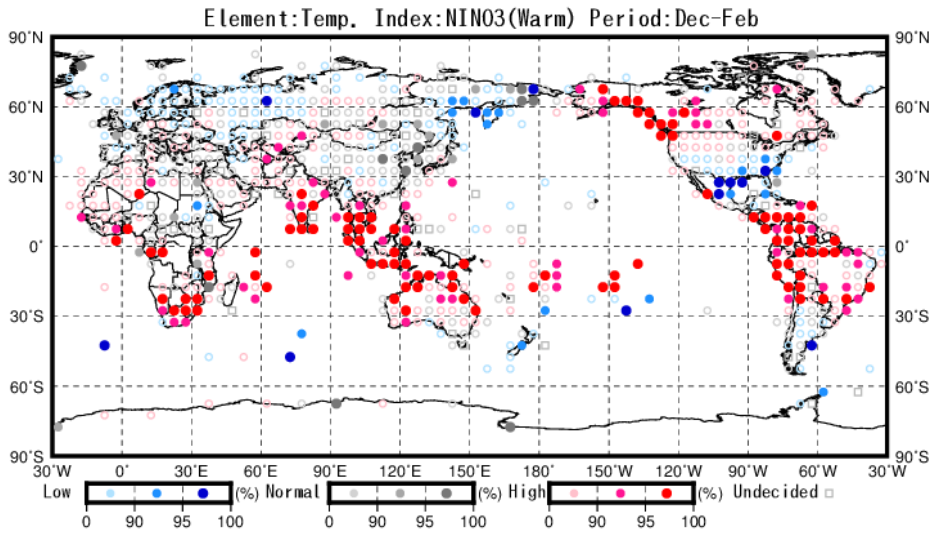


Assessment of ENSO's impact on the climate

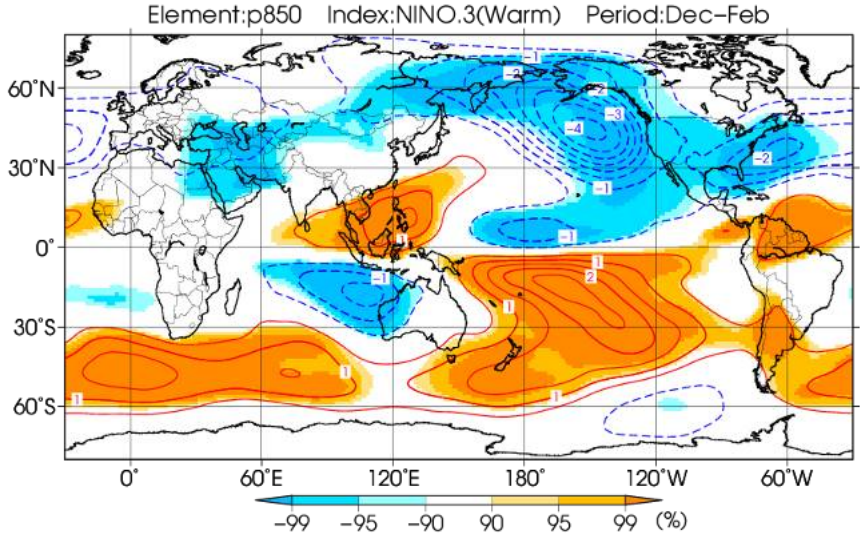
- To promote the understanding of the influence of ENSO on the global climate system, TCC provides statistical analysis results using the observation (CLIMAT reports) and the reanalysis data.
- In 2023, TCC updated the statistical results based on the new reanalysis dataset of JRA-3Q, which covers the period from 1948 to 2021.

Composite anomalies in DJF in El Nino years

Surface temperature anomalies (CLIMAT reports)



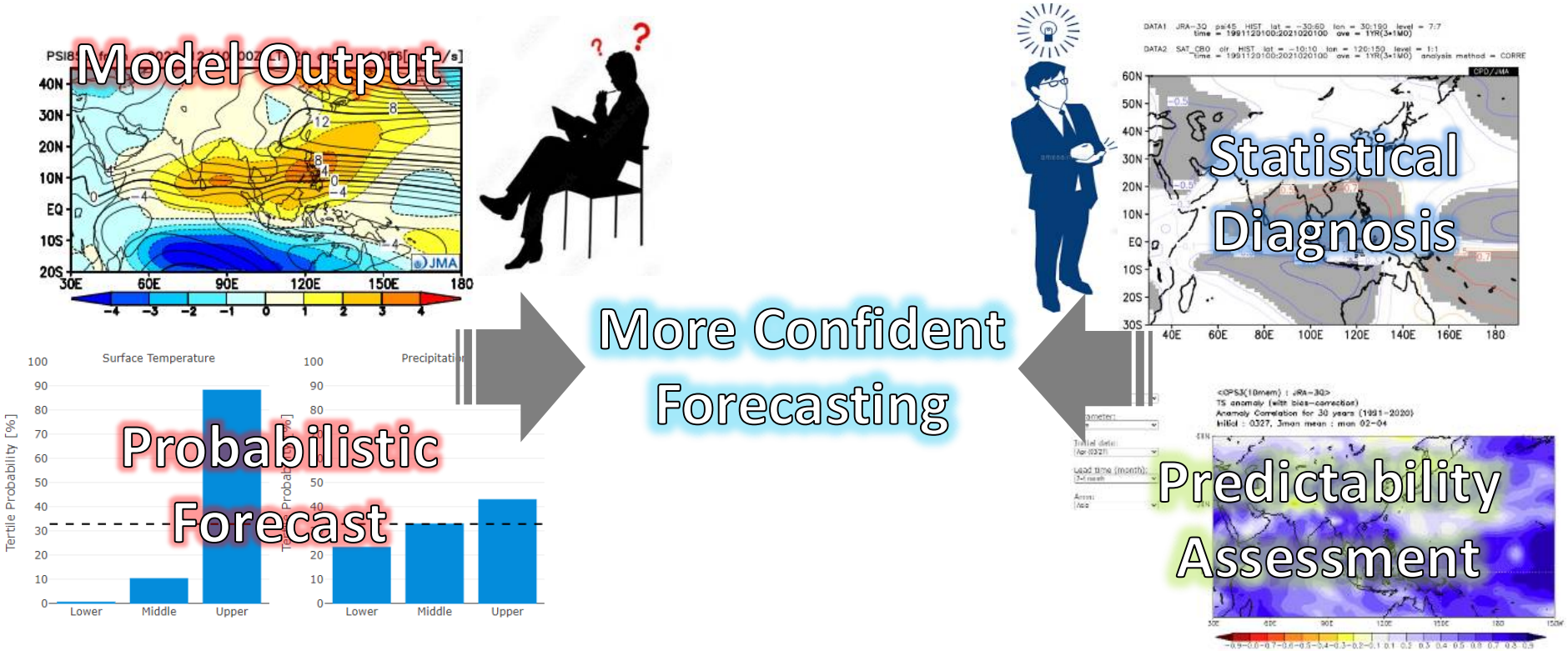
850hPa stream function anomalies (JRA-3Q)



World Climate Atmospheric Circulation
https://www.data.jma.go.jp/tcc/tcc/products/climate/ENSO/index.htm
https://www.data.jma.go.jp/tcc/tcc/products/clisys/enso_statistics/index.html

TCC Capacity Development Activities

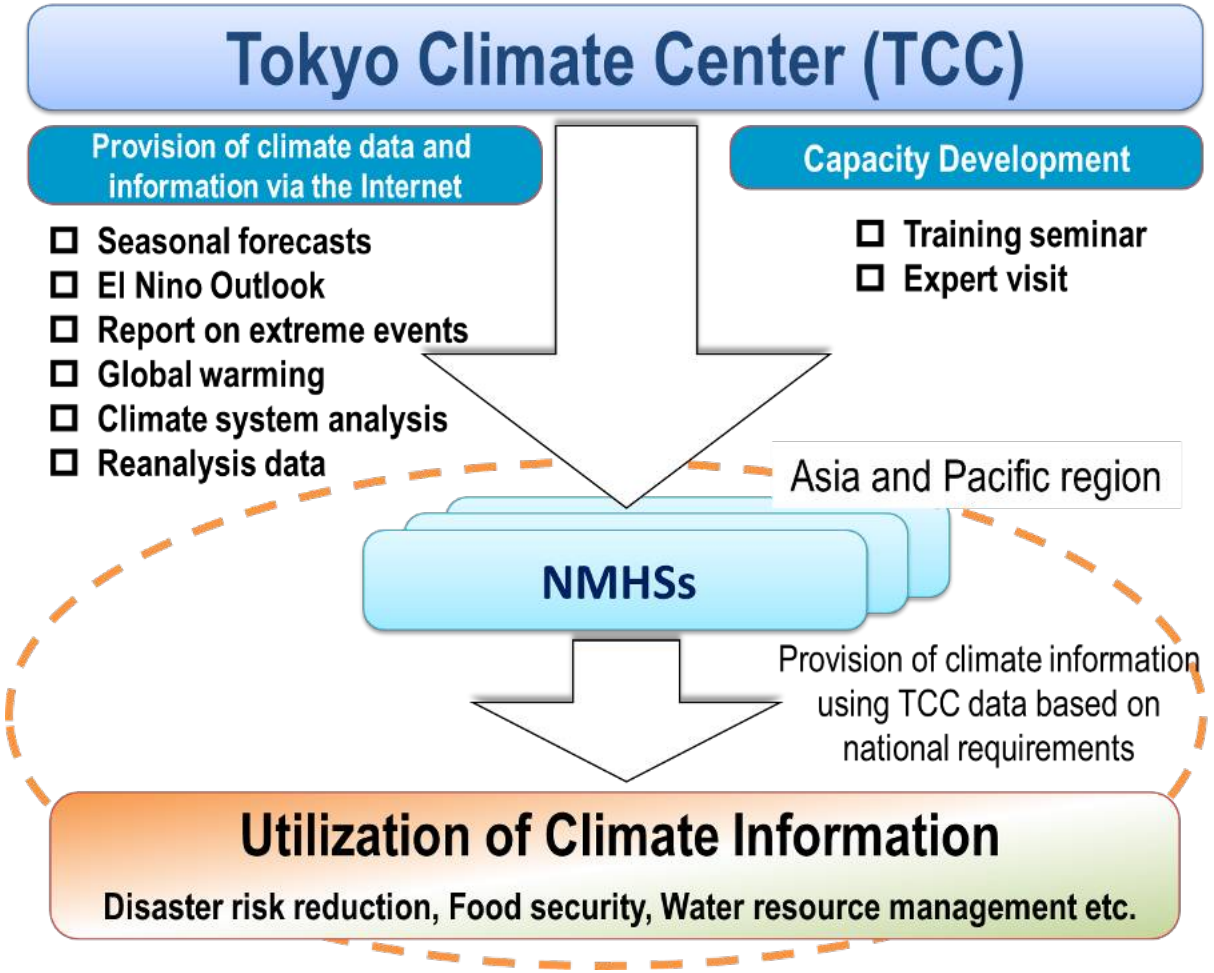
- TCC conducts annual training seminar on such as climate analysis and seasonal forecasts to NMHSs in Asia and Pacific regions as the capacity development activities.
- Our seminars are designed to provide essential expertise for conducting operational seasonal forecasts with emphasis on dynamical interpretation and assessment of forecast model outputs.



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

TCC as Regional Climate Center (RCC)

- TCC has served as a WMO Regional Climate Center in RA II since 2009.
- TCC supports NMHSs through data/tool/information provision and capacity development activities.



Mandatory RCC activities
e.g.
- Long-range forecasting
- Climate monitoring
- Climate data services
- Training

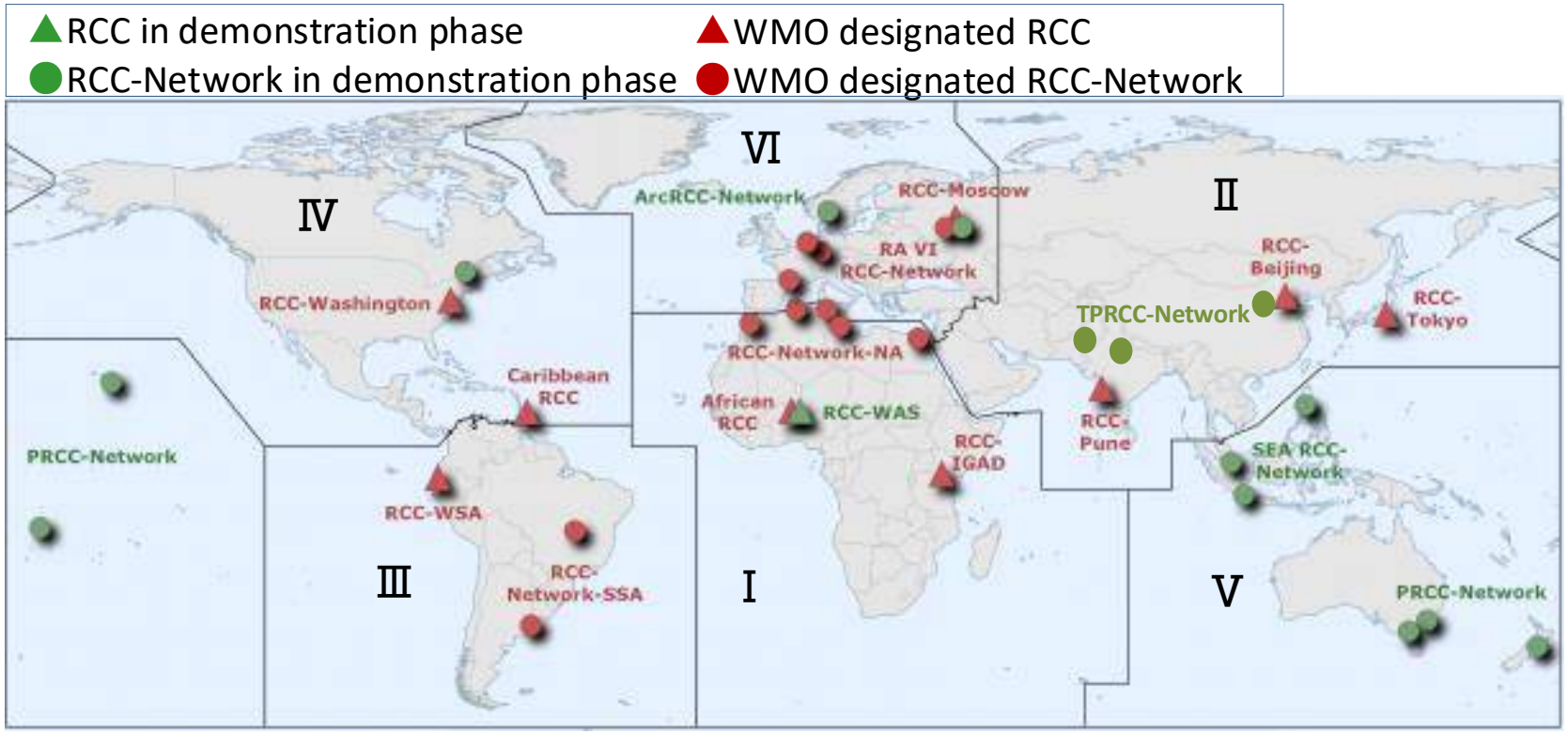
RCC Users:
- NMHSs
- other RCCs
- International institutions recognized by RAs

Regional Climate Center (RCC)

WMO Regional Climate Centers (RCCs) are centers of excellence that create regional climate products.

- RCCs are middle tier in a three-tierd WMO operational infrastructure
- RCCs strengthen the capacity of WMO Members in each region to generate and deliver the best climate services to national users
- RCC regional products include climate data sets, monitoring products and long-range forecasts.

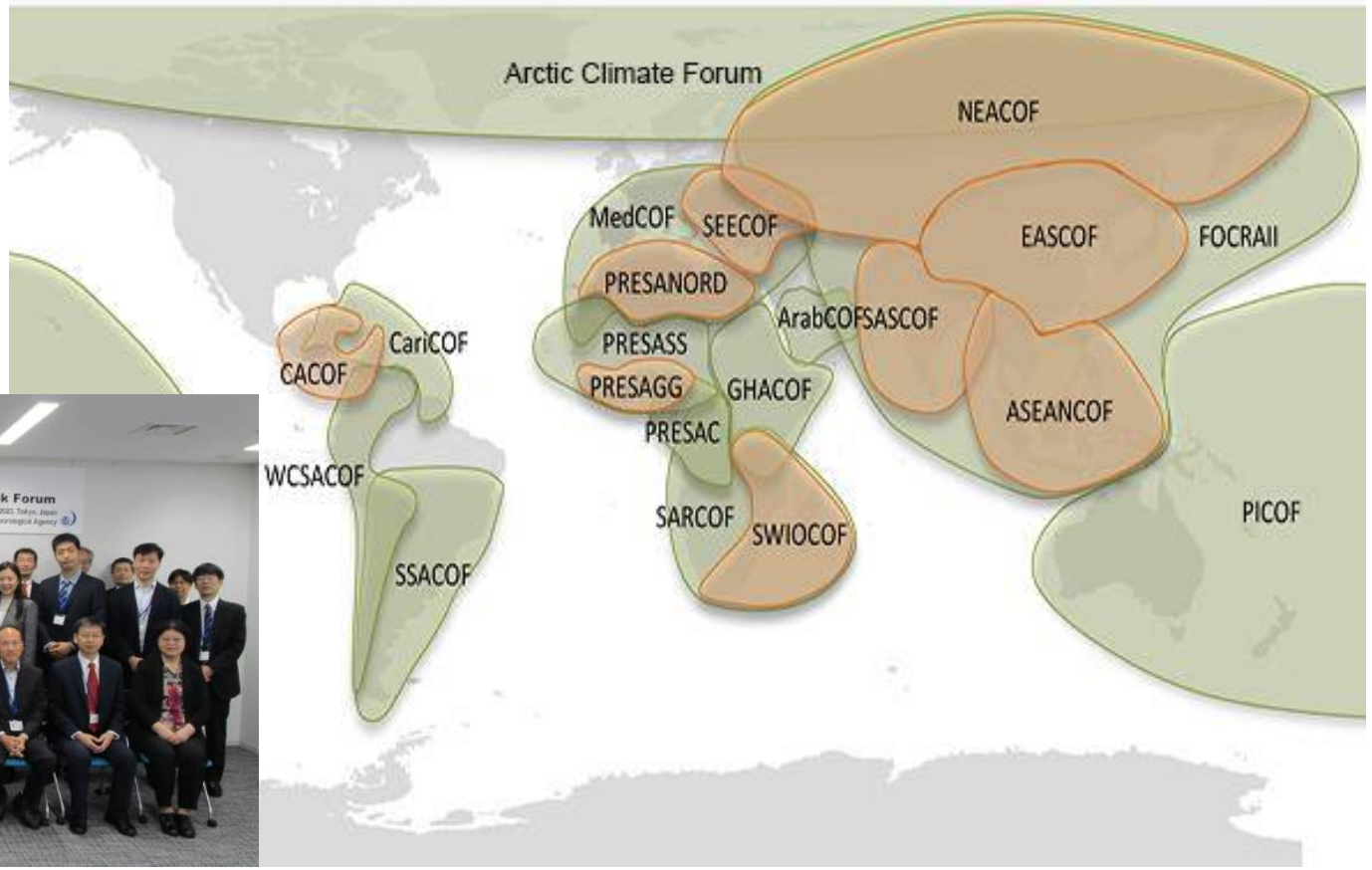
Current status of establishment of RCC



https://public.wmo.int/en/our-mandate/climate/regional-climate-centres

Regional Climate Outlook Forums(RCOFs)

RCOFs produce **consensus-based, user-relevant climate outlook products** in real time in order to reduce climate-related risks and support sustainable development for the coming season in sectors of critical socioeconomic significance for the region in question.



https://public.wmo.int/en/our-mandate/climate/regional-climate-outlook-products

Gaps, limitations and capacity needs for generating objective seasonal forecasts

Efforts toward the implementation of OSFs in the East Asia winter Climate Outlook Forum (EASCOF)

EASCOF-11 (Nov. 2023): Participants in EASCOF-11 agreed to continue discussions for seeking the optimal style of objective seasonal forecast for EASCOF, including such as

- Adding careful explanation about forecast (differences between issued forecasts and numerical predictions, why? How forecasters modified?)
- Including MME results into our final report as reference materials.

Recommendations on Objective Seasonal Forecasts for EASCOF (agreed in May 2025)

1. Enhancement of the explanation of seasonal outlook
2. Including forecast maps based on numerical models
3. Review the outlook for the previous winter season
4. Enhancement of the explanation of the verification of numerical models
5. Reiterate the importance of enhancing the user engagement into EASCOF

EASCOF-13 (Nov. 2025): In accordance with the recommendation on OSFs for EASCOF, forecast maps provided by each organization, such as CMA, JMA, KMA and NAMEM, are included in the summary report of EASCOF-13*.

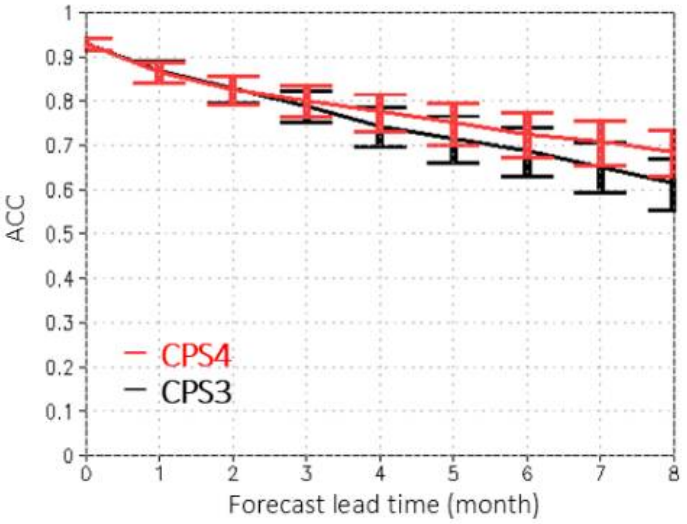
* https://ds.data.jma.go.jp/tcc/tcc/library/EASCOF/2025/Summary_Report_EASCOF13.pdf

Upgraded seasonal forecast model, CPS4

- On 22 January 2026, **JMA upgraded seasonal Ensemble Prediction System from CPS3 to CPS4**, which is based on the coupled atmosphere-ocean general circulation model.
- CPS4 has been used for one-month prediction, three-month prediction, warm/cold season outlook and El Niño Outlook.
- CPS4 shows **improved prediction of SST in the western tropical Pacific.**

Table. Breif description of the model spec.

Model	JMA/MRI-CPS3 (February 2022 – January 2026)	JMA/MRI-CPS4 (since January 2026)
Vertical Layers of the atmosphere	100 levels (up to 0.01hPa)	128 levels (up to 0.01hPa)
Forecast Frequency	5 ensemble members per day	25 ensemble members up to 1-month every Tuesday and Wednesday 5 ensemble members per day
Initial Condition for Forecast	JRA-3Q (hindcasts) and the Global Analysis (GA; forecasts only)	JRA-3Q (hindcasts), GA (forecasts only) and Ozon Analysis
Initial Condition perturbation	The breeding of growing mode (BGM) method for the atmosphere Ocean perturbations calculated using 4DVAR minimization history The Lagged Average Forecast (LAF) method	The Singular Vectors (SVs) and Local Ensemble Transform Kalman Filter (LETKF) methods for the atmosphere Ocean perturbations calculated using 4DVAR minimization history The Lagged Average Forecast (LAF) method



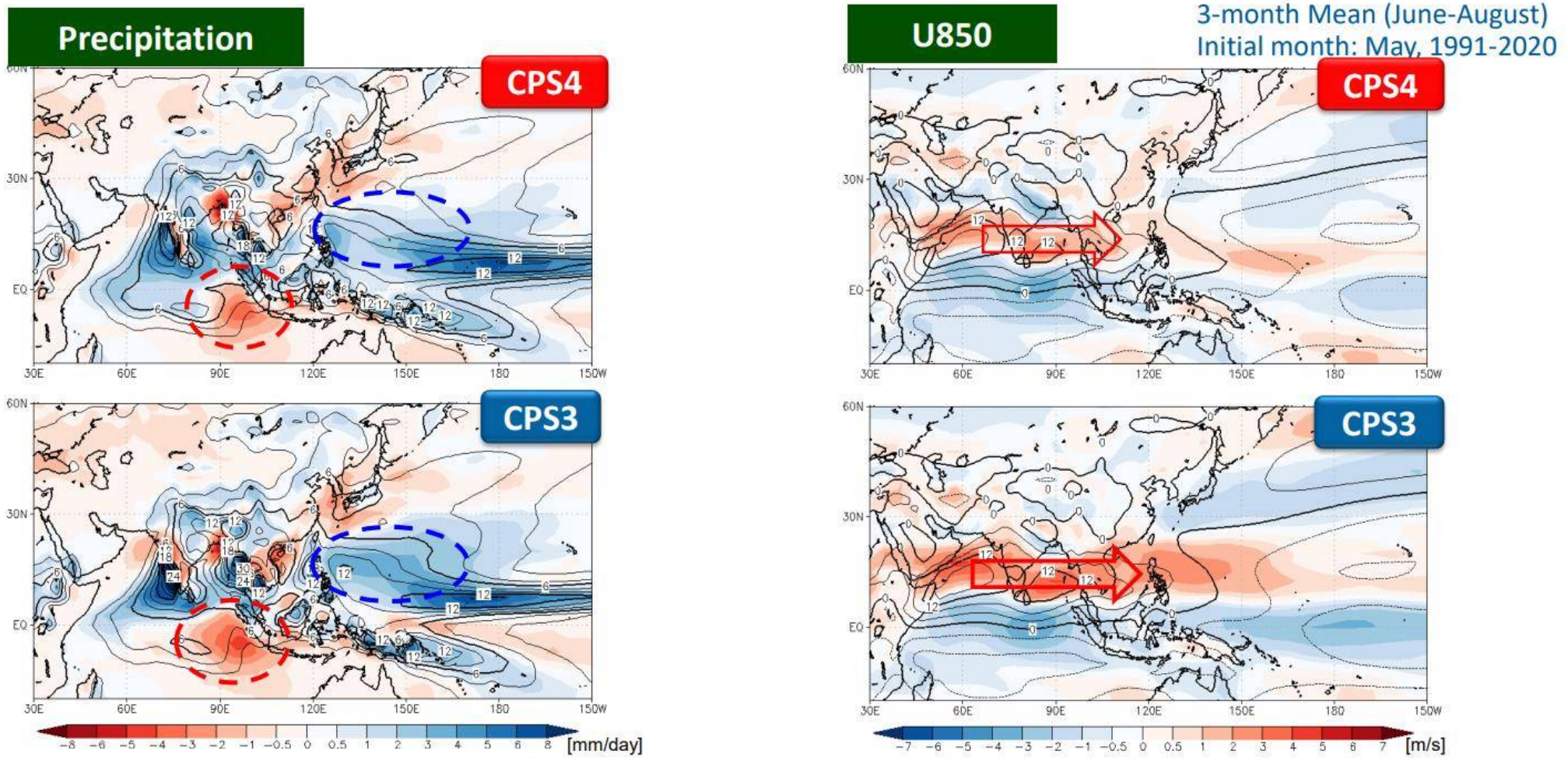
Anomaly correlation coefficients for NINO.WEST SSTs

Hindcast initialized by JRA-3Q is also available for 1991-2020.

Upgraded seasonal forecast model, CPS4

Mean Error of CPS4 for Precipitation and U850

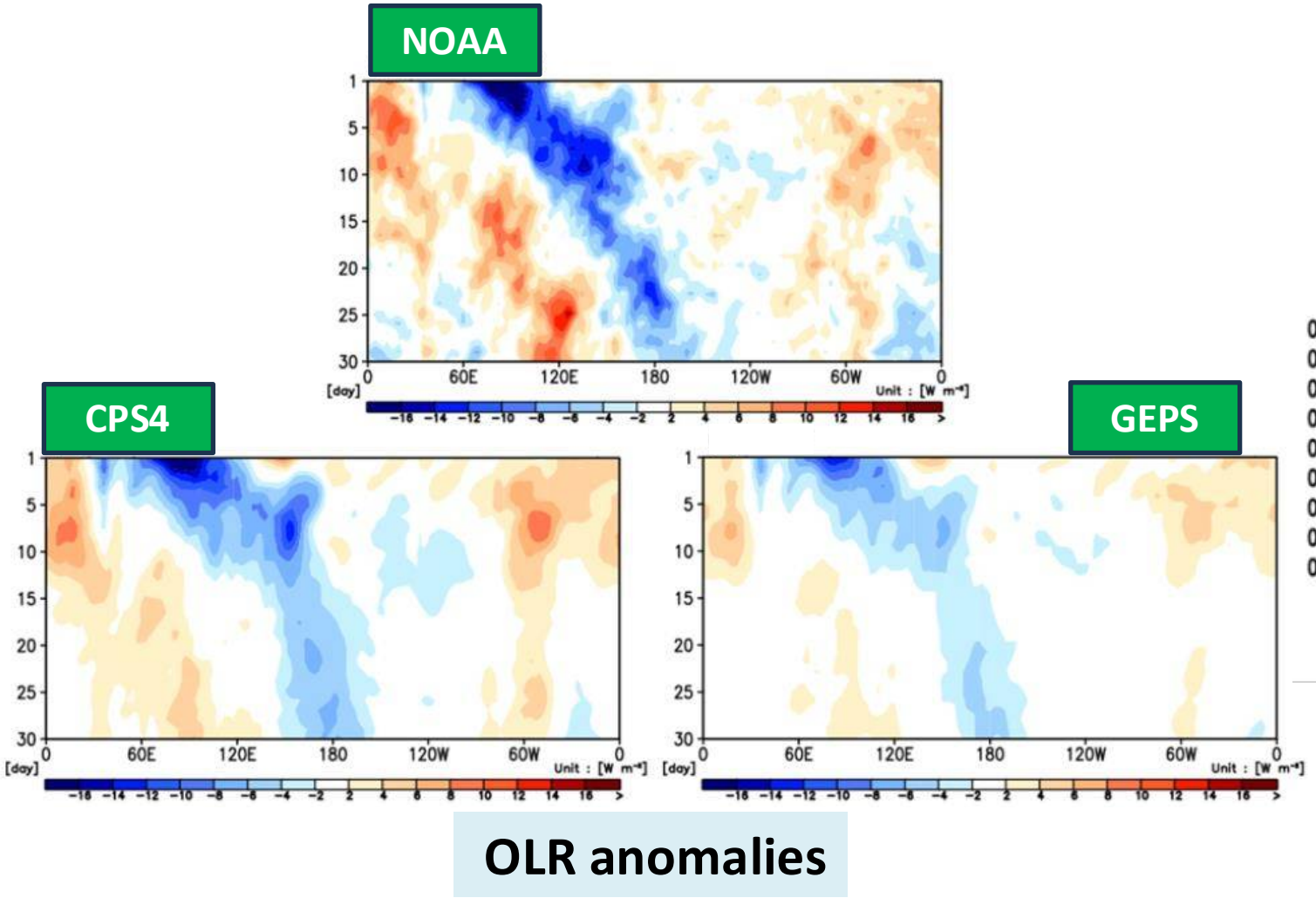
3-month Mean (June-August)
Initial month: May, 1991-2020



- The excess precipitation biases over the tropical western North Pacific and under-biases over the southeastern tropical Indian Ocean are reduced.
- The biases in the lower troposphere such as excessively strong monsoon westerly winds are reduced.

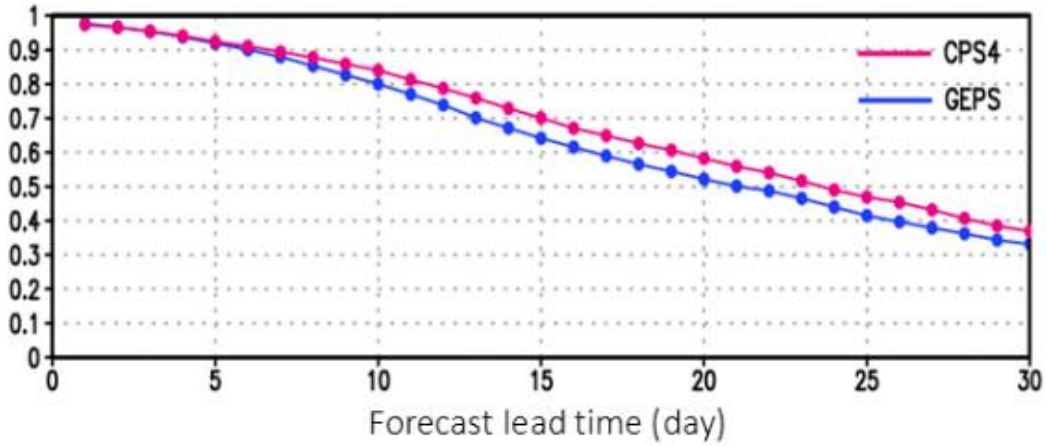
Improved MJO Prediction Skill with CPS4

- In one-month prediction, **CPS4 shows higher accuracy than the JMA's Global Ensemble Prediction System (GEPS) in prediction of tropical intraseasonal variability phenomena,** such as the Madden–Julian Oscillation and the Boreal Summer Intraseasonal Oscillation.



OLR anomalies

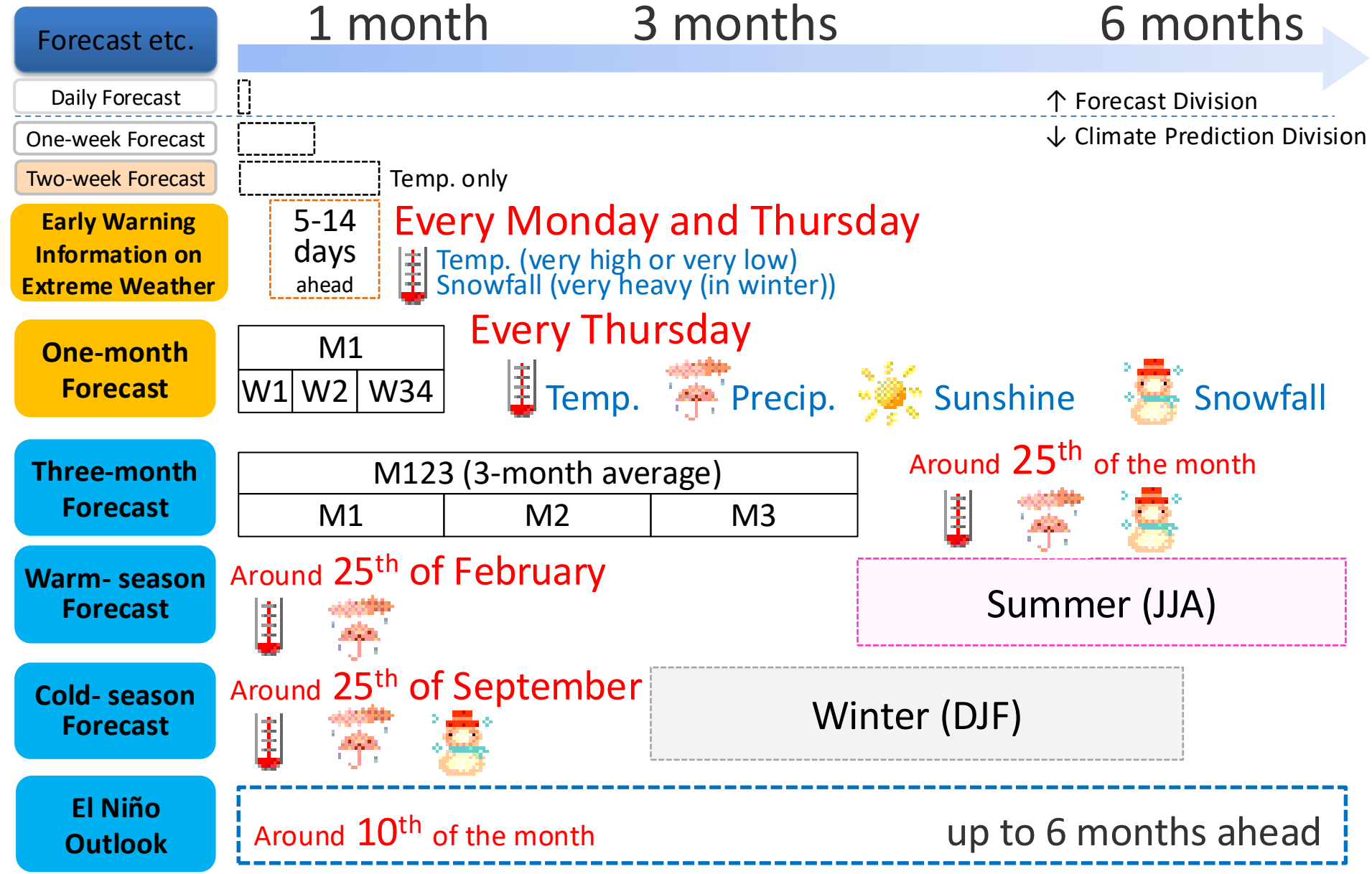
Bivariate correlation coefficient※



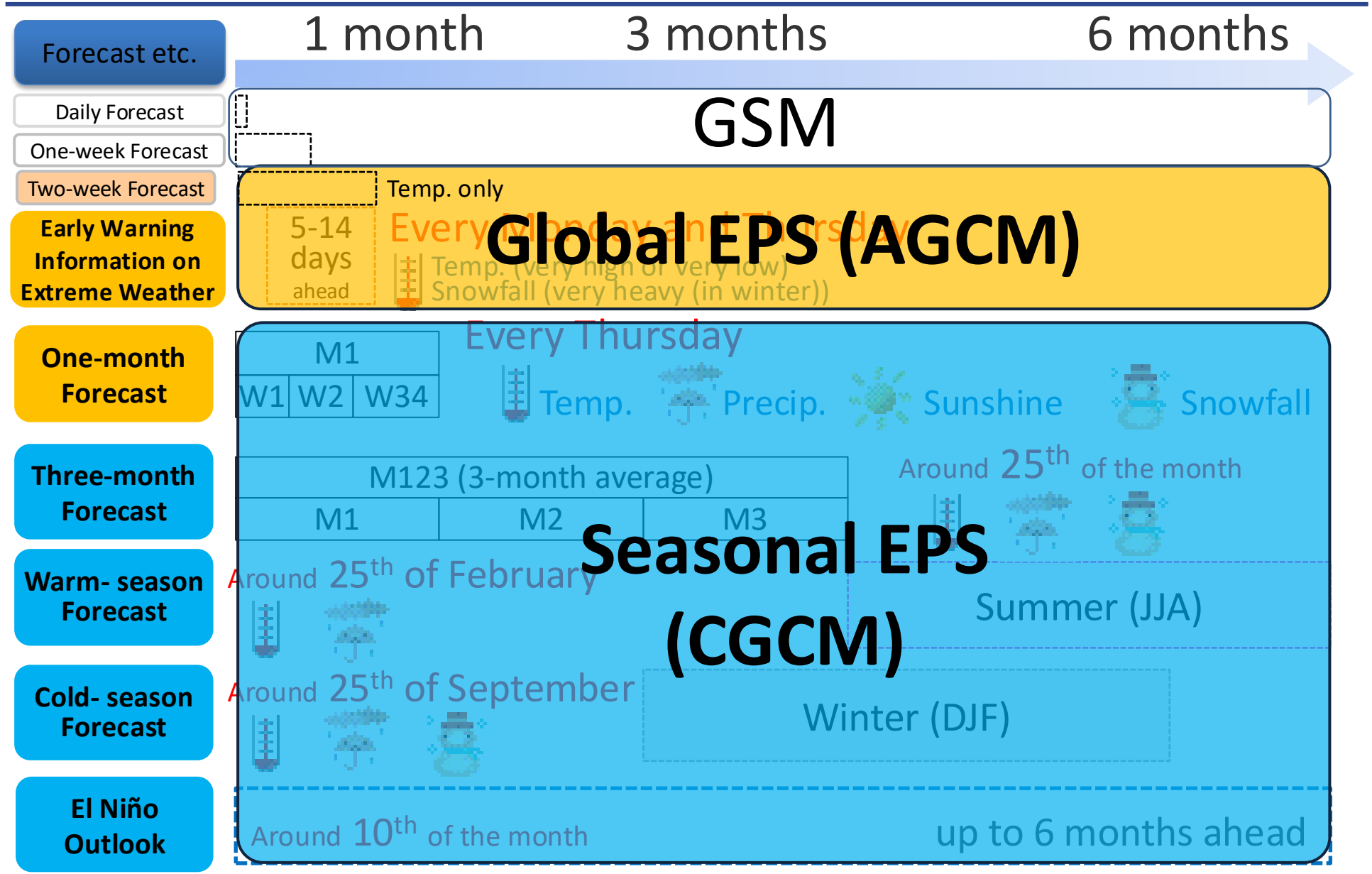
※ *Based on Wheeler and Hendon (2004)*

Wheeler, M. and H. Hendon, 2004: An all-season real-time multivariate MJO index: Development of an index for monitoring and prediction. Mon. Wea. Rev., 132, 1917-1932.

Seasonal forecast issued by JMA (domestic)



Seasonal forecast issued by JMA (domestic)



Animation map for one-month prediction

Animation for one-month prediction (7-days running mean)

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

Initial date: 2023.09.27 Forecast lead time: Day -11

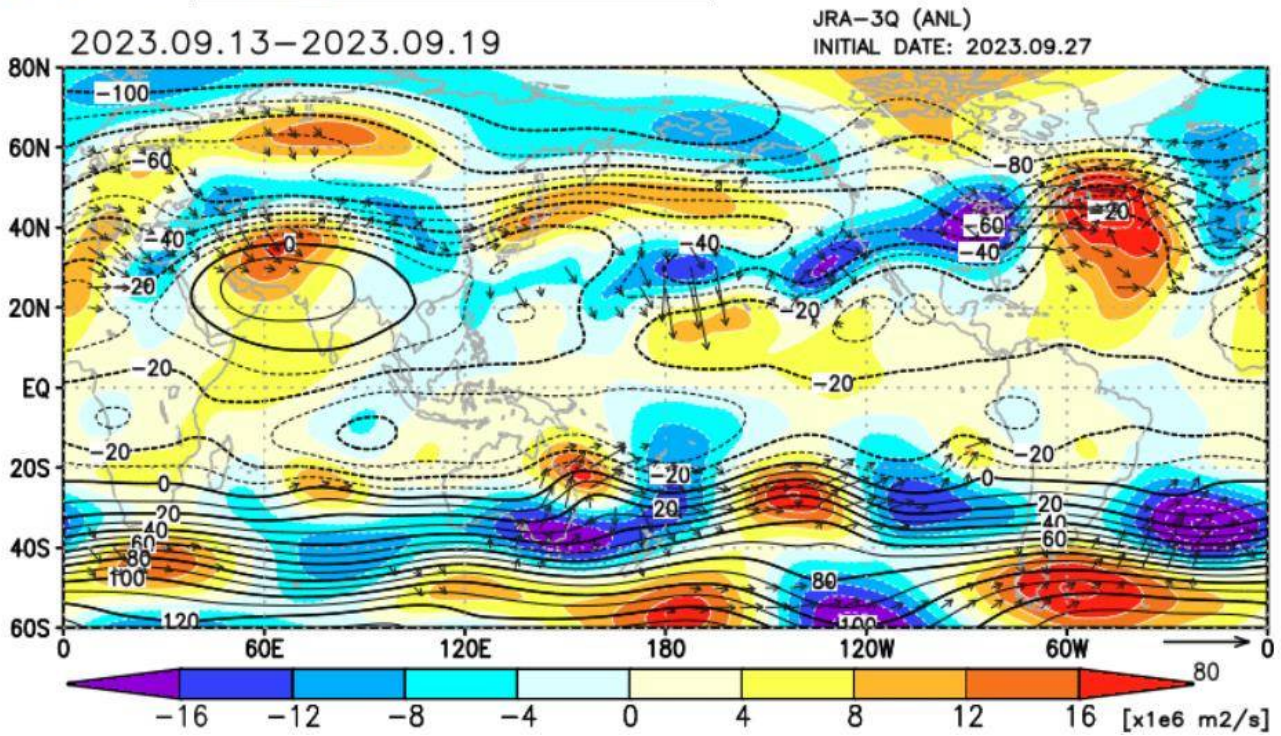
Setting for Animation

Oldest (lead Day -11) | -1 day | Initial | +1 day | Termination (lead Day +28) | Animation: Start | Stop

<< (Slow) | >> (Fast)

week-1 | week-2 | week-3 | week-4

Parameter: PSI200 (Tropics)

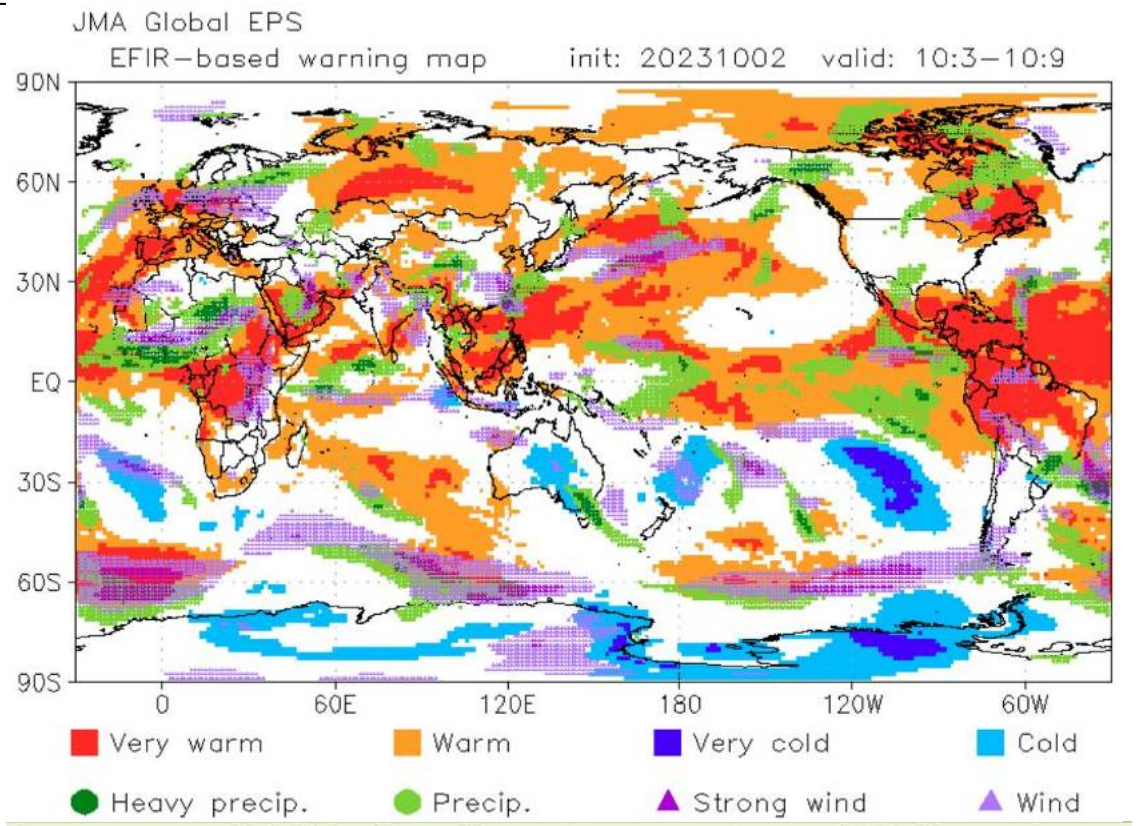


[Password Protected] https://www.data.jma.go.jp/tcc/tcc/gpv/model/Anime.1mE.experiment/anime.e.php

Forecast Products in Support of Early Warnings for Extreme Weather Events

This forecast products are prepared on the basis of Extreme Forecast Index (EFI), which is a measure of the difference between the probability distribution of a real-time forecast and a climatological distribution.

On the web page, available forecast products are geographical distribution (global and Asia) maps of
- Extreme Forecast Index (EFI),
- Extreme weather warning based on EFI,
- Probability above/below the 90th/10th percentile of the model climatology for covering the period up to two weeks ahead. This is updated everyday.



Occurrence probabilities for various extreme events are plotted on each map based on the following EFI thresholds:

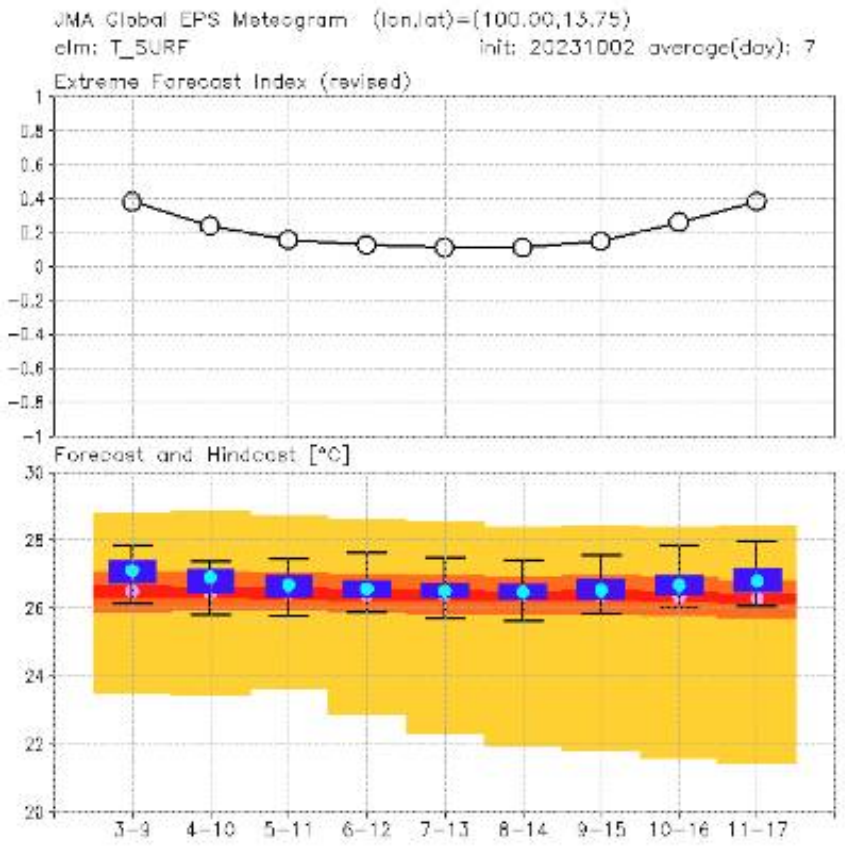
Very warm, Very cold, Heavy precip. and Strong wind : |EFI| ≥ 0.8
Warm, Cold, Precip. and Wind : |EFI| ≥ 0.5

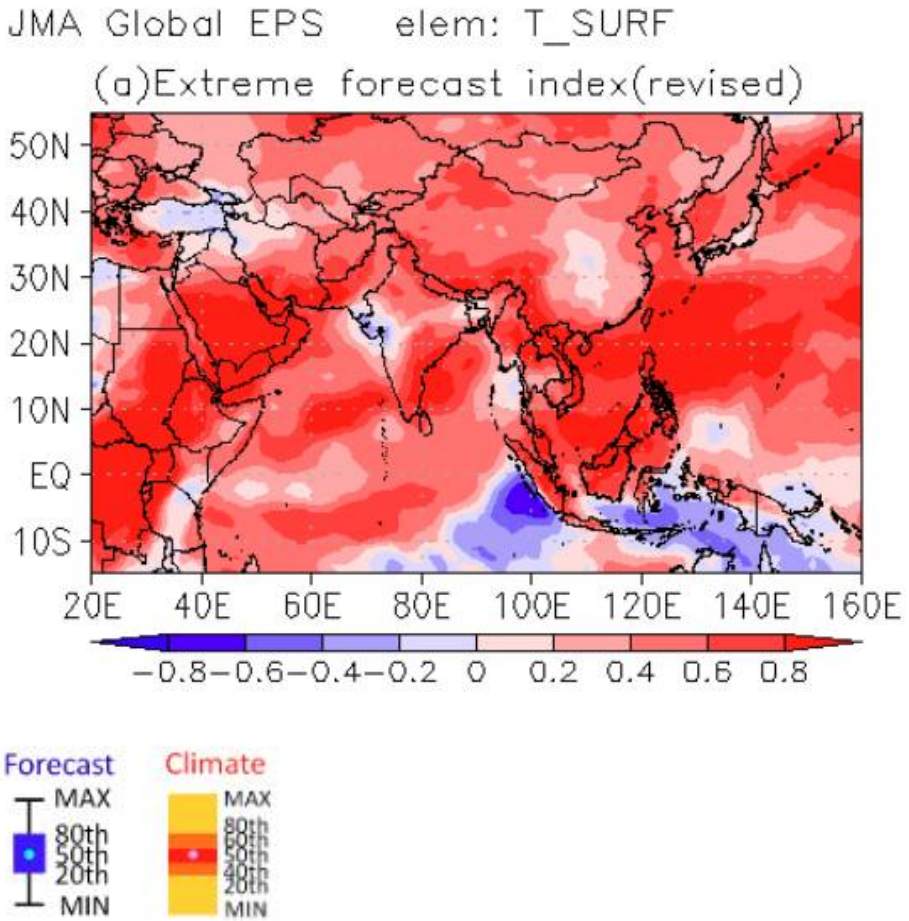
This product is available for NMHSs.

(Password Protected) https://www.data.jma.go.jp/tcc/tcc/gpv/EFI/index.php

Forecast Products in Support of Early Warnings for Extreme Weather Events

Initial date: 2023.10.02 / Forecast lead time: Day +1 / 7-day mean /
Element Surface temperature / Area(map) ASIA / Point(meteogram) BANGKOK(100.00E,13.75N) *Refer to the nearest grid point.

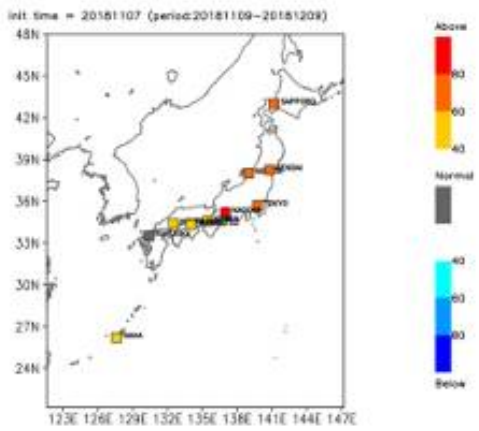




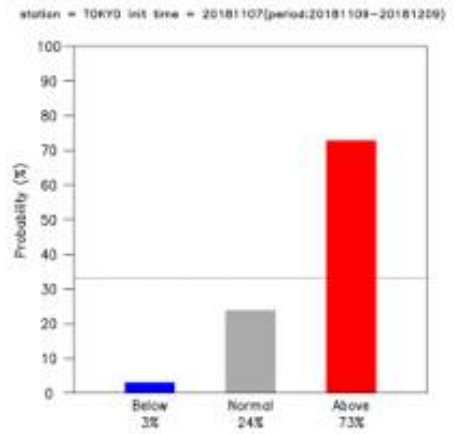
(top)Time series of EFI values.
(bottom)Time series of the EPS forecast (cold color) and the model climate (warm color)

(Password Protected)
http://www.data.jma.go.jp/tcc/tcc/gpv/EFI/index.php

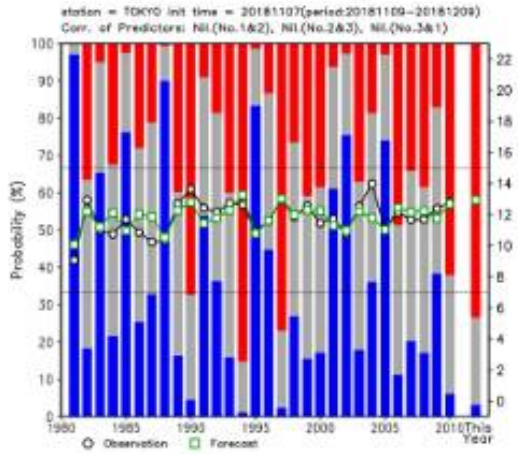
One-month Guidance Tool



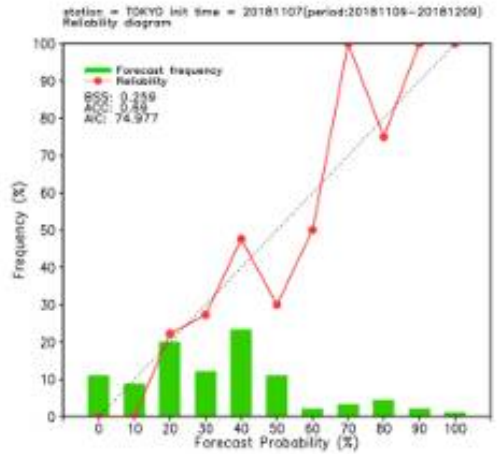
Sample temperature probability forecast map for each category. Cool-, grey- and warm-colored marks denote below-, near- and above-normal probability, respectively.



Sample temperature probability forecast for three categories. Blue, grey and red bars denote below-, near- and above-normal probability, respectively.



Sample temperature probability forecast for three categories. Blue, grey and red bars denote below-, near- and above-normal probability, respectively. Black and green lines are inter-annual timeseries representations of daily-mean observation and forecast anomaly data, respectively.



Sample reliability diagram. Red lines show reliability and green bars show forecast frequency.

TCC provides a web-based One-month Guidance Tool.

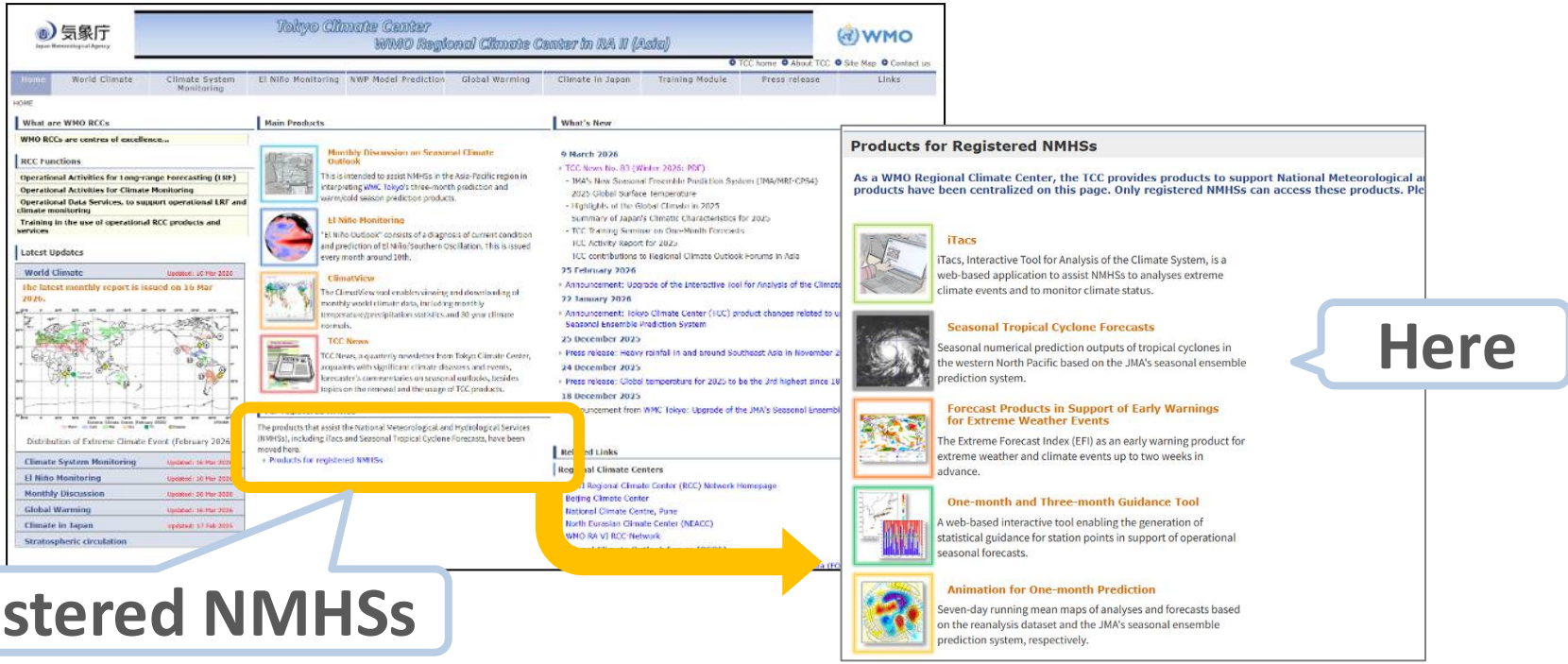
- Available via a web browser
- Provide three-level (tercile) probabilistic forecasts at specified points
- Forecast target: 2mT & total-P
- Max points: 10 points
- Outputs are four-type figures and CSV files
- Only registered NMHSs can access this guidance tool with password-protection

jica_2023/JICA2023
Valid by the end of 2023

https://extreme.kishou.go.jp/tool/simple_guidance/help/
(Password Protected) https://extreme.kishou.go.jp/cgi-bin/simple_guidance/index.cgi

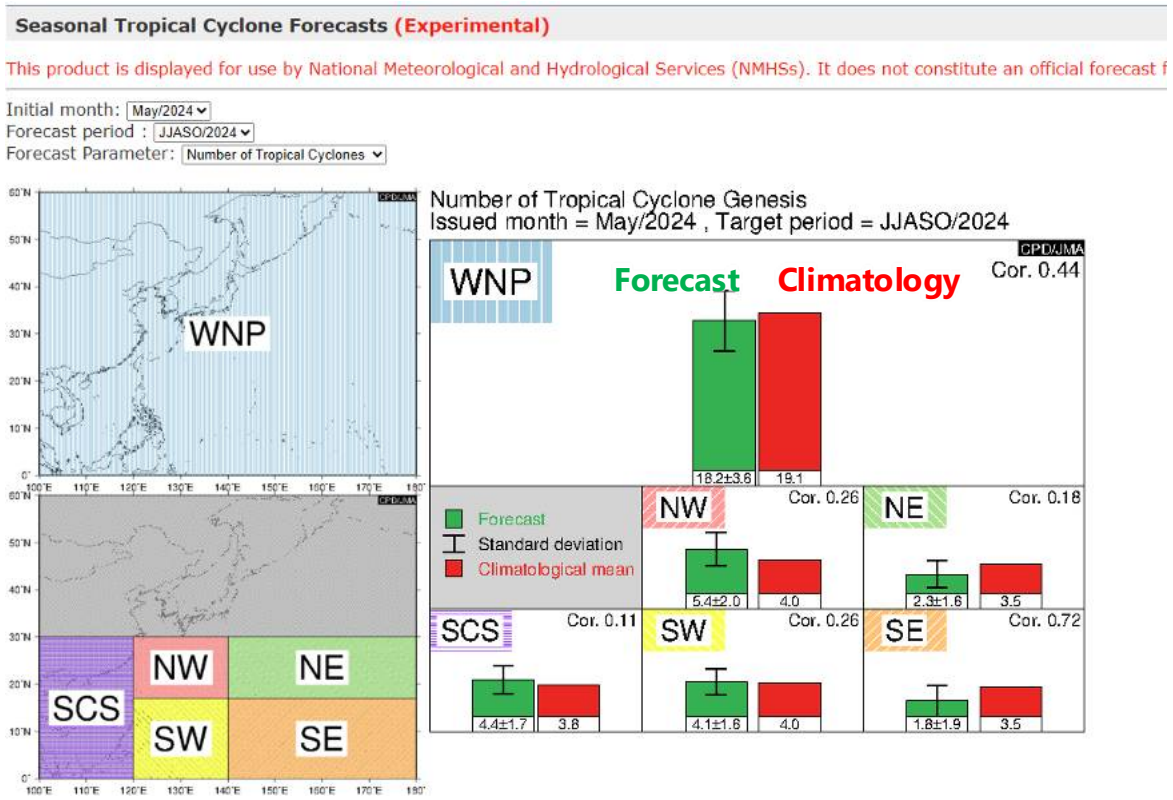
Seasonal Tropical Cyclone Forecast Products

- In its role as a WMO Regional Climate Center, TCC began experimentally providing products for seasonal forecasting of tropical cyclones reaching tropical storm intensity or higher for the western North Pacific to support WMO Members in the Asia/Pacific region.
- Registered users within NMHSs can access these products via the TCC website.
- The products are based on JMA's seasonal ensemble prediction system (JMA/MRI-CPS4), and updated around the 20th of every month from May to August.
- Prediction skill is verified by CPS4 30-years hindcast.



Seasonal Tropical Cyclone Forecast Products

- A sample of **Forecast** page

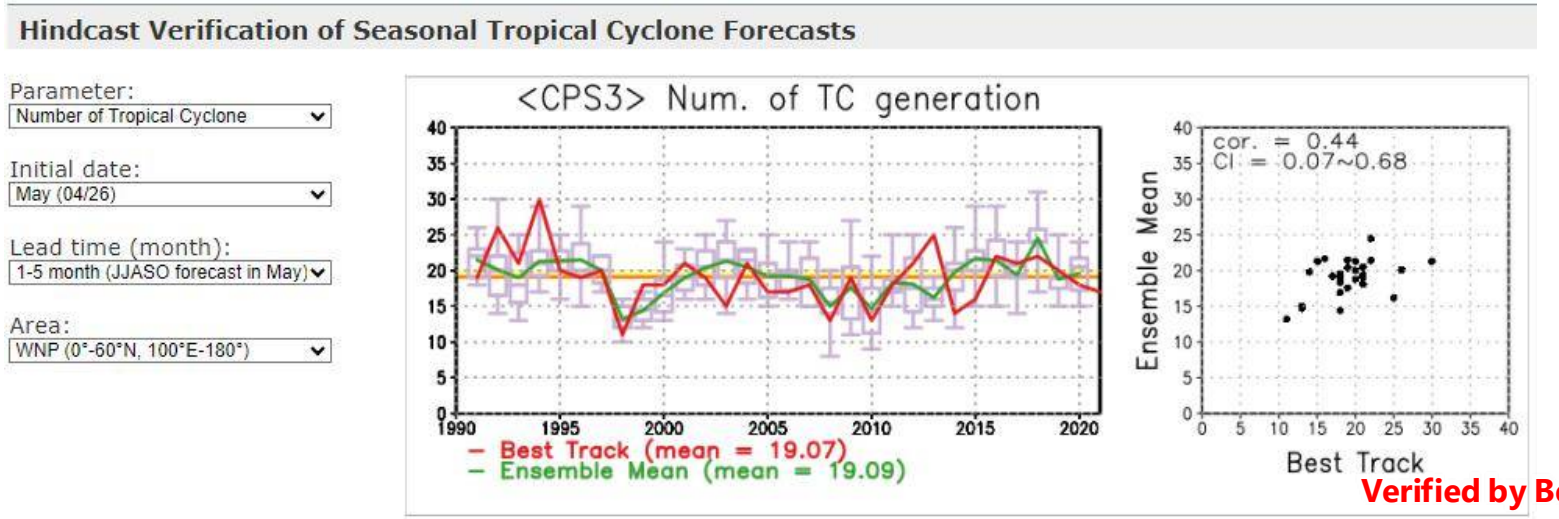


Regional histograms are shown for three forecast parameters:

- Number of Genesis
- TC frequency
- Accumulated Cyclone Energy (ACE)

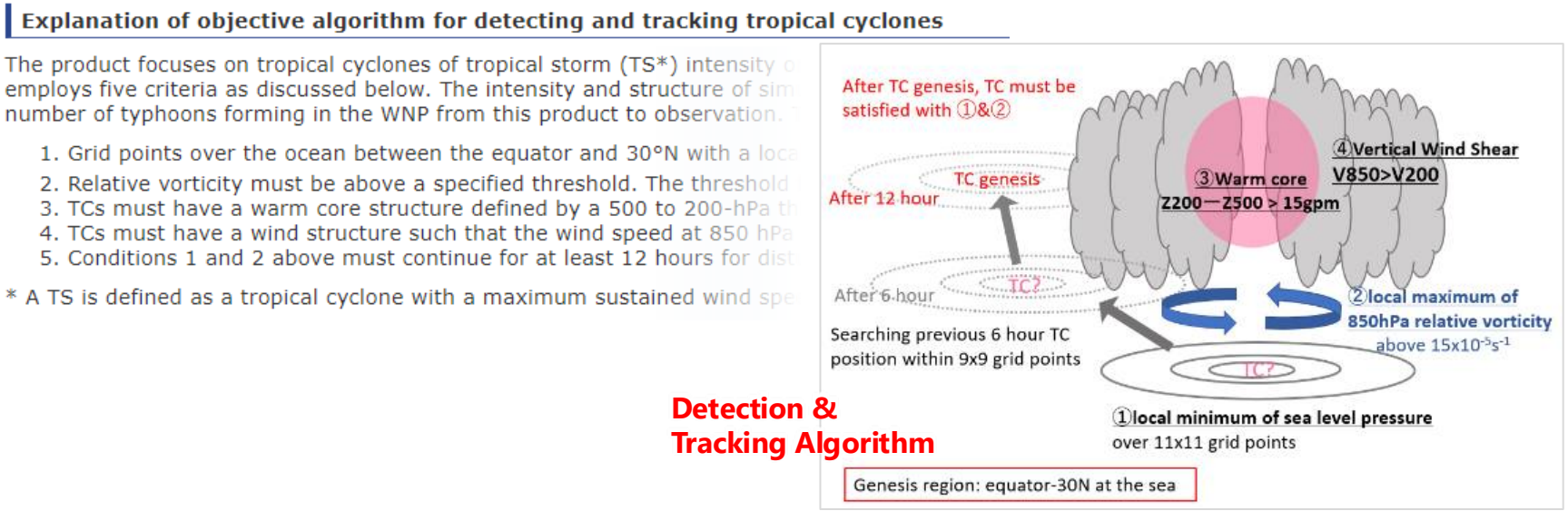
Seasonal Tropical Cyclone Forecast Products

- A sample of **Verification** page



Verified by Best-Track data

- A sample of **Explanation** page



Detection & Tracking Algorithm

Provision of Binary gridded data

Download Gridded Data File

Notice

- 16 May 2022
  Announcement: Terminating the data provision of CPS2 six-month forecasts
- 28 December 2021
  Announcement: Schedule for terminating the data provision of CPS2
- 15 September 2020
  Announcement: Improvement of Extreme Forecast Index (EFI) products
- 16 April 2020
  Announcement: Release of Global Gridded Datasets for 6-month Forecasts

Main Products

NWP Model Prediction

Global EPS for one-month prediction (28 Sep 2023)

High resolution data; 1.25 degree grid NEW

- Daily Statistics (1.25 degree grid)
- All Members (1.25 degree grid)
- Systematic Errors (1.25 degree grid)

Seasonal EPS for six-month prediction (CPS3) NEW (03 Oct 2023)

- Statistics
- All Members
- Indices
- Systematic Errors

Hindcast Gridded Data

Global EPS for one-month prediction NEW

- Daily data (1.25 degree grid)

Seasonal EPS (CPS3) NEW

- Monthly mean data

Animation of One-month Prediction

- Seven-days running mean NEW (28 Sep 2023)

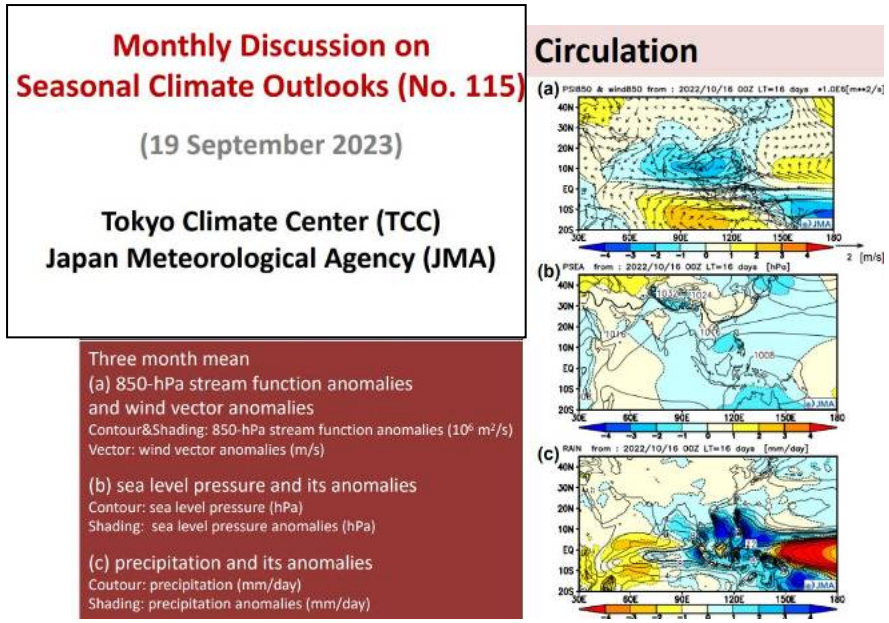
Tips

- Q&A

[Password protected] https://www.data.jma.go.jp/tcc/tcc/gpv/index.html

Monthly Discussion on Seasonal Climate Outlook

- "Monthly Discussion on Seasonal Climate Outlook" issued every month around the 25th is intended to assist NMHSs in the Asia-Pacific region in interpreting GPC-LRF Tokyo's three-month prediction and warm/cold season prediction products.



Provision

Feedback

TCC
producing materials

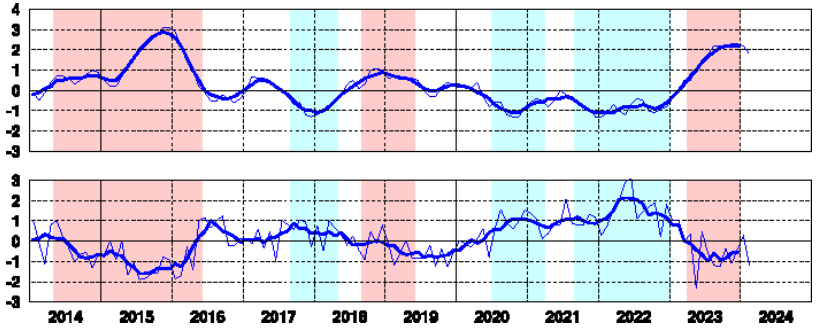
NMHSs
making seasonal outlooks

https://www.data.jma.go.jp/tcc/tcc/products/model/monthly_discussion/latest.pdf

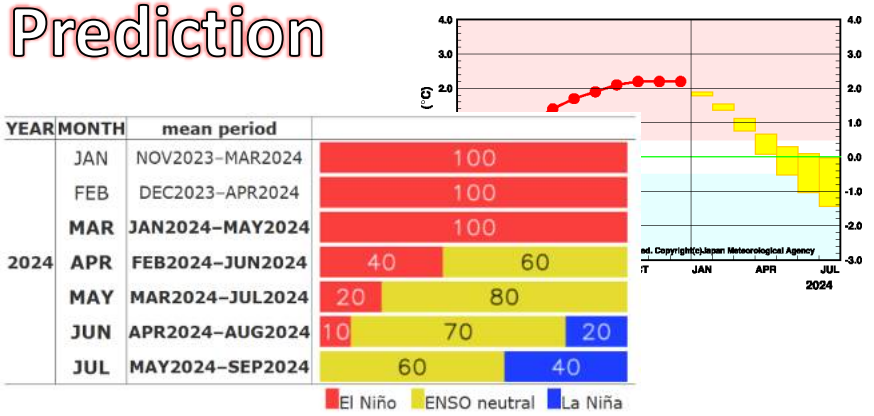
TCC's El Niño monitoring and prediction

- JMA operates the Ocean Data Assimilation System and the El Niño Prediction System (an ocean-atmosphere coupled model) for ENSO monitoring and prediction.
- El Niño outlooks are updated every month around the 10th.

Monitoring



Prediction



https://www.data.jma.go.jp/tcc/tcc/products/elnino/index.html
https://www.data.jma.go.jp/tcc/tcc/products/elnino/outlook.html

Global climate with CLIMAT and SYNOP report and climate monitoring activity

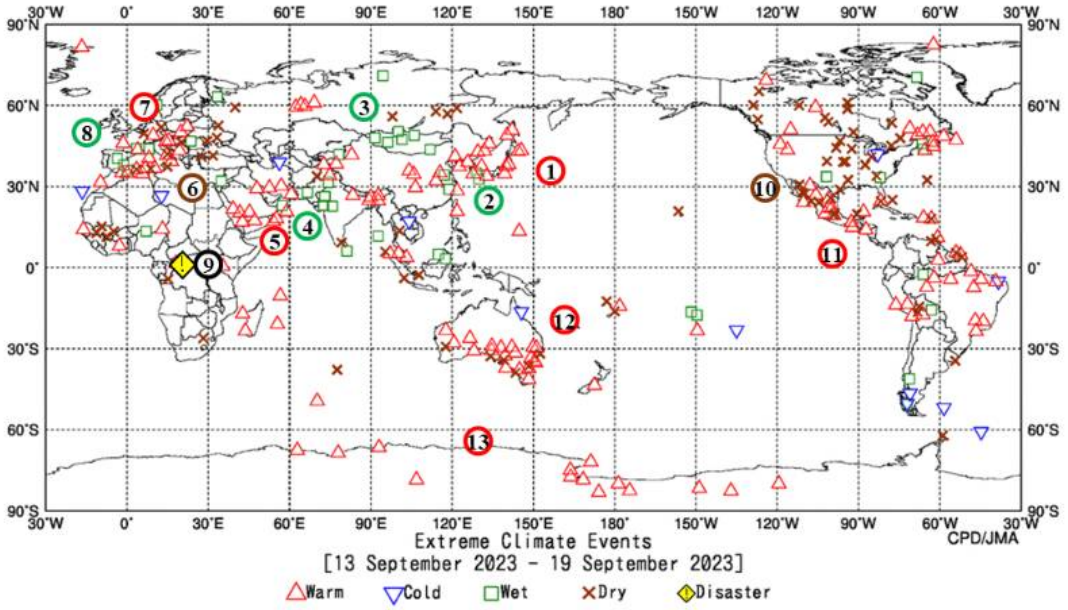
World Climate: https://www.data.jma.go.jp/tcc/tcc/products/climate/index.html
Climate System Monitoring: https://www.data.jma.go.jp/tcc/tcc/products/clisys/index.html

Weekly monitoring products on climate extreme

Weekly Report on Global Extreme Climate Events

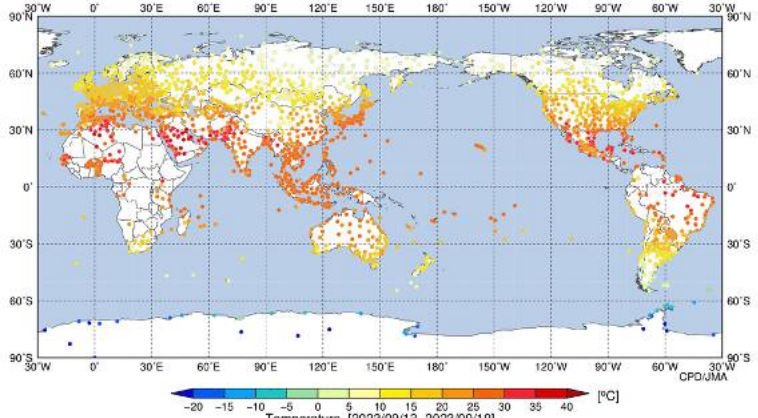
Period: 13 Sep. 2023 - 19 Sep. 2023 < > Show Figure: Extreme Climate Events

Extreme climate events and weather-related disasters during this period

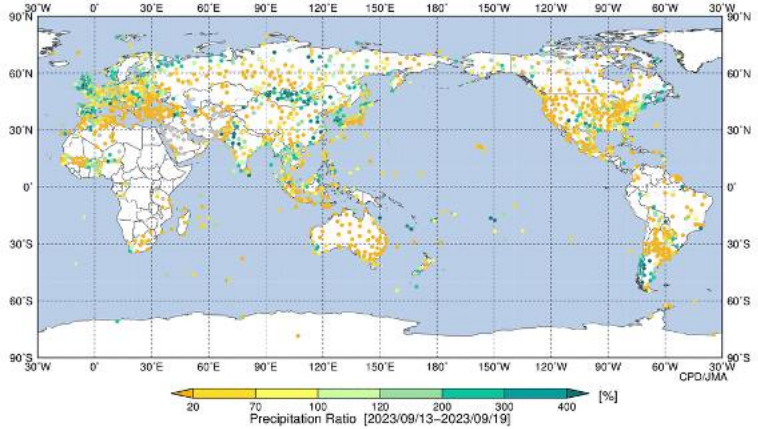


	Type	Area	Remarks
1	Warm	From southern Eastern Siberia to central China	
2	Wet	From the southern Korean Peninsula to eastern China	
3	Wet	Mongolia	
4	Wet	From northwestern India to Oman	• It was reported that heavy rains caused at least 40 fatalities in India (the

Update
Every Wednesday



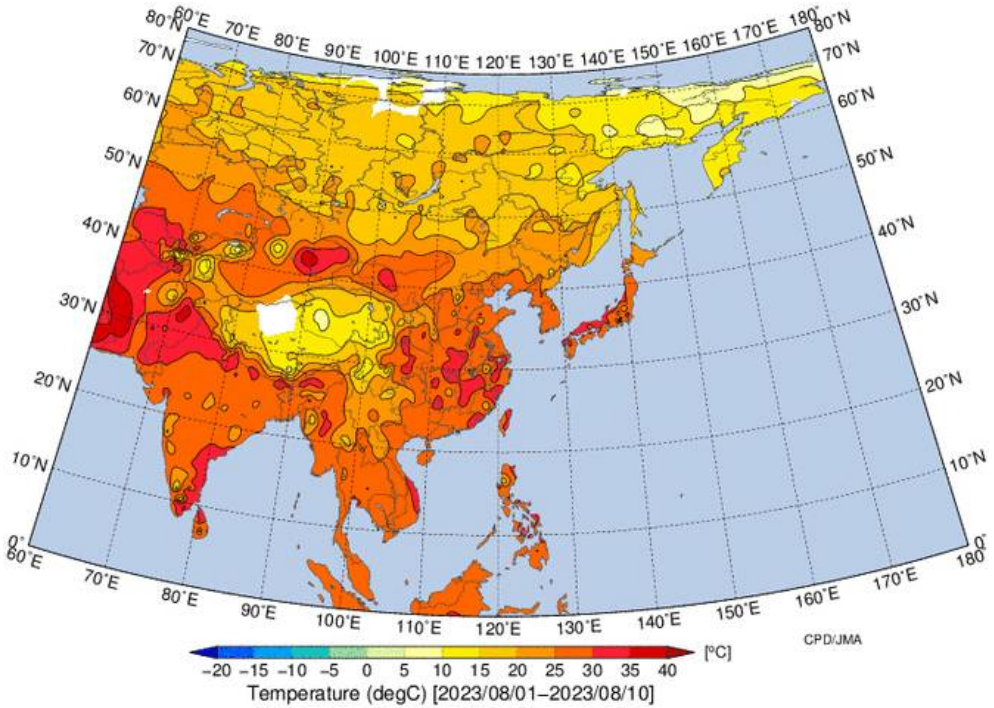
Temperature anomalies



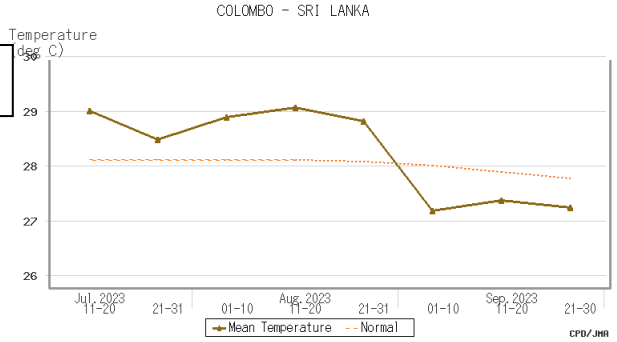
7-day precipitation ratios

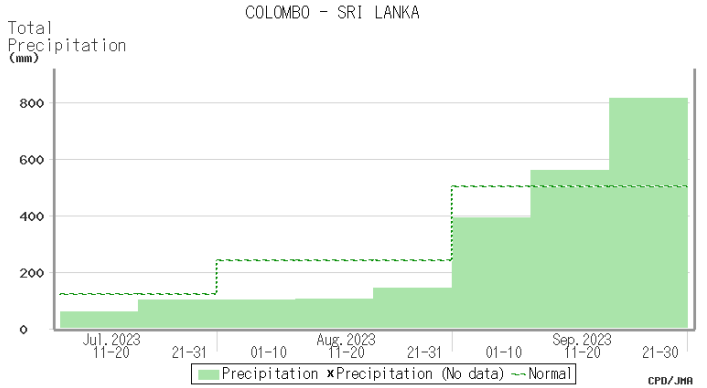
https://www.data.jma.go.jp/tcc/tcc/products/climate/weekly/index.html

10-day/half monthly temp./prec. products

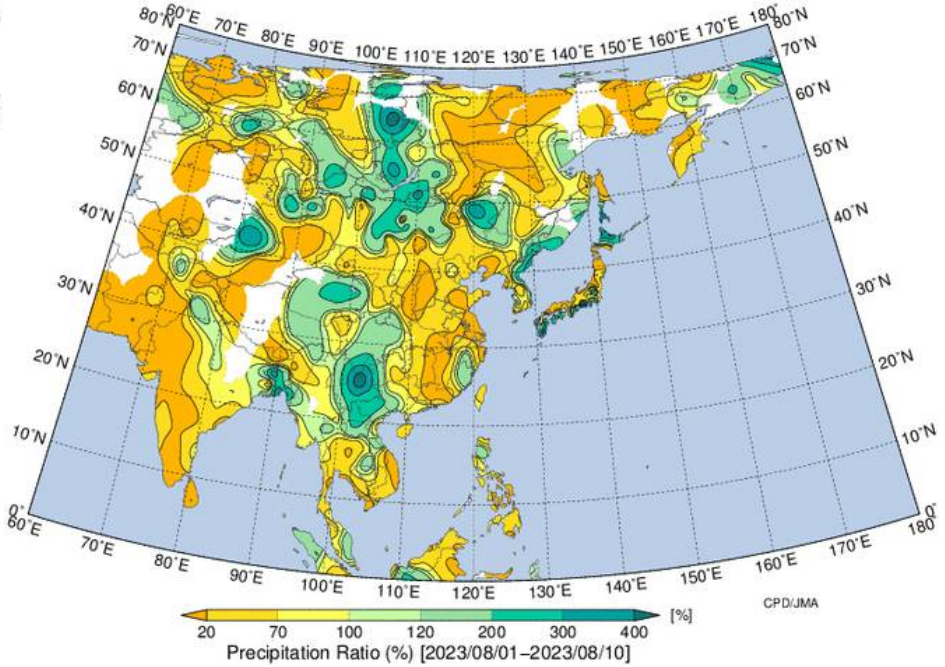


Temperature





Light-green shading represents total precipitation since 1 Jul. 2023.
The green dotted line represents normal monthly total precipitation since Jul.



Precipitation ratio

Update

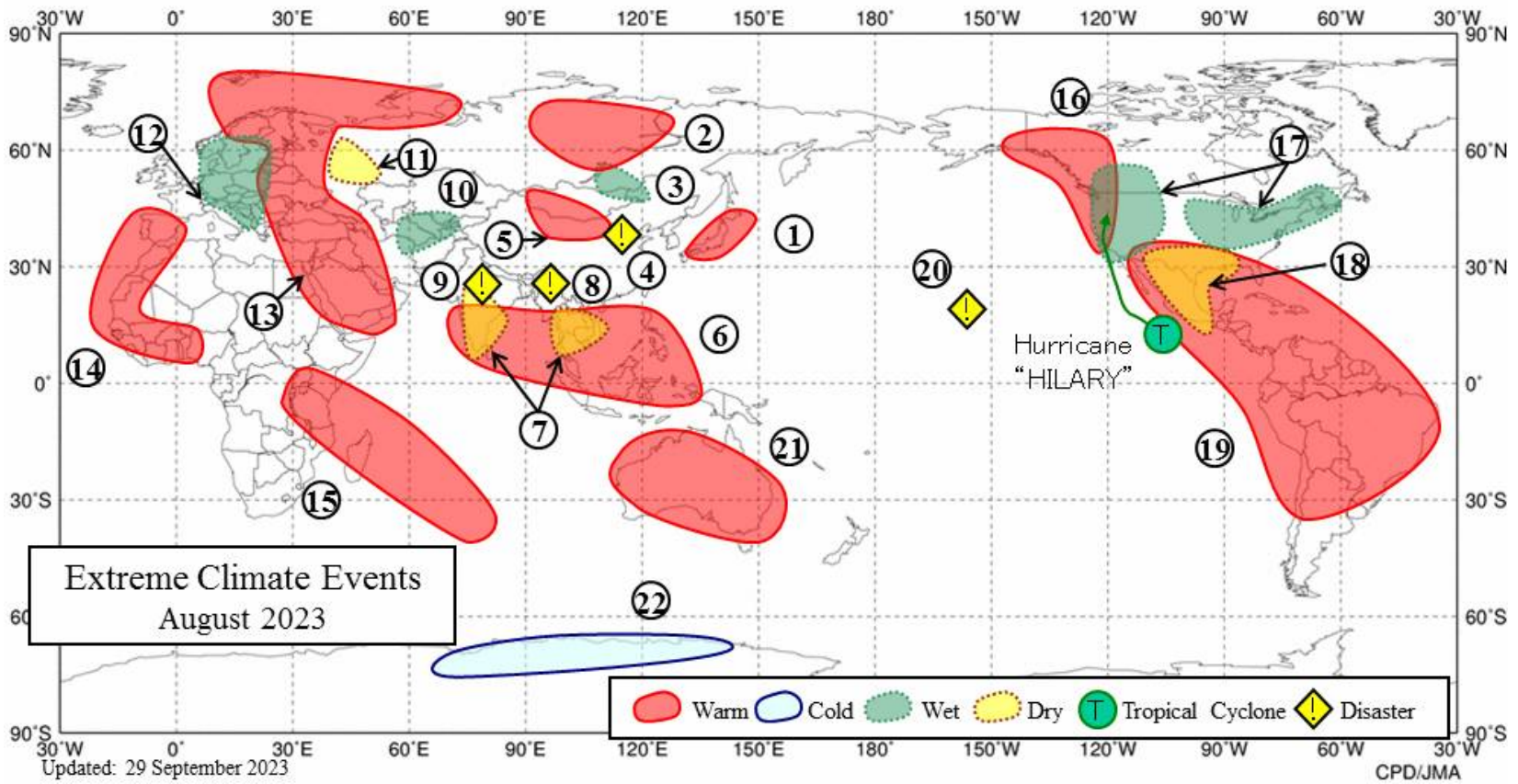
- 10-day: Every month at 1st,11th,21st
- Half-month: Every month at 1st,16th

https://www.data.jma.go.jp/tcc/tcc/products/climate/rmap/rmap.php

Extreme climate monitoring

TCC issued weekly, monthly, seasonal and annual temperature/ precipitation/hazardous climatic events (flood/drought/tropical cyclone) report using CLIMAT and SYNOP reports

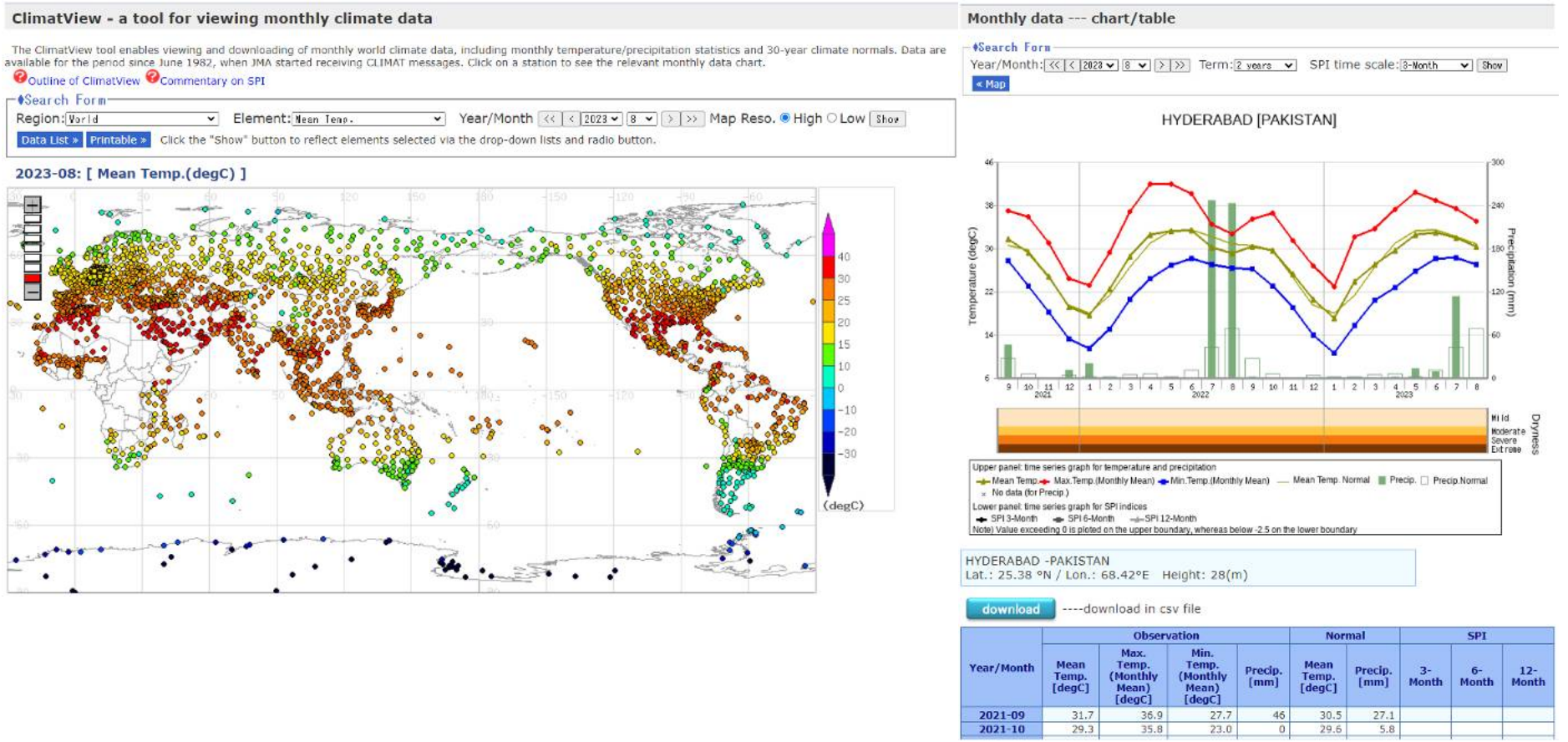
Distribution of Monthly Extreme Climate Events (August 2023) based on CLIMAT



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

ClimatView : monthly base

Powerful tool overviewing and downloading monthly world climate data.
It allows the user to see and obtain monthly mean temperatures, monthly total precipitation amounts, its anomaly/ratio and SPI at all available stations.



Year/Month	Observation				Normal		SPI		
	Mean Temp. [degC]	Max. Temp. (Monthly Mean) [degC]	Min. Temp. (Monthly Mean) [degC]	Precip. [mm]	Mean Temp. [degC]	Precip. [mm]	3-Month	6-Month	12-Month
2021-09	31.7	36.9	27.7	46	30.5	27.1			
2021-10	29.3	35.8	23.0	0	29.6	5.8			

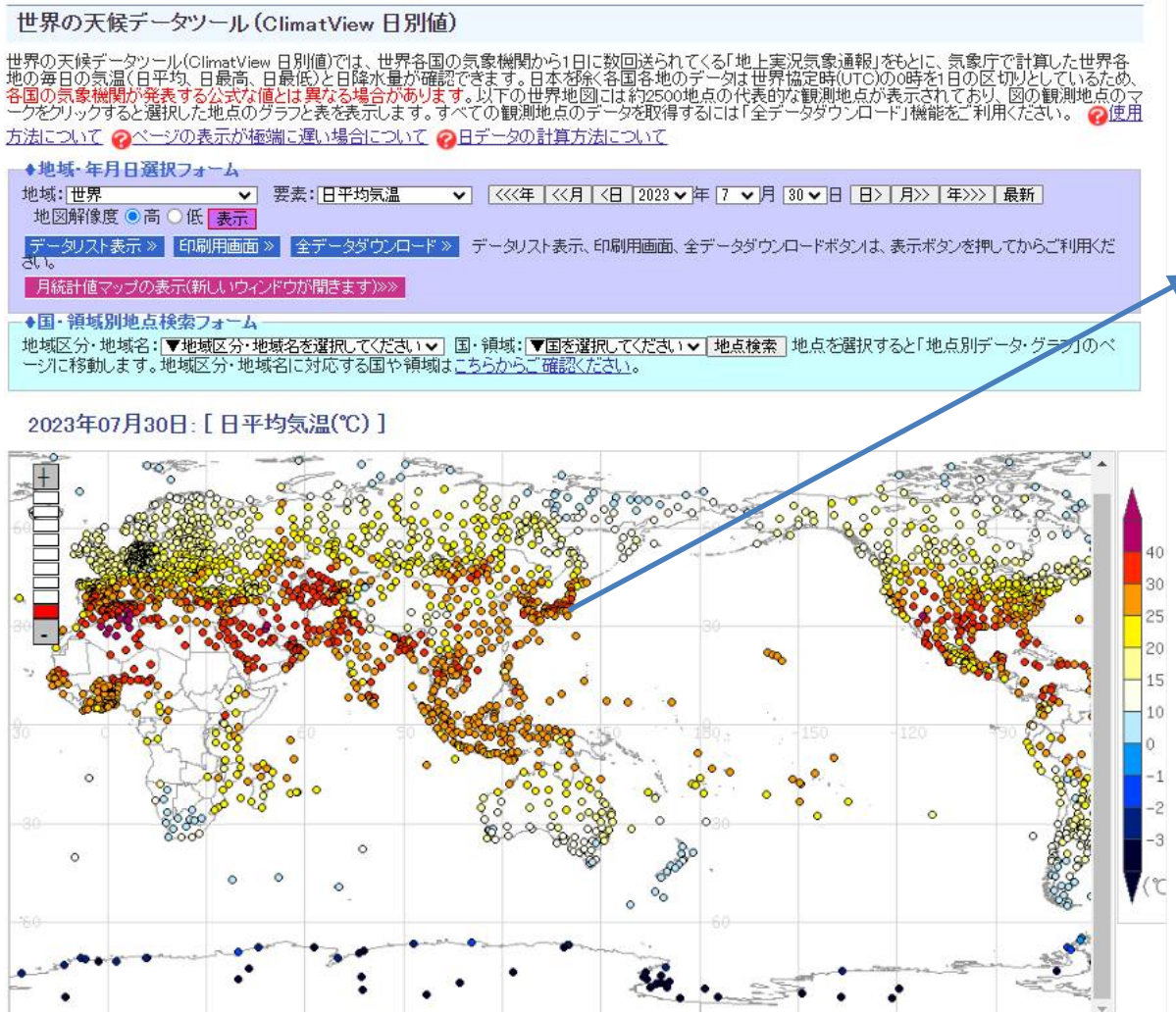
Time series of monthly max/mean/low Temp, monthly Precip and Standard Precip Index with 1, 2,5 and all years

http://www.data.jma.go.jp/gmd/tcc/tcc/products/climate/climatview/frame.php

ClimatView : daily base only in Japanese

Daily data version

- mean/max/min Temp & daily amount of precipitation
- ～2500 stations



Tokyo

東京（トウキョウ） 日本

東京(トウキョウ) -日本
緯度: 35.69° N / 経度: 139.75° E 高度: 25(m)

ダウンロード ——CSVファイルでダウンロード

年月日	日別値			
	日平均気温 ℃	日最高気温 ℃	日最低気温 ℃	日降水量 mm
2023年6月30日	26.3	30.5	23.8	3.0
2023年7月1日	25.3	27.8	21.5	13.5
2023年7月2日	26.0	31.2	20.7	2.5
2023年7月3日	27.3	32.2	23.6	--
2023年7月4日	25.9	30.6	21.3	1.0
2023年7月5日	25.2	28.7	22.5	0.0
2023年7月6日	26.4	33.4	22.0	13.0
2023年7月7日	29.4	34.2	23.8	--
2023年7月8日	27.8	30.9	25.2	0.0
2023年7月9日	28.6	33.0	25.1	0.0
2023年7月10日	30.2	36.5	25.7	--
2023年7月11日	29.4	34.3	25.3	--
2023年7月12日	30.8	37.5	25.1	0.0
2023年7月13日	28.0	30.3	24.2	0.0
2023年7月14日	27.4	30.5	24.8	0.0

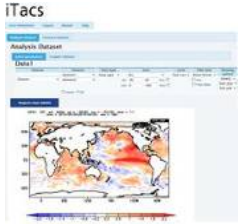
Time series can be displayed for 1,2.3 and 5-months

https://www.data.jma.go.jp/gmd/cpd/monitor/dailyview/index.php

Outcomes of the capacity development activities

● iTacs in support of generating nationally tailored products

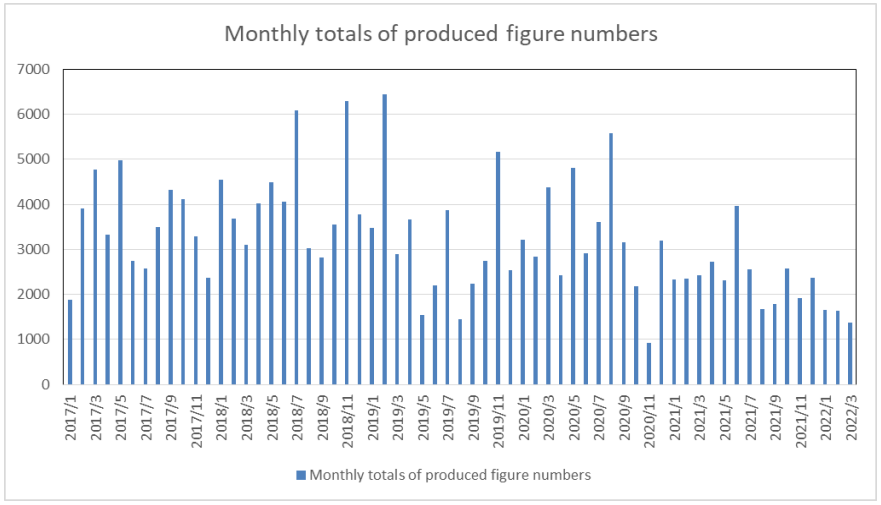
(One of the candidates for Climate Service Toolkit contents)



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.

Number of monthly use by NMHSs (recent 5yrs)

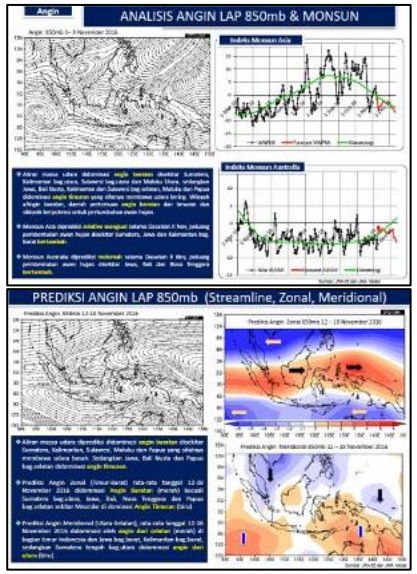
Avg. 3200 figures/1month



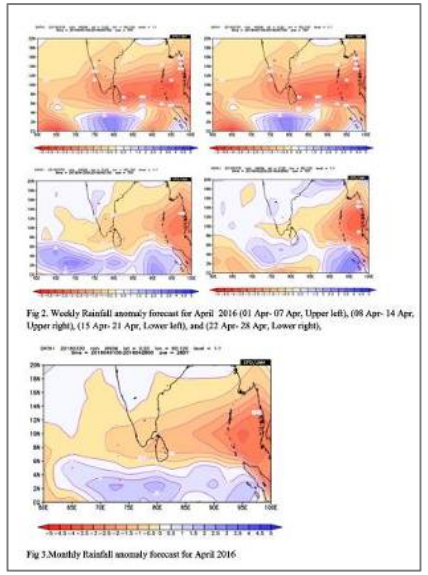
- A case for Indonesia (BMKG) and Sri Lanka (DoM)

The iTacs are used to generate 10-days climate monitoring report in BMKG and one-month forecast products in DoM of Sri Lanka

BMKG



DoM of Sri Lanka



Climate Risk Management (CRM)

This website includes information on the followings to support CRM activities

- Clarification of the basic CRM concept and related processes
- Good practices in CRM conducted by JMA together with partner organizations in the agriculture, apparel/fashion and drugstore industries

Best practices following areas are available from this page

http://www.data.jma.go.jp/gmd/risk/en/index.html

Agricultural sector

To take countermeasures against climate variability by controlling water depth in their rice fields

Apparel industry

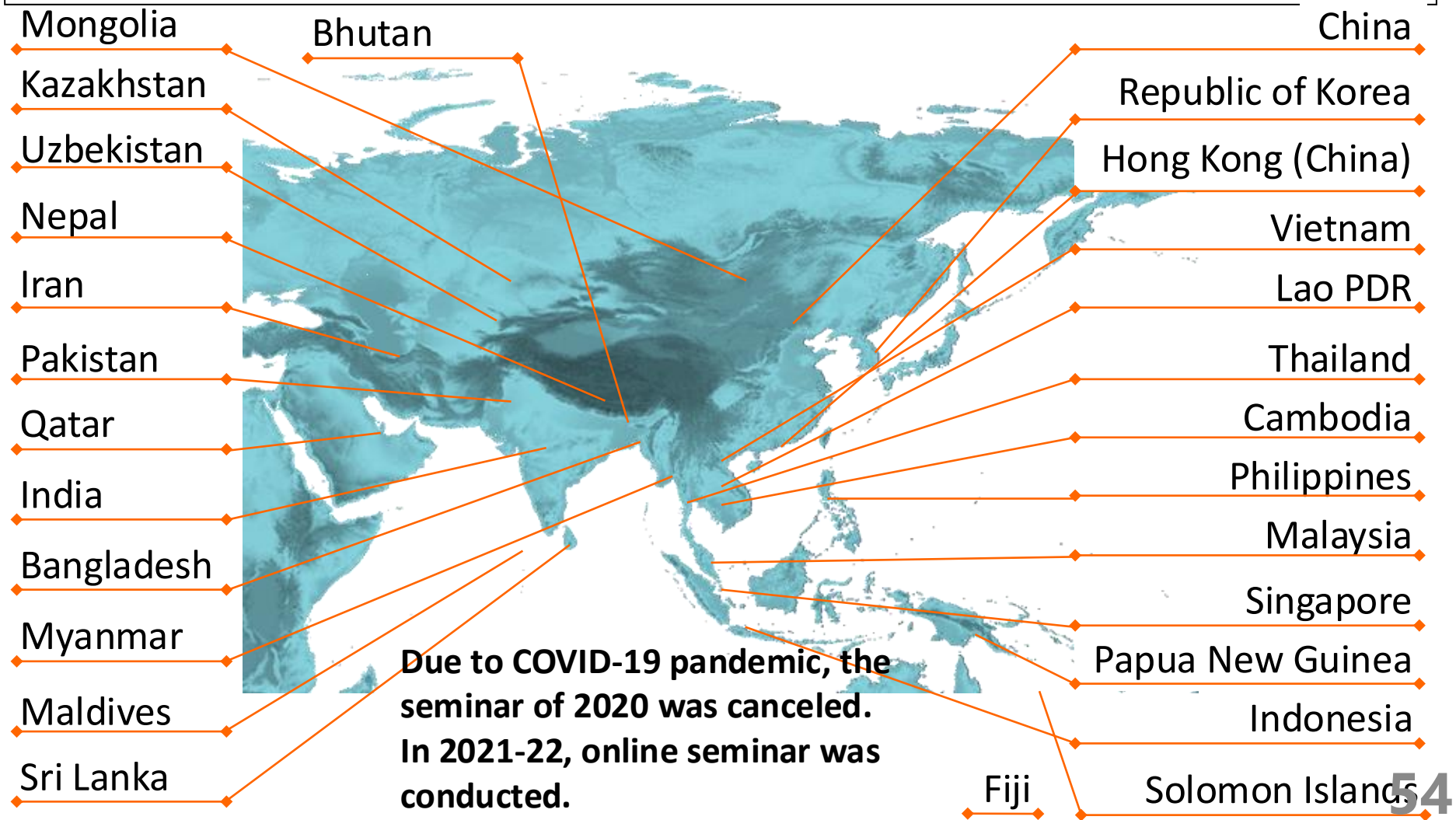
- Control of goods in stock
- Arranging a sales plan

Drugstore company

- Highly affected by temperature

TCC Annual Training Seminar

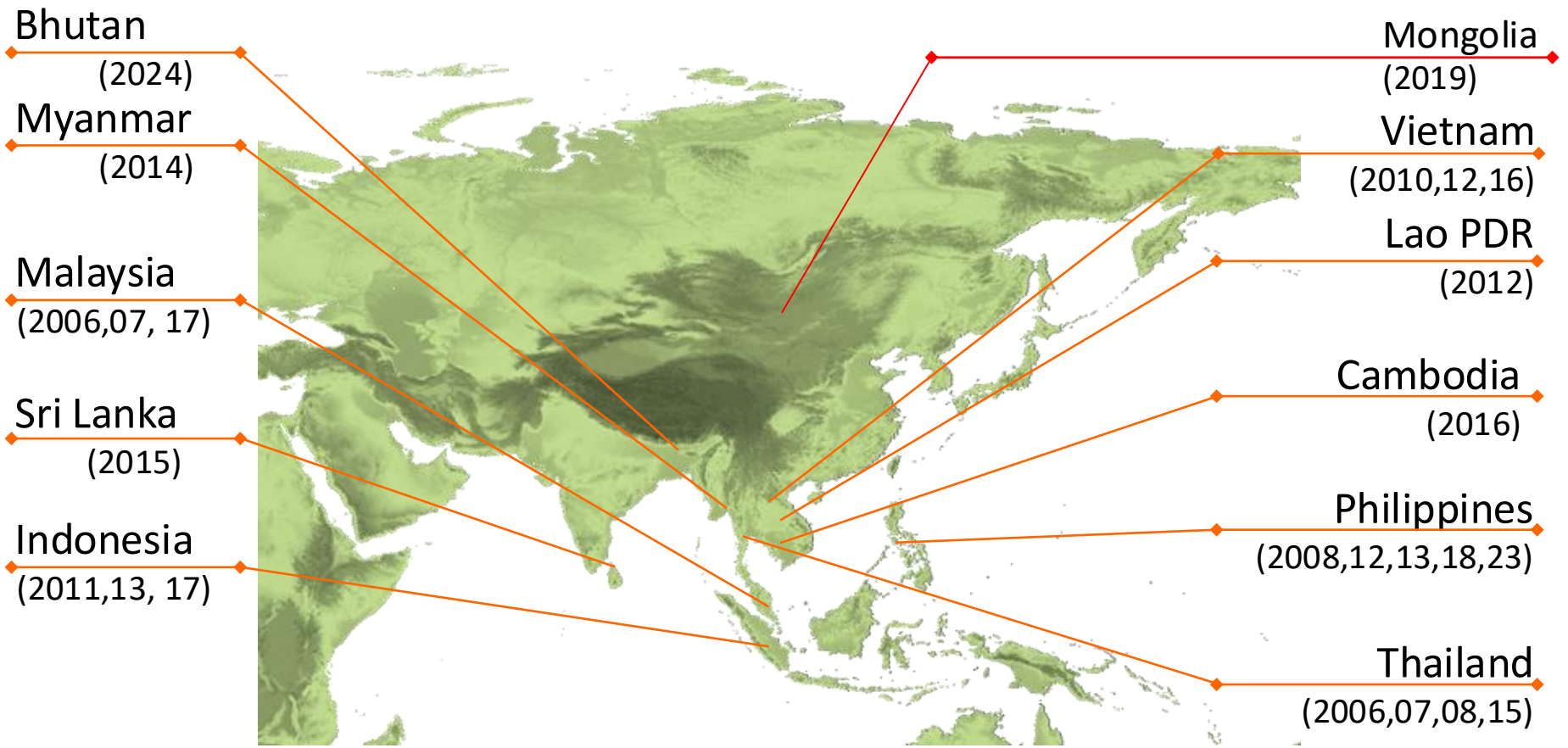
- As part of TCC's capacity developing activity in its role as RCC, TCC holds annual training seminars on the application of its climate monitoring and prediction products.
- A total of **200 experts** from NMHSs of **27 nations/territories** in Asia-Pacific region have attended since 2008. (as of 2022)



Due to COVID-19 pandemic, the seminar of 2020 was canceled. In 2021-22, online seminar was conducted.

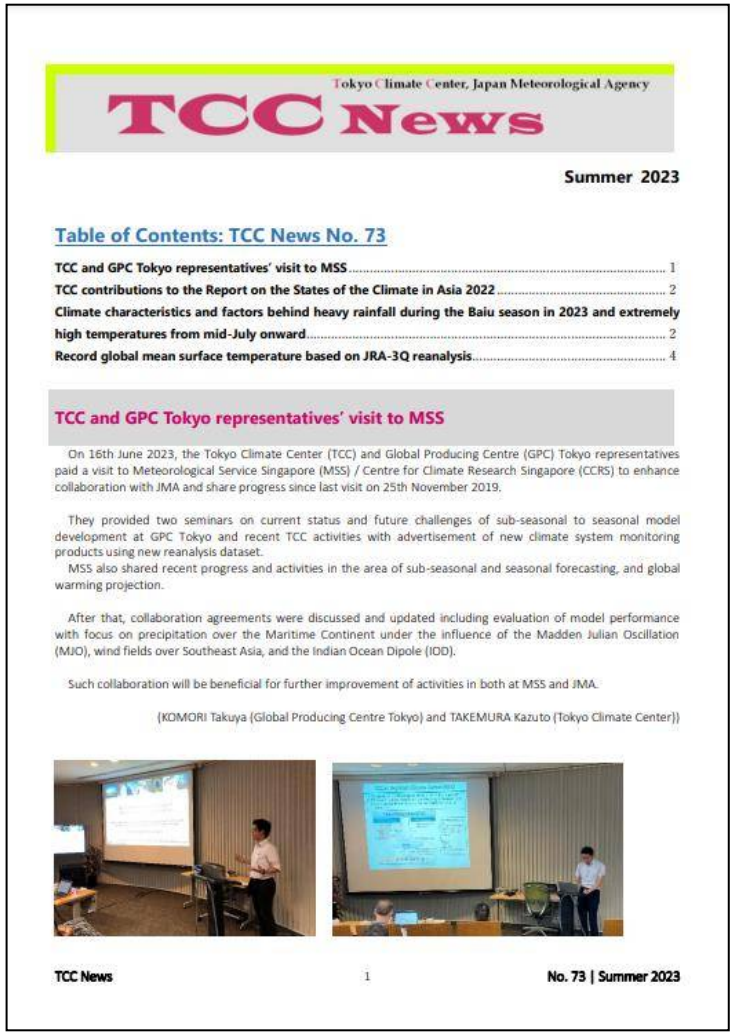
TCC Expert Visit

- TCC has arranged visits by TCC experts to the National Meteorological Services in Asia for discussions, technical cooperation and training seminars since 2006.
- TCC experts visit also aims to share the current challenges of the climate services in each country and to discuss about the request to TCC and future cooperation.



For recent two years, dispatch of experts has been stopped due to COVID-19.

TCC News and Press Releases



Tokyo Climate Center, Japan Meteorological Agency

TCC News

Summer 2023

Table of Contents: TCC News No. 73

TCC and GPC Tokyo representatives' visit to MSS

On 16th June 2023, the Tokyo Climate Center (TCC) and Global Producing Centre (GPC) Tokyo representatives paid a visit to Meteorological Service Singapore (MSS) / Centre for Climate Research Singapore (CCRS) to enhance collaboration with JMA and share progress since last visit on 25th November 2019.

They provided two seminars on current status and future challenges of sub-seasonal to seasonal model development at GPC Tokyo and recent TCC activities with advertisement of new climate system monitoring products using new reanalysis dataset.
MSS also shared recent progress and activities in the area of sub-seasonal and seasonal forecasting, and global warming projection.

After that, collaboration agreements were discussed and updated including evaluation of model performance with focus on precipitation over the Maritime Continent under the influence of the Madden Julian Oscillation (MJO), wind fields over Southeast Asia, and the Indian Ocean Dipole (IOD).

Such collaboration will be beneficial for further improvement of activities in both at MSS and JMA.

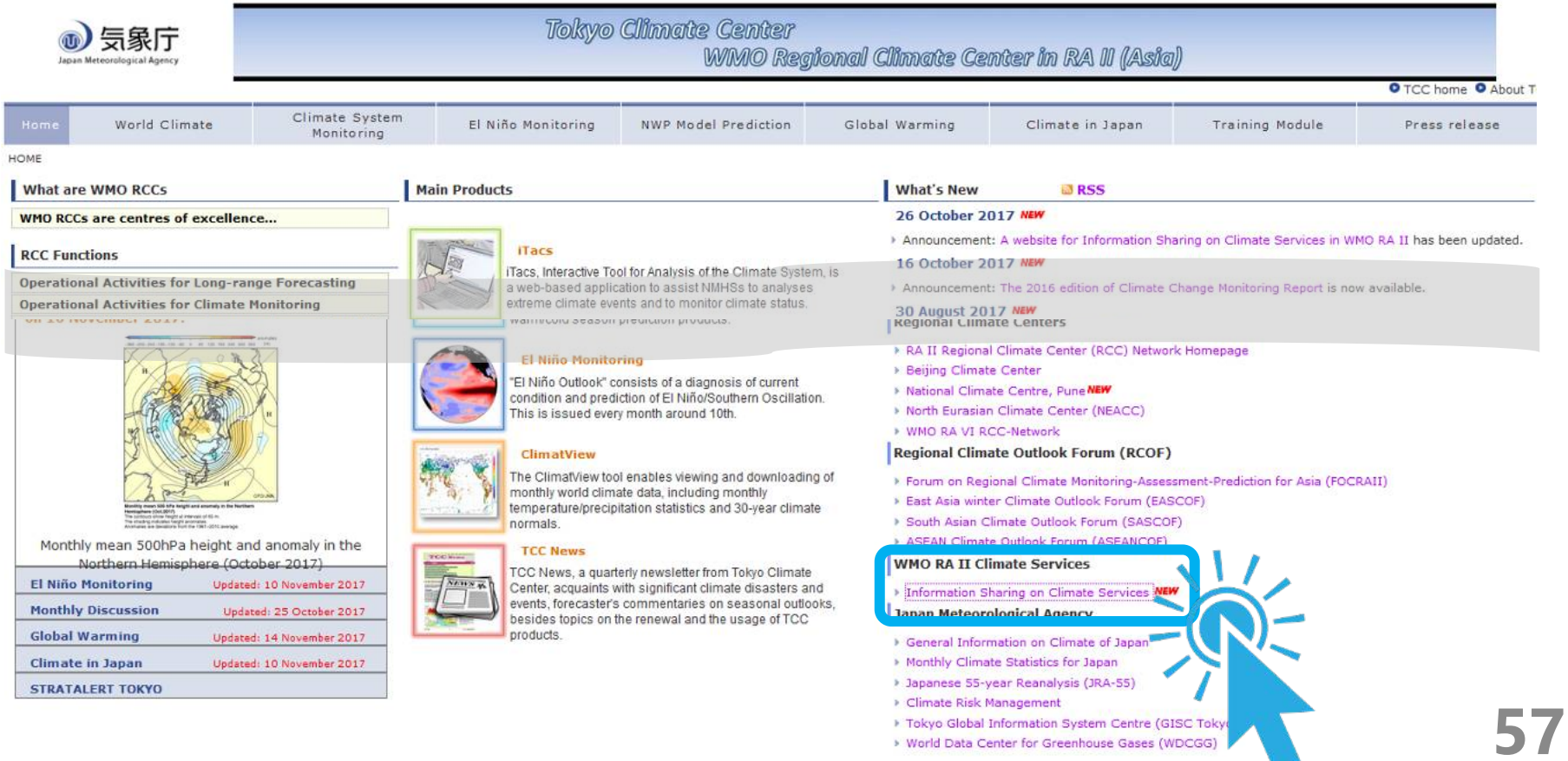
(KOMORI Takuya (Global Producing Centre Tokyo) and TAKEMURA Kazuto (Tokyo Climate Center))

- TCC issues a quarterly newsletter **TCC News** in February, May, August, and November containing the following articles;

✓ latest climate information (significant climate events, seasonal outlook)
✓ introduction of TCC's new products
✓ TCC's relevant activity
✓ contribution to the RCOF
✓ participation in the WMO meeting
✓ annual training seminar
✓ visits by TCC experts

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

TCC's Activities on Information Sharing on Climate Services in WMO RAII



Information Sharing on Climate Services

For the improvement of climate services, it is important **to share information on the services, good practices and lessons** learned in climate-related activities, especially among NMHSs in climatologically similar region.

Viet Nam

Home | Members | Links | Contact us

National Centre for Hydro-Meteorological Forecasting (NCHMF)

Last update: March 2014

I. Overall climate information services

- **Climate information (data and products) provided operationally for the general public and/or for specific information users**
  - Long-range forecasts
  - Analysis and assessment based on historical data
- **URL of a portal website providing climate data/products.**
  http://www.nchmf.gov.vn/ (in Vietnamese)
  http://www.nchmf.gov.vn/web/en-US/70/105/Default.aspx (in English)

II. Long-range forecast

- **Long-range forecast services (URL and language(s) used). Relevant forecasts, such as forecast for onset/end of rainy/dry season, drought advisory/warning and agrometeorological forecast, are also considered as services concerned.**

  Monthly predictions - 2 to 4 weeks
  - Ten-day Forecast
    http://www.nchmf.gov.vn/web/vi-VN/70/15/Default.aspx (in Vietnamese)
  - Monthly Forecast
    http://www.nchmf.gov.vn/web/vi-VN/70/40/Default.aspx (in Vietnamese)
    http://www.nchmf.gov.vn/web/en-US/70/105/Default.aspx (in English)

  Seasonal predictions - 3 to 6 months
  http://www.nchmf.gov.vn/web/vi-VN/70/16/Default.aspx (in Vietnamese)
  http://www.nchmf.gov.vn/web/en-US/70/106/Default.aspx (in English)
- **Methods taken by NMHS to generate long-range forecast products (e.g., model and statistical application). (URLs and language(s) used) if relevant information is provided through the Internet.**

  Based on statistical methods
- **Use of climate products provided by other NMHSs or meteorological institutes for long-range forecast**

  ECMWF, JMA/TCC, NOAA/CPC, IRI, BoM, APCC, WMO LC

III. Climate Monitoring

https://www.data.jma.go.jp/tcc/RaiiInfoshare/