

# **Recent TCC operational activities for Long-range Forecasting (LRF) and others**

WAKAMATSU Shunya  
Tokyo Climate Center  
Japan Meteorological Agency

[tcc@met.kishou.go.jp](mailto:tcc@met.kishou.go.jp)

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

# Tokyo Climate Center of the Japan Meteorological Agency (TCC/JMA)

- TCC serves as a WMO Regional Climate Centre in the RA II.
- TCC supports NMHSs through data/information provision and capacity development activities.

## Tokyo Climate Center (TCC)

### Provision of climate data, information and tools via the Internet

- Seasonal forecasts
- El Nino Outlook
- Report on extreme events
- Global warming
- Climate system analysis
- Reanalysis data

### Capacity Development

- Training seminar
- Expert visit

Asia and Pacific region

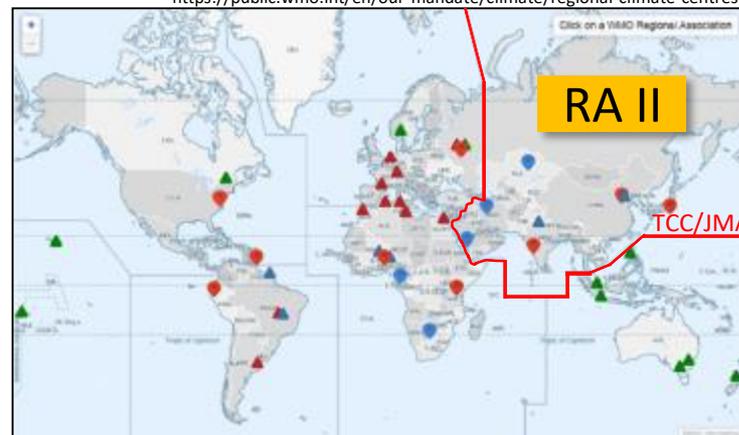
NMHSs

Provision of climate information using TCC data based on national requirements

## Utilization of Climate Information

Disaster risk reduction, Food security, Water resource management etc.

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



### Current status of establishment of RCC

TCC was designated as RCCs in RA II in 2009.

- designated RCC
- designated RCC-Network
- RCC in demonstration phase
- RCC-Network in demonstration phase
- RCC proposed
- RCC-Network proposed

➤ TCC provides a variety of products on climate analysis/prediction and related tools via our TCC website. <https://ds.data.jma.go.jp/tcc/tcc/index.html>

**気象庁**  
Japan Meteorological Agency

**Tokyo Climate Center**  
WMO Regional Climate Center in RA II (Asia)

TCC home About TCC Site Map Contact us

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

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 February 2021

The latest monthly report is issued on 15 February 2021.

Distribution of Extreme Climate Event (January 2021)

**Climate System Monitoring** Updated: 15 March 2021

**El Niño Monitoring** Updated: 10 March 2021

**Monthly Discussion** Updated: 24 March 2021

**Global Warming** Updated: 1 April 2021

**Climate in Japan** Updated: 15 March 2021

**Stratospheric circulation**

**Main Products**

**iTacc**

iTacc, Interactive Tool for Analysis of the Climate System, is a web-based application to assist NMHSs to analyse 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** RSS

**15 March 2021**

- Announcement: Upgrade of the JMA's Global Ensemble Prediction System for one-month prediction

**9 March 2021**

- TCC News No. 63 (Winter 2021: PDF)
- The year 2020 tied with 2016 as the warmest since 1891
- Highlights of the Global Climate in 2020
- Summary of Japan's Climatic Characteristics for 2020
- New Indian Ocean Dipole products
- TCC and WMC Tokyo co-contributions to ASEANCOF-15
- TCC Activity Report for 2020

**28 January 2021**

- Announcement: Launch of Indian Ocean Dipole (IOD) Monitoring website.

**15 January 2021 (updated on 25 January 2021)**

- Press release: Factors behind the heavy snowfall and low temperatures in Japan from mid-December 2020 onward and weather outlook

➤ Previous news  
➤ Press release

**Links**

**Regional Climate Centers**

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

**Regional Climate Outlook Forum (RCOF)**

- Forum on Regional Climate Monitoring-Assessment-Prediction for Asia (FOCRA11)
- East Asia winter Climate Outlook Forum (EASCOF) **NEW**
- South Asian Climate Outlook Forum (SASCOF)
- ASEAN Climate Outlook Forum (ASEANCOF)

**WMO RA II Climate Services**

➤ TCC provides a variety of online data on climate analysis/prediction and related tools via our TCC website. <https://ds.data.jma.go.jp/tcc/tcc/index.html>

The image shows a screenshot of the Tokyo Climate Center (TCC) website. The header includes the JMA logo and the text "Tokyo Climate Center WMO Regional Climate Center in RA II (Asia)". The navigation menu includes "Home", "World Climate", "Climate Monitoring", "Global Warming", "Climate in Japan", "Training Module", "Press release", and "Links".

**Main Products** (indicated by a blue callout box):

- iTacs**: Interactive Tool for Analysis of the Climate System is a web-based application to assist NMHSs to analyze 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.

**Other website features and callouts:**

- RCC Functions** (indicated by a red callout box):
  - 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
- Training Materials** (indicated by a green callout box): Training Module in the navigation menu.
- Interactive Analysis Tool: iTacs** (indicated by a blue callout box).
- WMC Tokyo Numerical prediction products** (indicated by a blue callout box).
- Support materials for interpreting: Monthly Discussion** (indicated by a blue callout box).
- El Niño and IOD Monitoring** (indicated by a blue callout box).
- Interactive Monitoring Tool: ClimatView** (indicated by a blue callout box).
- RCC Mandatory Functions (summarized)** (indicated by a red callout box): A red box highlights the "RCC Functions" section.
- What's New**: RSS feed with updates like "15 March 2021" and "28 January 2021".
- Latest Updates**: "World Climate" report updated on 15 February 2021.
- Footer**: "WMO RA II Climate Services".

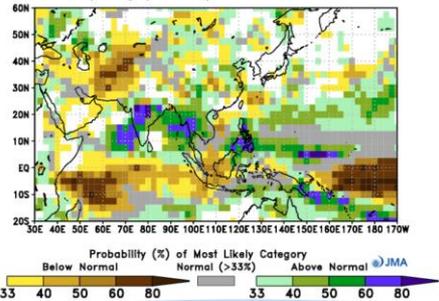
➤ Monthly Discussion on Seasonal Climate Outlook summarizes TCC monitoring and prediction products with brief forecaster's comments.

# Monthly Discussion

## <AMJ 2021> Probability Forecasts (precipitation)

- A high probability of above-normal precipitation is predicted in South Asia and in the northwestern and northeastern parts of Southeast Asia.
- A high probability of below-normal precipitation is predicted from the equatorial Indian Ocean to the southwestern part of Southeast Asia and around the date line in the equatorial Pacific.

JMA Seasonal Forecast (Forecast initial month is 03 2021)  
Most likely category of Precipitation for AMJ 2021

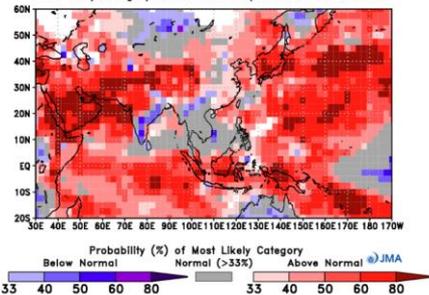


## Probability Forecast

## <AMJ 2021> Probability Forecasts (temperature)

- A high probability of above-normal temperatures is predicted in the southern part of Southeast Asia, from the Middle East to the western part of East Asia, and in the northeastern part of East Asia.

JMA Seasonal Forecast (Forecast initial month is 03 2021)  
Most likely category of Surface Temperature for AMJ 2021



Verification based on hindcast  
[https://ds.data.jma.go.jp/tcc/tcc/products/model/probfcst/3-mon/hind/html/skill\\_reg\\_3-mon.html](https://ds.data.jma.go.jp/tcc/tcc/products/model/probfcst/3-mon/hind/html/skill_reg_3-mon.html)  
[https://ds.data.jma.go.jp/tcc/tcc/products/model/probfcst/3-mon/hind/html/skill\\_2d\\_3-mon.html](https://ds.data.jma.go.jp/tcc/tcc/products/model/probfcst/3-mon/hind/html/skill_2d_3-mon.html)

### MJO diagram

<Feb...> **CH200 ANOM 5S-5N**  
 0° 60°E 120°E 180° 120°W 60°W

• The active phase of equatorial intraseasonal oscillation was seen over the western Pacific in the first half of the month, and became obscure afterward.

Time-longitude cross-section of velocity potential anomalies (m<sup>2</sup>/s) and MJOs.

## Asian Circulation Prediction

- In the 850-hPa stream function field, cyclonic circulation anomalies straddling the equator are predicted from the Indian Ocean to the Maritime Continent.
- In the sea level pressure field, negative anomalies are predicted from the Indian Ocean to the western tropical Pacific.
- Above-normal precipitation is predicted over the northern Indian Ocean and the western tropical North Pacific, and below-normal precipitation is predicted near the date line in the equatorial Pacific.

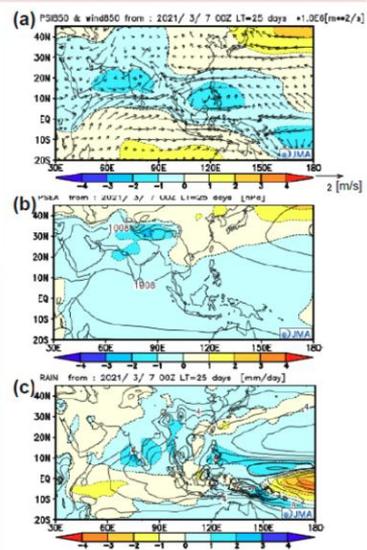
Three month mean

(a) 850-hPa stream function anomalies and wind vector anomalies  
 Contour&Shading: 850-hPa stream function anomalies (10<sup>6</sup> m<sup>2</sup>/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)

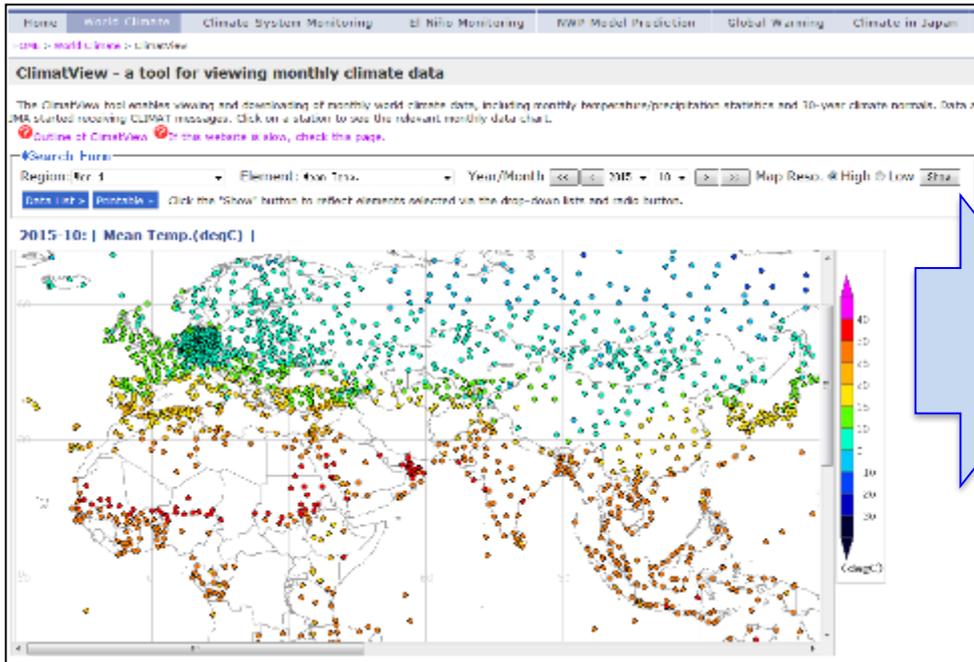
(c) precipitation and its anomalies  
 Contour: precipitation (mm/day)  
 Shading: precipitation anomalies (mm/day)

Verification based on hindcast <https://ds.data.jma.go.jp/tcc/tcc/products/model/hindcast/fc03/indav.html>

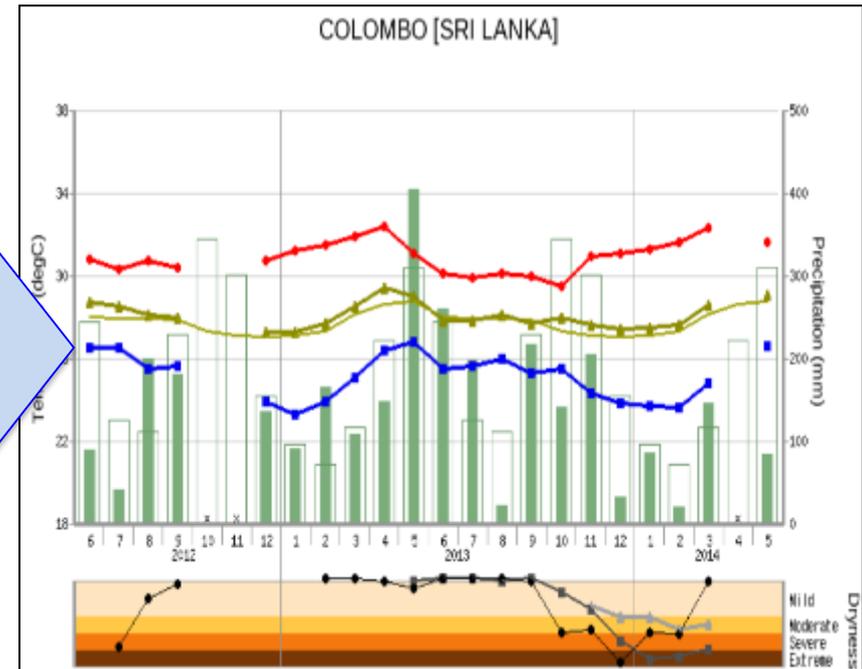


➤ TCC provides interactive monitoring tool overviewing and downloading monthly world climate data of temperature and precipitation amounts. SPI (drought index recommended by WMO) is also calculated and shown in the same figure. (newly added in 2019)

## ClimatView



Monthly climate data over the world since 1982 are available.



Time series of monthly max., mean and min. temperatures, monthly precipitation and Standard Precipitation Index (SPI)

➤ New Indian Ocean Dipole (IOD) products, such as monitoring indices and statistical results of IOD impacts on climate, are now available on the TCC website. (newly added in 2021)

# IOD index

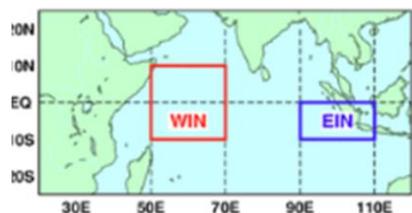
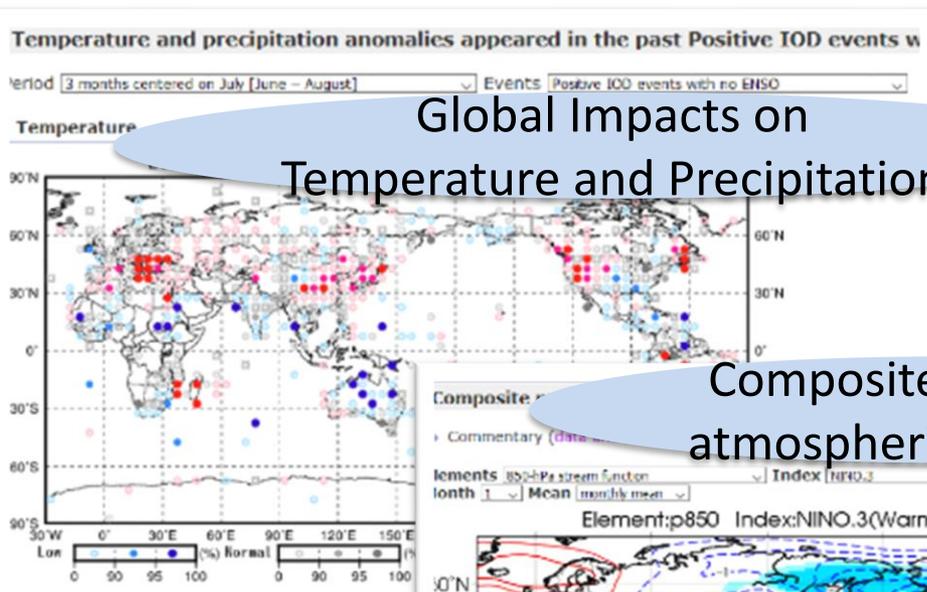
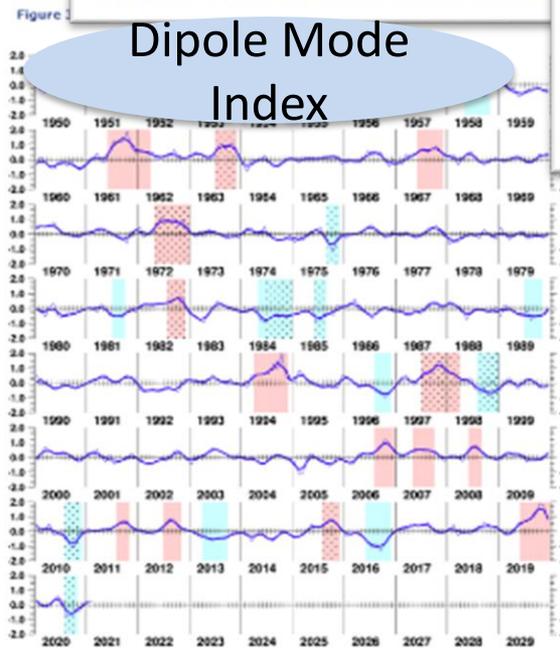


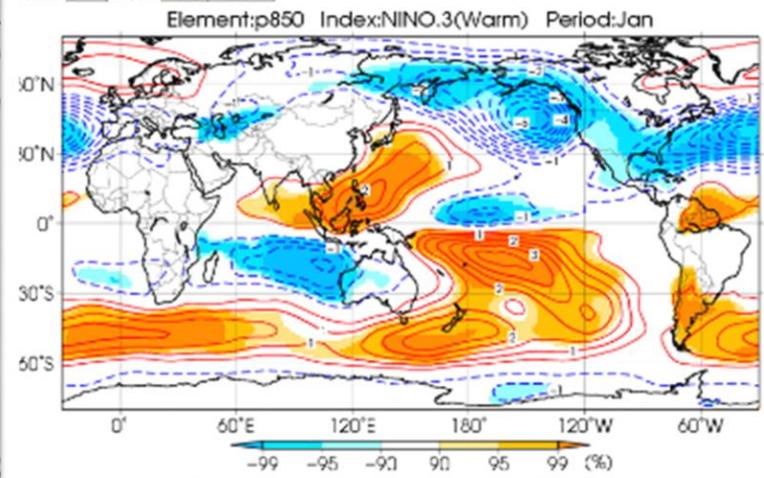
Figure 2. Regions for IOD monitoring indices

## Dipole Mode Index



## Global Impacts on Temperature and Precipitation

## Composite analysis of atmospheric circulation



monthly mean composite of 850-hPa stream function anomalies in the positive (warm) phase of NINO.3 (Jan). contours show composite anomalies at intervals of  $0.5 \times 10^6 \text{ m}^2/\text{s}$ . shading indicates the confidence level. the base period for composite analysis is 1958 - 2012, while that for the three-month means of November-December

➤ Two step process to change the normal period from the current 1981 – 2010 to 1991 – 2020.

**Main Products**

-  **ITacs**  
ITacs, Interactive Tool for Analysis of the Climate System, is a web-based application to assist NMHSs to analyse 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.

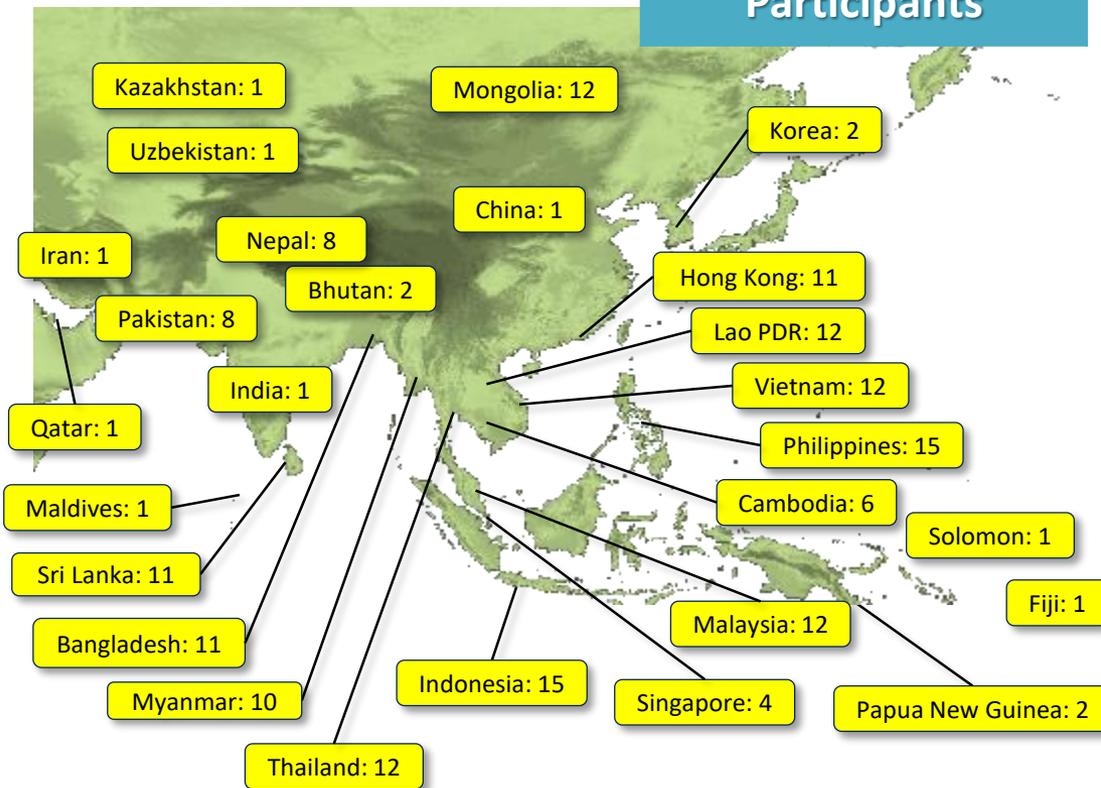
➤ From **May 19 2021** onward, TCC products (other than those of WMC Tokyo for long-range forecasting) has been based on the 1991 – 2020 normal period.

➤ In **early 2022**, WMC Tokyo GPV products for long-range forecasting will follow.

- TCC holds its training seminar every year since 2008 (except 2020), welcoming Experts from NMHSs in Asia-Pacific region.
- TCC dispatches experts to NMHSs as necessary to provide technical support by holding a follow-up training seminar.

# Training Seminar

## Participants



		Theme
1	Nov. 2008	Climate Information and Forecasting
2	Dec. 2009	Climate Analysis using Reanalysis Data
3	Jan. 2011	Application of Seasonal Forecast Gridded Data to Seasonal Forecast Products
4	Nov. 2011	One month Forecast Products
5	Nov. 2012	Climate Analysis Information
6	Nov. 2013	Seasonal Forecast Products
7	Jan. 2015	Global Warming Projection Information
8	Nov. 2015	One-month Forecast
9	Nov. 2016	Primary Modes of Global Climate Variability and Regional Climate
10	Jan. – Feb. 2018	Seasonal Forecast
11	Nov. 2018	One-month Forecast
12	Nov. 2019	Climate Analysis Information on Extreme Climate Events

➤ In order to support better management of climate-related risks, JMA has developed best practices for climate risk management in the fields of agriculture, health, energy and retailing.

➤ The climate risk management process involves three steps:

1. **Awareness:** Based on dialogue, develop awareness in various user sectors
2. **Assessment:** quantify climate risks by using past climate data
3. **Adaptation:** take action by using JMA's climate forecast products.

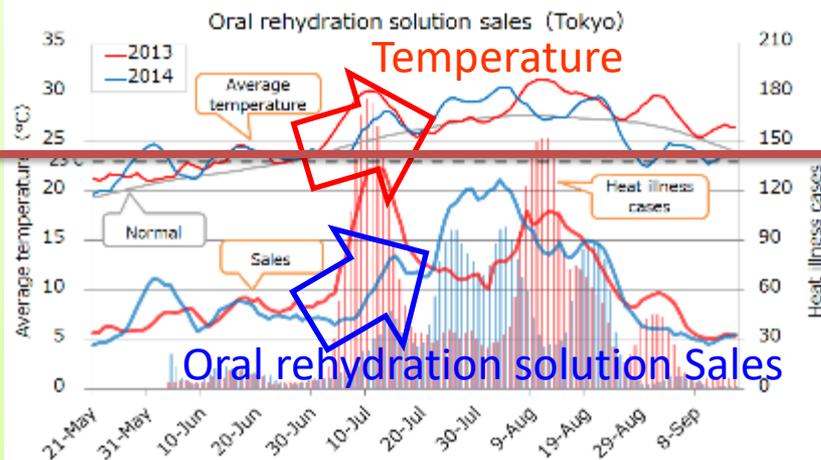


Dialogue with The Japan Association of Chain Drug Stores and sharing knowledge of drug store sales data.

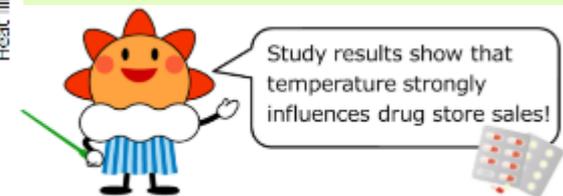
Find that sales increase sharply when the temperature reaches 23°C.

Modify supply volume from warehouses to stores

23°C



Reports are available here:  
<https://www.data.jma.go.jp/gmd/risk/en/index.html>



**Thank you for your attention.**