# TCC Activity Report for 2021

**In 2021, the Tokyo Climate Center (TCC) continued to support the climate services of National Meteorological and Hydrological Services (NMHSs) in Asia-Pacific countries by providing and enhancing data and products, holding training seminars, publishing quarterly newsletters and participating in online international meetings.**

## 1. Enhancement of data/products/tools on the TCC website

### 1.1 Issuance of special reports on extreme events

In a mandate role as a WMO Regional Climate Centre (RCC) in Regional Association II (RAII), TCC monitors world climate conditions with focus on Asia and its surrounding area. The Center issues reports on extreme climate events and summaries of the Asian summer/winter monsoon on its website (https://ds.data.jma.go.jp/tcc/tcc/products/clisys/reports/index.html).

A series of heavy snowfall events hit Japan from mid-December 2020 onward, especially on the Sea of Japan side, with new records observed in some places. TCC issued a press release on factors behind this snowfall and low temperatures around the country, and uploaded an English-language report to its website (https://ds.data.jma.go.jp/tcc/tcc/news/press_20210115.pdf).

Japan experienced record-warm weather conditions in March, and TCC issued a report summarizing the related characteristics of atmospheric circulation anomalies and the underlying mechanisms. The information was published in English on the Center's website (https://ds.data.jma.go.jp/tcc/tcc/news/press_20210421.pdf).

In mid-August 2021, areas from western to eastern Japan experienced record-heavy rain. In this context, the Japan Meteorological Agency (JMA), with the help of the Tokyo Climate Center Advisory Panel on Extreme Climatic Events (see TCC News No. 28), investigated atmospheric and oceanic conditions considered to have contributed to such climate extremes and summarized related primary factors. The comprehensive report is available on the website (https://ds.data.jma.go.jp/tcc/tcc/news/press_20210924.pdf).

### 1.2 Upgrade of the Global Ensemble Prediction System for One-month Prediction

JMA upgraded its Global EPS for one-month prediction on 1st April 2021, increasing the number of vertical model levels from 100 to 128 and improving surface/atmospheric initial conditions. Hindcast gridded data and verification charts for the new EPS are available to registered users via the TCC website.

Elsewhere, the provision of 2.5-degree forecast and hindcast gridded data for one-month prediction was terminated on 25 March 2021.

The ensemble size of forecast data for each initial day was changed from 24 to 25 for Tuesday and from 26 to 25 for Wednesday.

### 1.3 Release of Indian Ocean Dipole products

The Indian Ocean Dipole (IOD) is a major mode of interannual climate variability in the tropics, significantly affecting climate conditions on regional and global scales. From discussions with NMHSs (such as those held during the 2019 visit to Meteorological Service Singapore), TCC recognized a need to gather information on this mode. In response, the Center released new online IOD products on 28 January 2021, including data related to monitoring and associated effects on global climate/atmospheric

circulation. A brief description of the products is provided in TCC News No. 63.

### 1.4 Update of website on RA II Information sharing for Climate Services

For the improvement of climate services and successful implementation of the Global Framework for 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. However, such important information has not so far been fully shared among NMHSs in WMO RA II. In response to Decision 35 taken at the 16th session of Regional Association II (RA II) to improve information sharing on climate services in the region, TCC operates a dedicated website (https://ds.data.jma.go.jp/tcc/RaiiInfoshare/, see TCC News No.36 for more information).

A November 2021 questionnaire survey conducted by TCC for updating of the website generated responses from more than 10 Members thanks to the kind cooperation of their involvement. Based on the information provided, the site was updated and refined in December 2021.

### 1.5 Operational application of new climatological normals for 1991 – 2020

Under the Technical Regulations of the World Meteorological Organization (WMO-No. 49), climatological standard normals are averages of climatological data computed for 30-year periods (e.g., 1 January 1981 to 31 December 2010, 1 January 1991 to 31 December 2020 and so forth.) Countries should calculate climatological standard normals as soon as possible after the end of a standard normal period.

TCC switched from the previous climatological normal period of 1981 – 2010 to 1991 – 2020 on 19 May 2021. TCC products (other than those from WMC Tokyo for long-range forecasting and Model Prediction for NINO Regions) have been based on this new period since that date.

## 2. Capacity development

TCC holds annual training seminars as part of capacity-development activities related to its role as an RCC in RA II. In addition to running annual training seminars, it also arranges expert visits to and hosts visitors from NMHSs to support exchanges of views on climate services and the effective transfer of technology.

### 2.1 Training seminar

TCC holds training seminars every fiscal year (April – March), with the December 2021 event covering one-month forecasts. The seminar was held online for the first time due to COVID-19. Details of the events are reported in TCC News No. 66.

## 3. International meetings

### 3.1 Regional Climate Outlook Forums

RCCs are expected to actively contribute to and lead profound discussions in Regional Climate Outlook Forums (RCOFs). In 2021, TCC experts participated in the following RCOFs in Asia:

- Seventeenth session of the Forum on Regional Climate Monitoring, Assessment and Prediction for Regional Association II (FOCRA II-17) held online, on 7 May
- Nineteenth session of the South Asian Climate Outlook Forum (SASCOF-19) held online, from 26 to 28 April
- Twentieth session of the South Asian Climate Outlook Forum (SASCOF-20) held online, from 27

to 30 September
- Ninth session of the East Asia winter Climate Outlook Forum (EASCOF-9) held online, on 4 November
- Seventeenth session of the ASEAN Climate Outlook Forum (ASEANCOF-17) held online, from 22 to 26 November
- Twentieth session of the North Eurasian Climate Forum (NEACOF-20) held online, on 20 May

TCC attendees gave presentations on seasonal predictions based on JMA's numerical model and participated in discussions toward the formulation of a consensus statement on regional forecasts.

In collaboration with TCC, a representative from the World Meteorological Centre Tokyo (WMC Tokyo) attended FOCRA II-17, SASCOF-19, SASCOF-20, and NEACOF-20 online. WMC Tokyo also produced presentation materials for ASEANCOF-17.

## 4. Publications

TCC has published its newsletter (TCC News) on a quarterly basis since 2005. The publication is intended to enhance communication and provide information to NMHSs and related communities about recent TCC developments, events and activities as well as details of the Center's reports on the state of the climate, monitoring results and outlooks. In 2021, TCC News No. 63 – 66 were issued and made available on the TCC website.

## 5. Plans for 2022

**- Contribution to the Global Framework for Climate Services (GFCS)**

RCCs are expected to play a major role in the implementation of the GFCS. TCC plans to further strengthen its activities and lead RA II's contribution to the Framework. Such activities include the provision of further assistance to NMHSs for better climate services, as well as maintenance of the portal site for Information Sharing on Climate Services in RA II.

**- New/upgraded data, products and tool development**

As per TCC News No. 65, on 14 February 2022 JMA upgraded its Seasonal Ensemble Prediction System (Seasonal EPS) from JMA/MRI-CPS2 to JMA/MRI-CPS3, which was adopted as the basis for three-month prediction products such as gridded date files, forecast maps and verification maps. Model forecasts of SST anomalies for NINO regions (provided via the El Niño and Indian Ocean Dipole online resources) were also influenced by the upgrade.

Specifications for operational forecasting were changed from 13 ensemble members every 5 days to 5 ensemble members every day. The baseline period for seasonal forecast products was also changed to 1991 – 2020.

In line with this upgrade, TCC plans to switch from CPS2 to CPS3 data provision as per the description page. CSP2 2.5-degree gridded data (GPV) for three-month and warm/cold-season prediction were discontinued in January 2022, and those for six-month prediction will still be provided for a few months in parallel with the new CPS3 gridded data.

Further enhancements of the new dataset planned for autumn 2022 include the utilization of JRA-3Q (Japanese Reanalysis for Three-Quarters of a Century), COBE-SST2 (Centennial in situ Observation-Based Estimates of the Variability of SST and Marine Meteorological Variables, version 2), and

MOVE/MRI.COM-G3 (the Multivariate Ocean Variational Estimation/Meteorological Research Institute Community Ocean Model - Global version 3). These improvements will influence several products on the TCC website, including the interactive iTacs tool, with details to be provided in due course.

**- Capacity development**

In the last quarter of the year, TCC will hold its annual training seminar with a dozen invited experts as attendees. The Center will also continue to dispatch experts to NMHSs as necessary and host visitors from NMHSs upon request. The format of these activities (i.e., online or in person) will depend on COVID-19 developments.

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