TCC Activity Report for 2020

In 2020, 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, publishing quarterly newsletters and hosting/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).

Winter in Japan (December 2019 to February 2020) was the warmest since 1897/98, with significantly lower snowfall than usual. TCC issued a press release on primary factors causing these conditions, with two English-language reports provided on its website (https://ds.data.jma.go.jp/tcc/tcc/news/press_20200127.pdf, https://ds.data.jma.go.jp/tcc/tcc/news/press_20200501.pdf).

Stagnation of the active Meiyu-Baiu front over Japan brought record-heavy rainfall from western to northeastern parts of the country in July (officially titled the Heavy Rain Event of July 2020) along with record-low sunshine durations. In collaboration with the Tokyo Climate Center Advisory Panel on Extreme Climatic Events (see TCC News No. 28), the Japan Meteorological Agency (JMA) reported on primary atmospheric and oceanic conditions associated with these extremes (https://ds.data.jma.go.jp/tcc/tcc/news/press_20200916.pdf).

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

JMA upgraded its Global Ensemble Prediction System (Global EPS) for one month prediction on 24th March 2020. In addition to improved physical parameterization schemes in the forecast model, new relaxation method for its oceanic boundary condition was also implemented. Along with the Global EPS upgrade, JMA released higher-resolution global 1.25-degree grid data for one-month prediction in GRIB2 format, which involves spatial differencing and complex packing for reduced data volume. The data are provided to authenticated users on the TCC website at https://ds.data.jma.go.jp/tcc/tcc/gpv/index.html. The hindcast data are also provided to authenticated users in the same website.

1.3 Release of Global Gridded Datasets for 6-month Forecasts

In response to received requests from NMHSs and other international centers, JMA began providing global 2.5-degree gridded datasets for 6-month forecasts every 5-days. The data are provided to authenticated users at https://ds.data.jma.go.jp/tcc/tcc/gpv/index.html.

1.4 Security of TCC interactive product pages (iTacs and JMA One-month Guidance Tool)

To ensure online security for interactive product pages, TCC began requiring secure website connections in November, thereby eliminating unencrypted communication with iTacs and JMA's

One-month Guidance Tool. Users of these pages should change the website address from http to https as follows:

- iTacs (Interactive Tool for Analysis of the Climate System)
  https://extreme.kishou.go.jp/tool/itacs-tcc2015/
- JMA's One-month Guidance Tool
  https://extreme.kishou.go.jp/cgi-bin/simple_guidance/index.cgi

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's annual training seminar was not held in FY 2020 due to COVID-19 and related travel restrictions. The Center is considering the potential for running the seminar in FY 2021.

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 2020, TCC experts participated in the following RCOFs in Asia:

- Sixteenth session of the Forum on Regional Climate Monitoring, Assessment and Prediction for Regional Association II (FOCRA II-16) held online, on 7 May
- Sixteenth session of the South Asian Climate Outlook Forum (SASCOF-16) held online, from 20 to 22 April
- Seventeenth session of the South Asian Climate Outlook Forum (SASCOF-17) held online, from 23 to 28 September
- Eighth session of the East Asia winter Climate Outlook Forum (EASCOF-8) held online, on 5 November (Hosted by JMA; see 3.2 for details.)

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 the 15th session of the ASEAN Climate Outlook Forum (ASEANCOF-15) online to present TCC's climate outlook for the region.

3.2 EASCOF

The eighth EASCOF session (EASCOF-8) was hosted online by JMA on 5 November 2020 with the presence of more than 30 experts from China, Japan, Mongolia and the Republic of Korea and a special contribution by experts from the North Eurasia Climate Centre (NEACC). Attendees discussed recent phenomena related to seasonal prediction of the East Asian Winter Monsoon (EAWM) and reached a consensus on seasonal outlooks for the coming winter. A WMO representative outlined the organization's objective seasonal prediction strategy, and a UN ESCAP representative detailed the

organization's proposal for impact-based forecasting based on seasonal climate prediction in the region. Forum materials used in the session are available via the EASCOF portal website (https://ds.data.jma.go.jp/tcc/tcc/library/EASCOF/index.html).

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 2020, TCC News No. 59 – 62 were issued and made available on the TCC website.

5. Personnel changes

Having served as TCC head since 2018, TAKATSUKI Yasushi took over as director of the Meteorological Research Institute on 1st April 2020. He was succeeded by FUJIKAWA Norihisa, who also serves as the director of JMA's Climate Prediction Division.

6. Plans for 2021

- 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

From discussions with NMHSs (such as those held during the 2019 visit to Meteorological Service Singapore), TCC recognized the relevance of gathering information regarding the Indian Ocean Dipole (IOD) mode for improved climate forecasts. In response to demand, the Center planned to start providing new IOD information/products in January 2021.

Due to a change in calculation scheduling for the Global Ensemble Prediction System, the number of ensemble members for each base time (00 UTC on Tuesday and Wednesday) will be changed in gridded data files for one-month prediction. However, as the total number of ensemble members (50) will not change, the GPV format will remain the same. No significant modification for users' analysis commands is needed. The Extreme Forecast Index (EFI) and other TCC products will be slightly influenced by the ensemble member change, but usability will not be affected.

As per TCC News No. 60, the old low-resolution 2.5-degree grid data of the Global EPS for one-month prediction in GRIB2 format was provided as a temporary measure for the transition period. Since JMA will stop providing these data online at the end of March 2021, authenticated users should switch to the current 1.25-degree grid data.

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

TCC also plans to change the normal period from the current 1981 – 2010 to 1991 – 2020 in a two-step process. From spring 2021 onward, TCC products (other than those of WMC Tokyo for long-range forecasting) will be based on the 1991 – 2020 normal period, and WMC Tokyo GPV products will follow in spring 2022. TCC will add notations to avoid confusion over any differing normal values during the transition period.

Further improvements are planned for spring 2022, including increased resolution for TCC's Global Ensemble Prediction System for operational one-month forecasting. Details will 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 hosting or in-person attendance) will depend on the status of the COVID-19 pandemic.