TCC's recent development

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URL: http://ds.data.jma.go.jp/tcc/tcc/index.html

Contents

- Pilot Project on Information Sharing on Climate Services
- Monthly Discussion on Seasonal Climate Outlooks
- New/Upgraded Products/Services

Tokyo Climate Center (TCC)

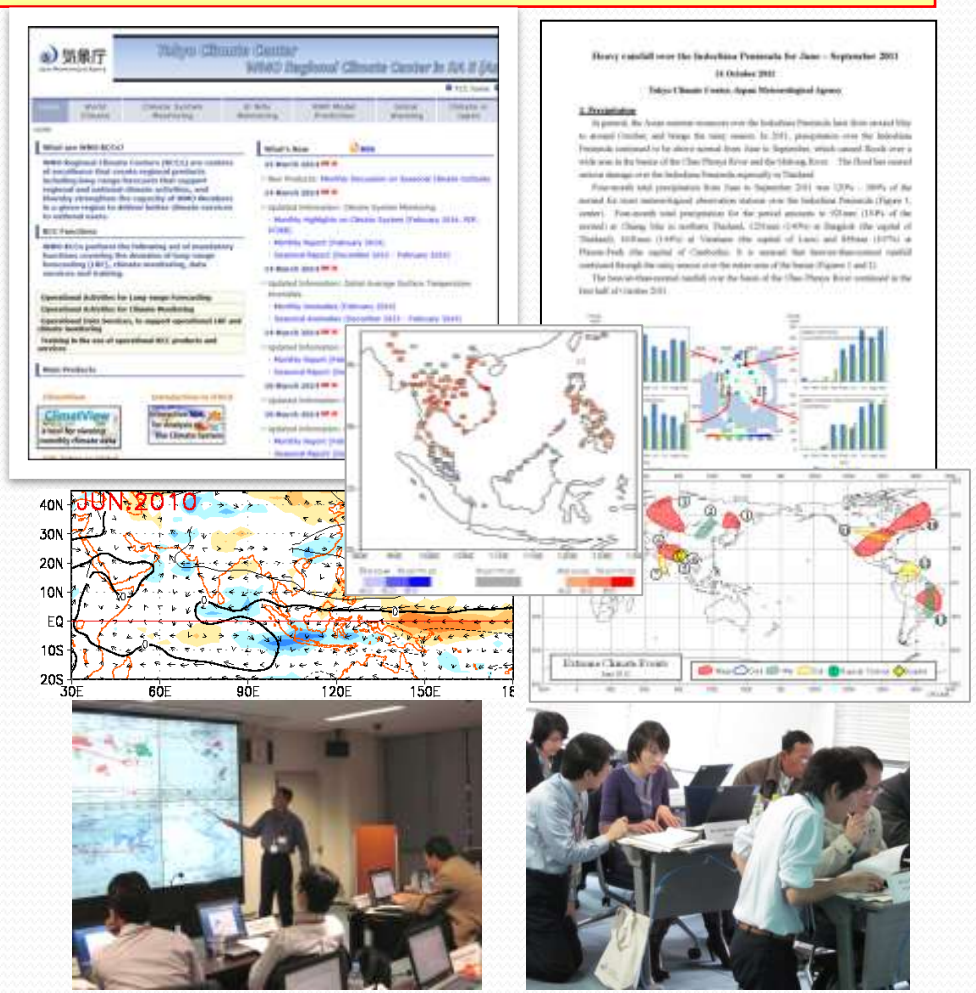
- TCC serves as a WMO Regional Climate Center in the RA II.
- TCC supports NMHSs through data/information provision and capacity development activities.

Tokyo Climate Center (TCC)

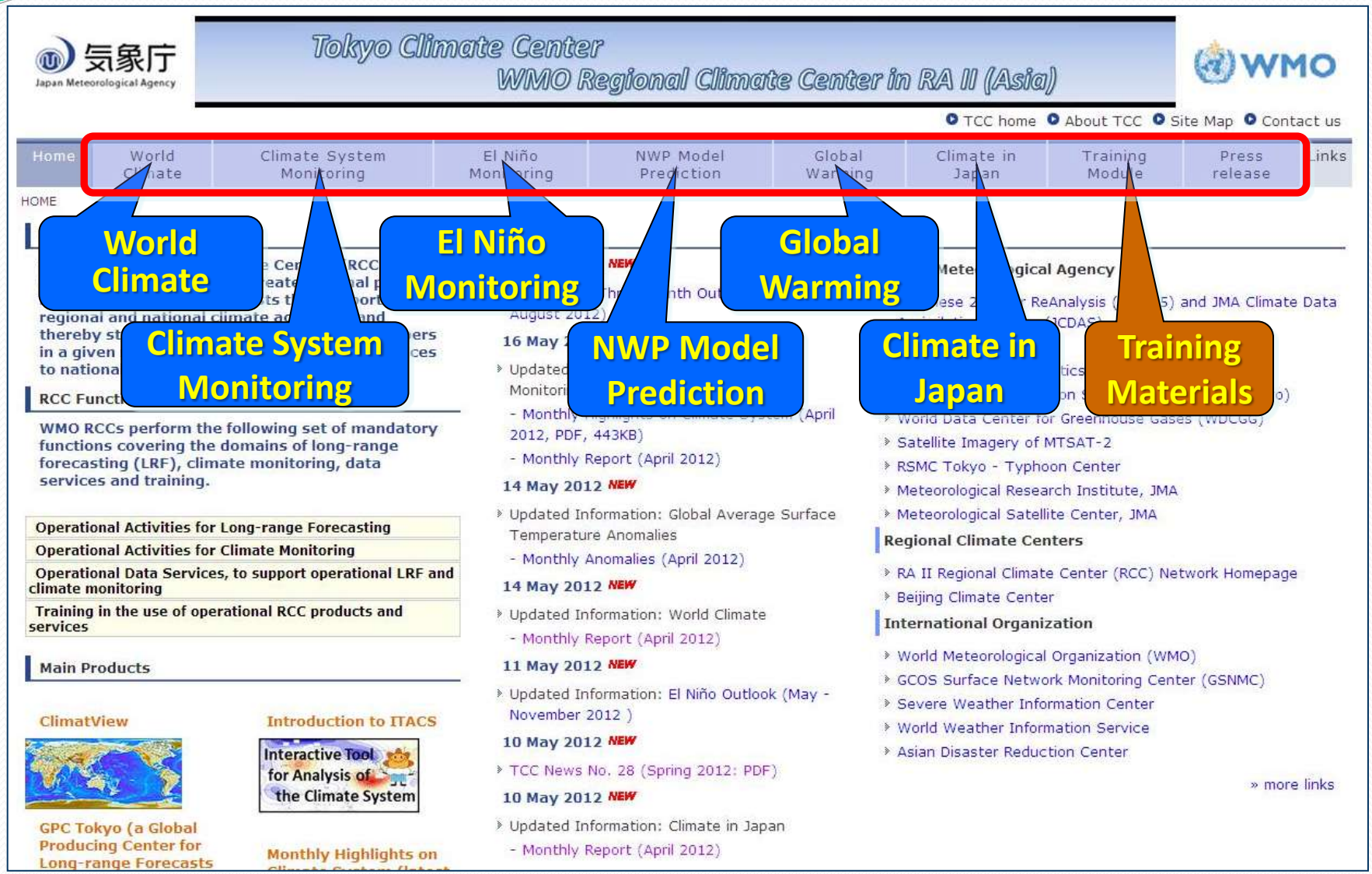
- **Provision of climate data and information via the Internet**
  - Seasonal forecasts
  - Global warming
  - Report on extreme events
  - Climate monitoring
  - Climate system analysis
  - Reanalysis data
- **Capacity Development**
  - Training seminar
  - Expert visit

NMHSs in Asia
- Provision of climate information using TCC data based on national requirements

- Natural disaster reduction
- Food security
- Water management



TCC website



http://ds.data.jma.go.jp/tcc/tcc/index.html

RA II Pilot Project on Information Sharing on Climate Services (1)

Purpose

To collect and share information on climate services provided by NMHSs as well as good practices in RA II in the application of climate information to various fields, such as agriculture, health and water management.

Sharing lessons learned and best practices among NMHSs

-To develop projects and improve climate services by NMHSs

-To avoid duplication and minimize the risk of failure

RA II decided to establish the pilot project at its 15th session in December 2012 (Doha, Qatar)

RA II Pilot Project on Information Sharing on Climate Services (2)

Procedure

A questionnaire developed and disseminated to registered focal points in RA II (about 30 Members)

Responses from about 20 Members

Based on the responses, a dedicated webpage developed and released in March 2014

Your inputs/updates are welcome!

Questionnaire for the
Pilot Project on Information Sharing on Climate Services

I. Overall climate information services

1-1 What kind of climate information (data and products) does your NMHS provide operationally for the general public and/or for specific information users? (Please check all that apply.)

- ☐ Long-range forecast
- ☐ Climate monitoring
- ☐ Analysis and assessment based on historical data
- ☐ Historical climate data
- ☐ El Niño monitoring and outlook
- ☐ Climate change projection
- ☐ Long-term trend
- ☐ Others (please describe.)

1-2 Does your NMHS operate a portal website providing climate data/products? If yes, please give the URL.

- ☐ Yes (URL: _____)
- ☐ No

II. Long-rangeforecast

2-1 Does you NMHS provide long-range forecast service? If yes, please check all that apply and give URL(s) (and language(s) used) for these services.

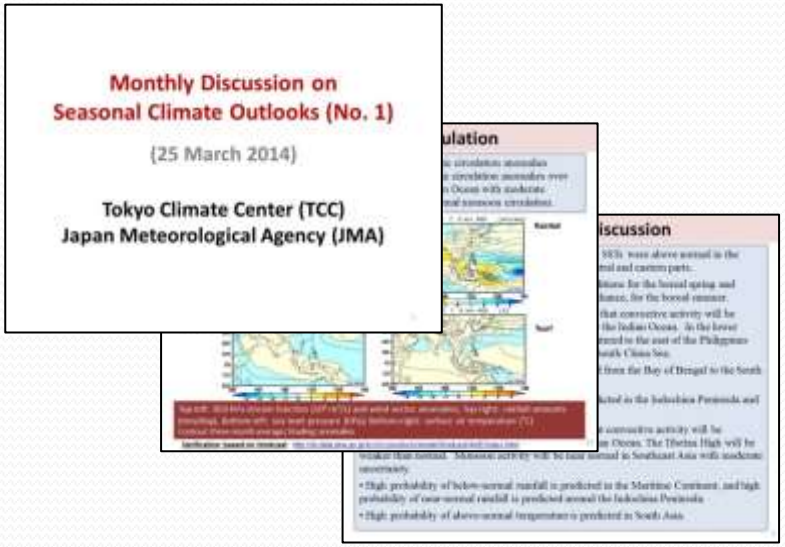
(Extended-range weather forecast (10-30 days) and long-range forecasting (30 days up to two years) (both defined by WMO) can be checked here. Reliable forecasts, such as forecast for onset/end of rainy season, drought advisory/warning and agrometeorological forecast, are also considered as services concerned in this questionnaire.)

- ☐ Yes
  - ☐ Monthly predictions – one to six weeks
    URL: _____
  - ☐ Sub-seasonal predictions – six weeks to two months
    URL: _____
  - ☐ Seasonal predictions – three to six months
    URL: _____
  - ☐ Annual predictions – six to twelve months
    URL: _____

http://ds.data.jma.go.jp/tcc/pilot/index.html

"Monthly Discussion on Seasonal Climate Outlooks" (1)

- On 25 March 2014, TCC started providing a new product of "***Monthly Discussion on Seasonal Climate Outlooks***" on its website.
- The Monthly Discussion is intended to assist NMHSs in the Asia-Pacific region in interpreting and assessing GPC Tokyo's products for three-month prediction and warm/cold season prediction and understanding the current conditions of the climate system.



Provision

Feedback

TCC
organizing materials

NMHSs
making seasonal outlooks

"Monthly Discussion on Seasonal Climate Outlooks" (2)

- The Monthly Discussion consists of chapters on Summary and Discussion, Latest State of the Climate System, Three-month Predictions, Warm/Cold Season Predictions, and Explanatory Note, updated around 25th of every month.
- TCC welcomes comments and requests from NMHSs so that the it will be further improved for use in making seasonal outlooks at respective NMHSs.

Outline

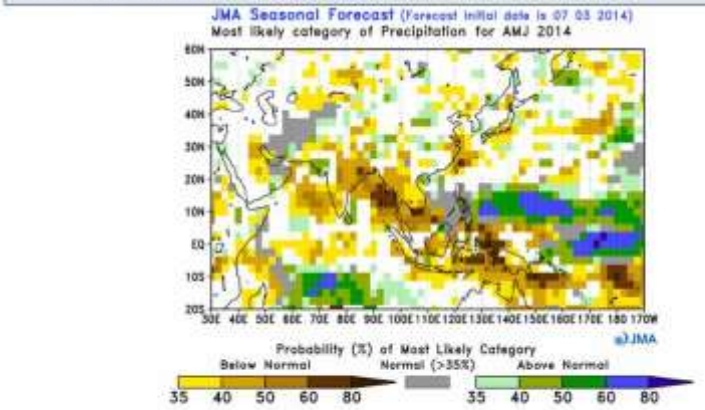
1. Summary and Discussion <Slide 3>
2. Latest State of the Climate System (Feb. 2014) <Slides 4 – 13>
3. Three-month Predictions (Apr. – Jun. 2014) <Slides 14 – 20>
4. Explanatory Note <Slides 21 – 24>

Note:

- The present monthly discussion is intended to assist National Meteorological and Hydrological Services (NMHSs) in WMO RA II (Asia) in interpreting GPC Tokyo's seasonal prediction products. It does not constitute an official forecast for any nation. Seasonal outlooks for any nation should be obtained from the relevant NMHS.
- Seasonal predictions are based on a JMA's Seasonal Ensemble Prediction System (EPS) of the coupled atmosphere-ocean general circulation model (CGCM).
- JMA provides three-month prediction products around 20th every month with warm season (Jun. – Aug.)/cold season (Dec. – Feb.) prediction products in Feb. Mar. and Apr. /Sep. and Oct.

<AMJ 2014> Probability Forecasts (precipitation)

- High probability of above-normal rainfall is predicted to the east of the Philippines and in the equatorial dateline region.
- High probability of below-normal rainfall is predicted in many parts of South Asia with moderate prediction skill and of Southeast Asia.



Verification based on hindcast

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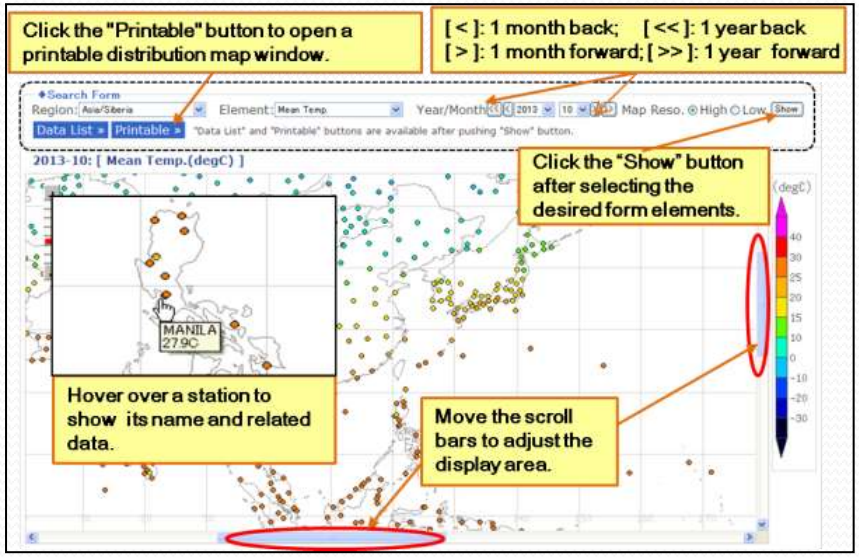
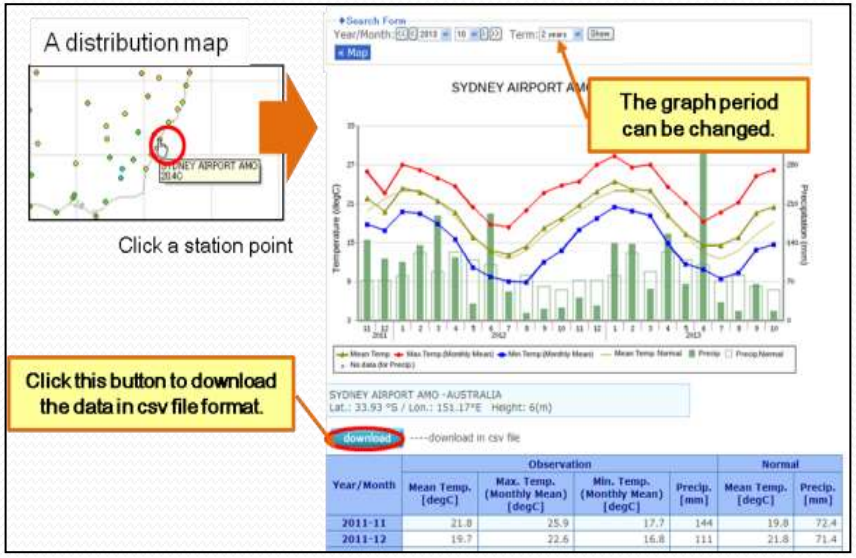
http://ds.data.jma.go.jp/tcc/tcc/products/model/prob/cst/4mE/hnd/html/skill_2d_4mE.html

http://ds.data.jma.go.jp/tcc/tcc/products/model/index.html

Upgraded Tool for viewing monthly climate data

TCC completed revision of the **ClimatView** online interactive climate database allowing users to see and obtain monthly mean temperatures, monthly total precipitation amounts and its anomaly or ratio at all available stations.
To view ClimatView graphics in the previous version, a plug-in (Adobe SVG Viewer for Windows Internet Explorer) was required. The new version is designed to allow browsing without plug-ins using PHP and its graphic library. It enables viewing with web browsers including Firefox and Google Chrome in addition to Internet Explorer.

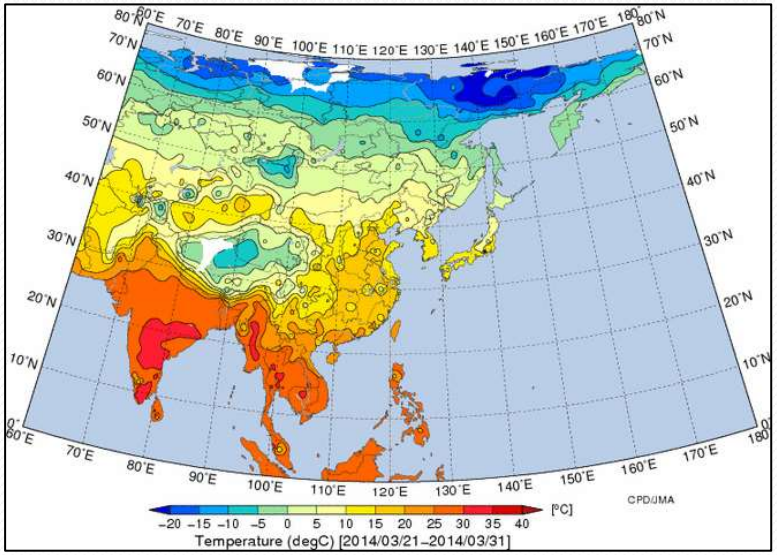




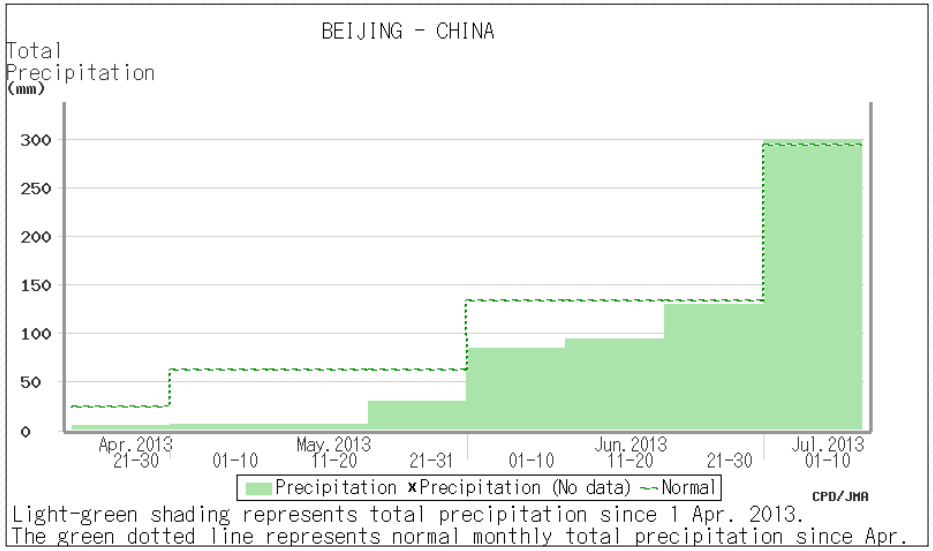
http://ds.data.jma.go.jp/gmd/tcc/tcc/products/climate/climatview/frame.php

Regional map of ten-day/half-monthly mean temperatures and total precipitation

In July 2013, TCC started providing new climate monitoring products called **Regional Maps** on its website These resources enable users to easily monitor the regional distribution of 10-day and half-monthly mean temperatures and total precipitation in Africa, Asia, South America, North America, Oceania and Europe.



Ten-day mean temperatures in Asia

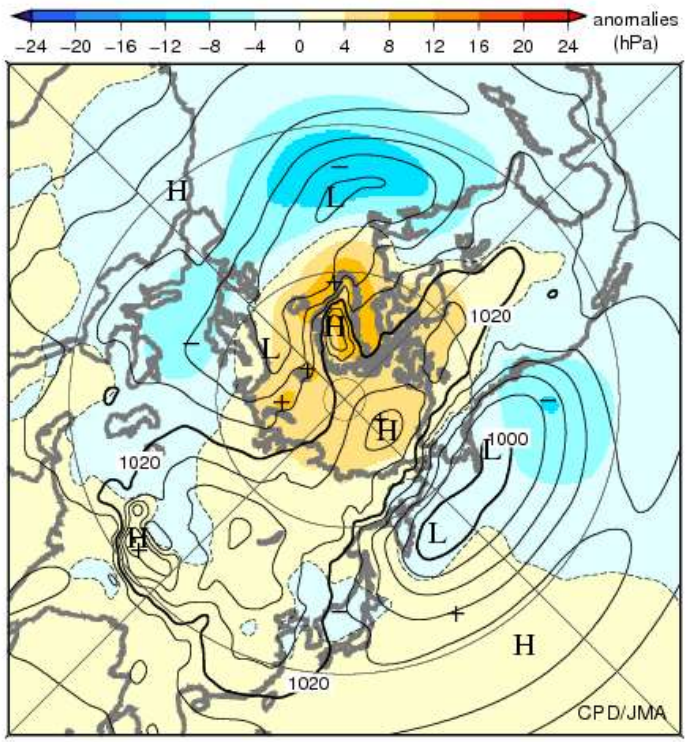


Time-series graphs of total precipitation

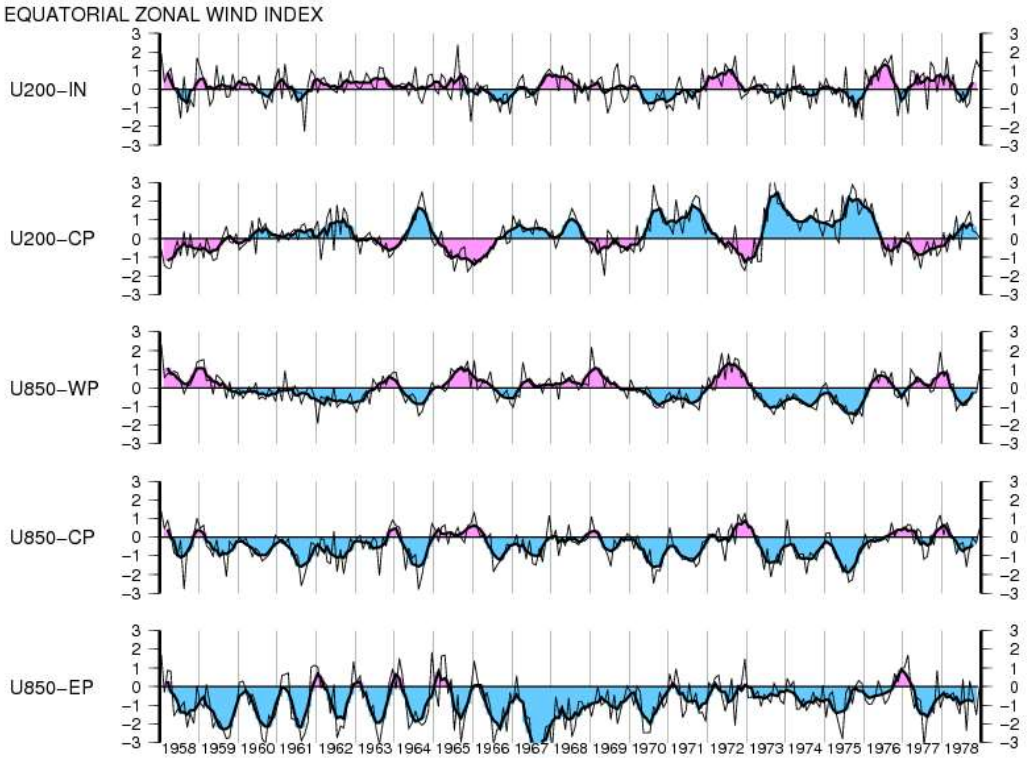
http://ds.data.jma.go.jp/tcc/tcc/products/climate/rmap/rmap.php

Climate Products using JRA-55 data

In response to the release of JRA-55 data (http://jra.kishou.go.jp/JRA-55/index_en.html), all climate system monitoring products generated using JRA-25 data has been replaced by versions generated using JRA-55 data.
JRA-55 data has also been made available in Interactive Tool for Analysis of the Climate System (ITACS; http://extreme.kishou.go.jp/tool/itacs-tcc2011/).



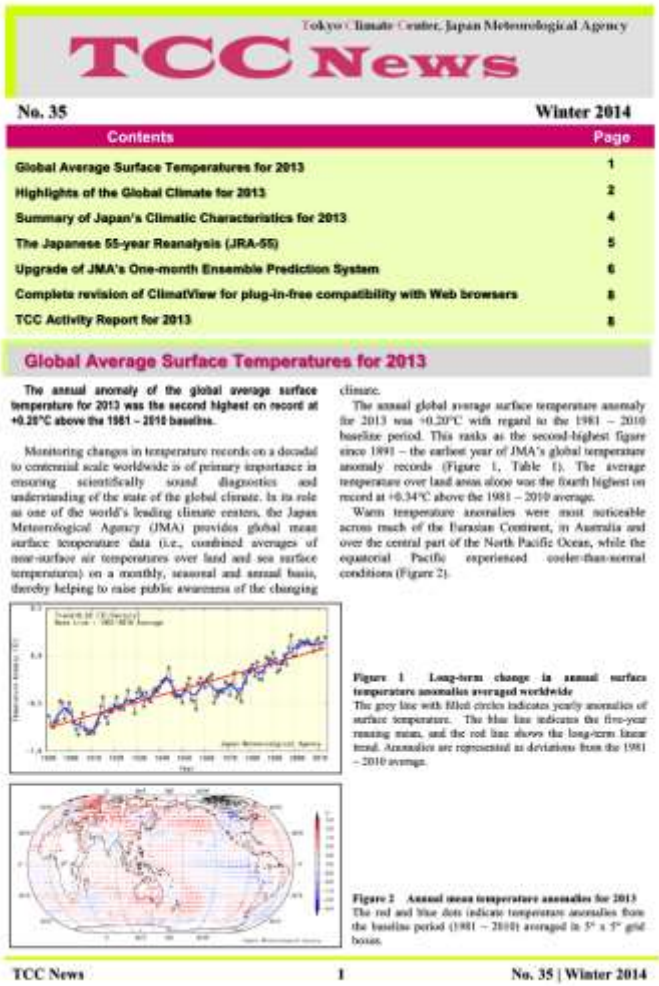
Three month mean sea level pressure and anomaly in the Northern Hemisphere (Jan.1958–Mar.1958)
The contours show sea level pressure at intervals of 4 hPa.
The shading indicates sea level pressure anomalies.
Anomalies are deviations from the 1981–2010 average.



Time–series representation of equatorial zonal wind indices
The thin and thick lines indicate monthly and five month running mean values, respectively.

http://ds.data.jma.go.jp/tcc/tcc/products/clisys/acmi.html

TCC News



Tokyo Climate Center, Japan Meteorological Agency

TCC News

No. 35 Winter 2014

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Highlights of the Global Climate for 2013	2
Summary of Japan's Climatic Characteristics for 2013	4
The Japanese 55-year Reanalysis (JRA-55)	5
Upgrade of JMA's One-month Ensemble Prediction System	6
Complete revision of ClimatView for plug-in-free compatibility with Web browsers	8
TCC Activity Report for 2013	8

Global Average Surface Temperatures for 2013

The annual anomaly of the global average surface temperature for 2013 was the second highest on record at +0.28°C above the 1981 – 2010 baseline.

Monitoring changes in temperature records on a decadal to centennial scale worldwide is of primary importance in ensuring scientifically sound diagnostics and understanding of the state of the global climate. In its role as one of the world's leading climate centers, the Japan Meteorological Agency (JMA) provides global mean surface temperature data (i.e., combined averages of near-surface air temperatures over land and sea surface temperatures) on a monthly, seasonal and annual basis, thereby helping to raise public awareness of the changing climate.

The annual global average surface temperature anomaly for 2013 was +0.20°C with regard to the 1981 – 2010 baseline period. This ranks as the second-highest figure since 1891 – the earliest year of JMA's global temperature anomaly records (Figure 1, Table 1). The average temperature over land areas alone was the fourth highest on record at +0.34°C above the 1981 – 2010 average.

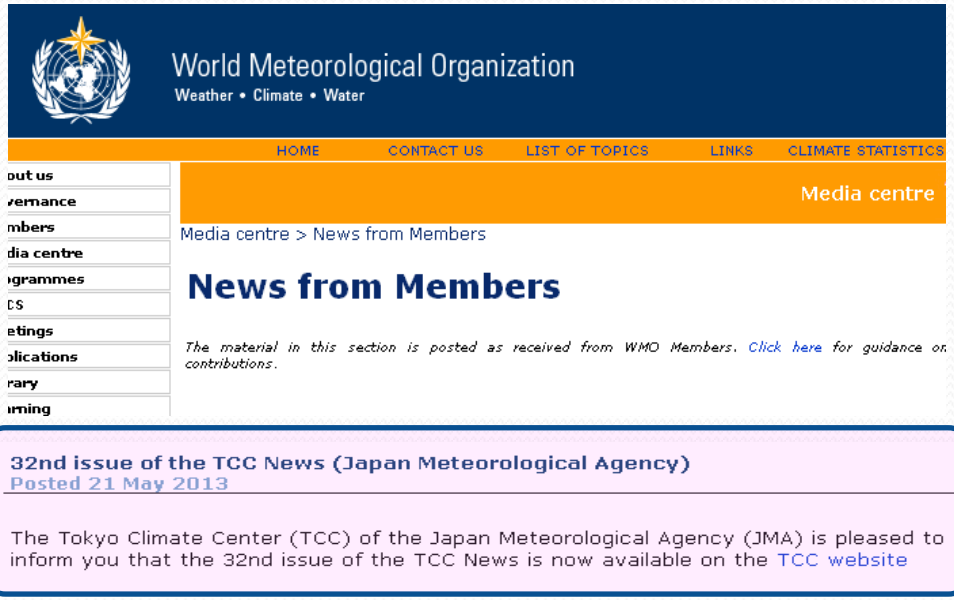
Warm temperature anomalies were most noticeable across much of the Eurasian Continent, in Australia and over the central part of the North Pacific Ocean, while the equatorial Pacific experienced cooler-than-normal conditions (Figure 2).

Figure 1 Long-term change in annual surface temperature anomalies averaged worldwide
The grey line with filled circles indicates yearly anomalies of surface temperature. The blue line indicates the five-year running means, and the red line shows the long-term linear trend. Anomalies are represented as deviations from the 1981 – 2010 average.

Figure 2 Annual mean temperature anomalies for 2013
The red and blue dots indicate temperature anomalies from the baseline period (1981 – 2010) averaged in 5° x 5° grid boxes.

TCC News 1 No. 35 | Winter 2014

TCC issues a quarterly newsletter **TCC News** in February, May, August and November containing articles on the latest climate information (significant climate events, seasonal outlook…..), introduction of TCC's new products and relevant activity.



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Weather • Climate • Water

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Media centre

Media centre > News from Members

News from Members

The material in this section is posted as received from WMO Members. Click here for guidance on contributions.

32nd issue of the TCC News (Japan Meteorological Agency)
Posted 21 May 2013

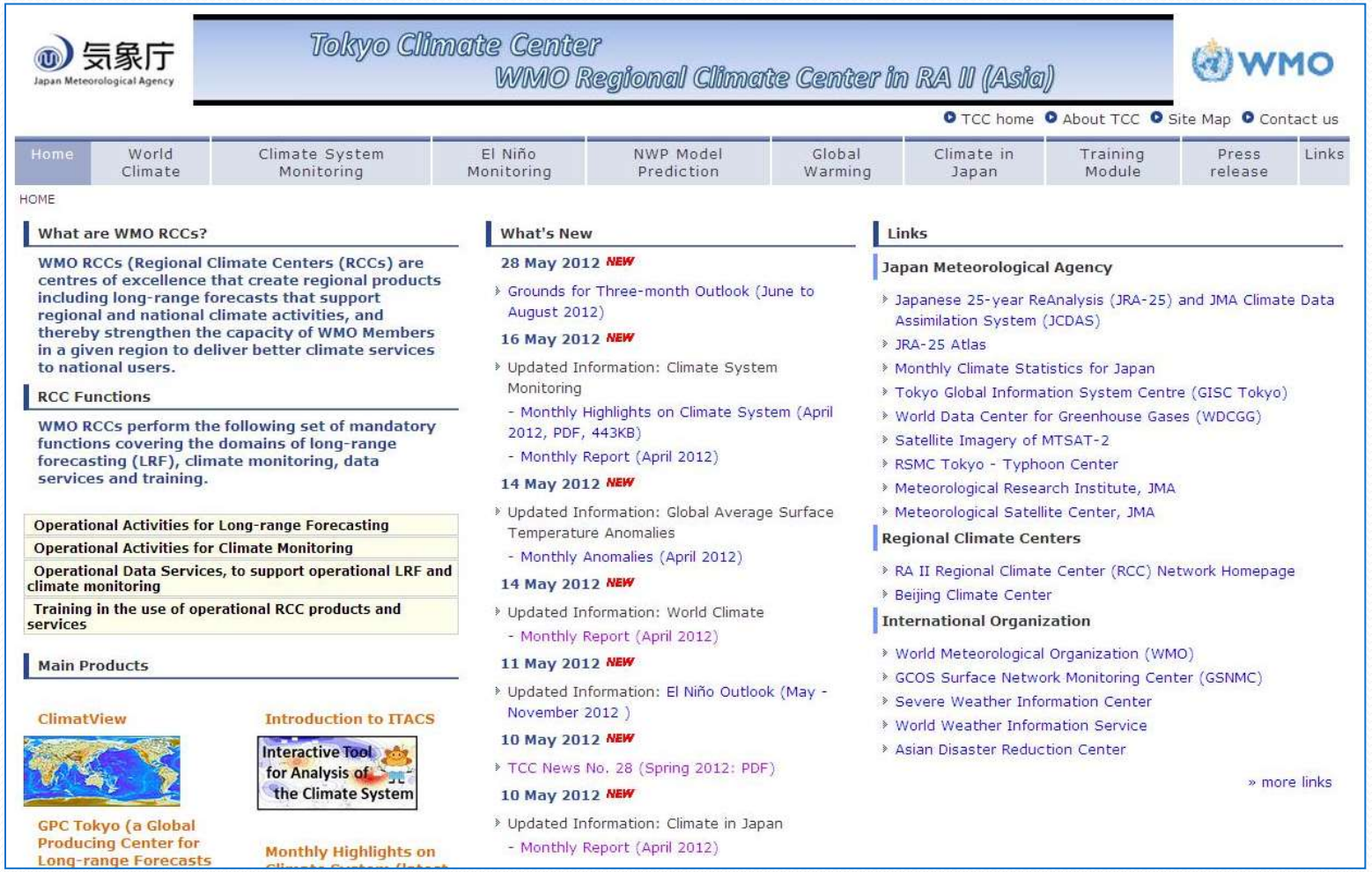
The Tokyo Climate Center (TCC) of the Japan Meteorological Agency (JMA) is pleased to inform you that the 32nd issue of the TCC News is now available on the TCC website

http://ds.data.jma.go.jp/tcc/tcc/news/index.html

Thank you for your attention.

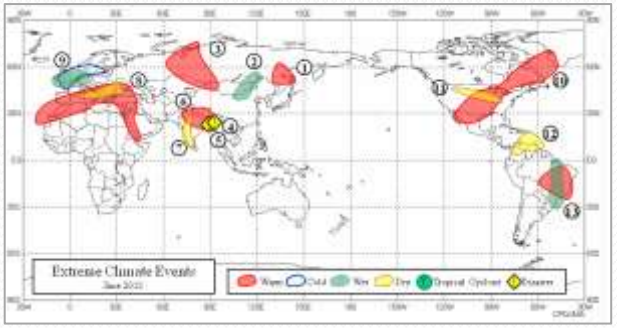
Please visit the TCC website.

http://ds.data.jma.go.jp/tcc/tcc/index.html



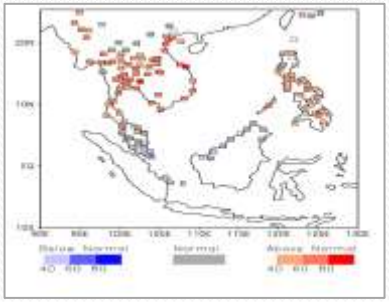
Additional slides

Examples of climate information, data and products

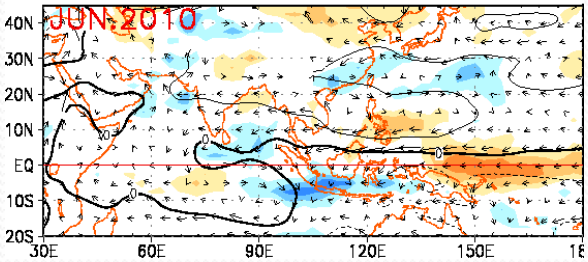


Monitoring of Extreme Climate Events

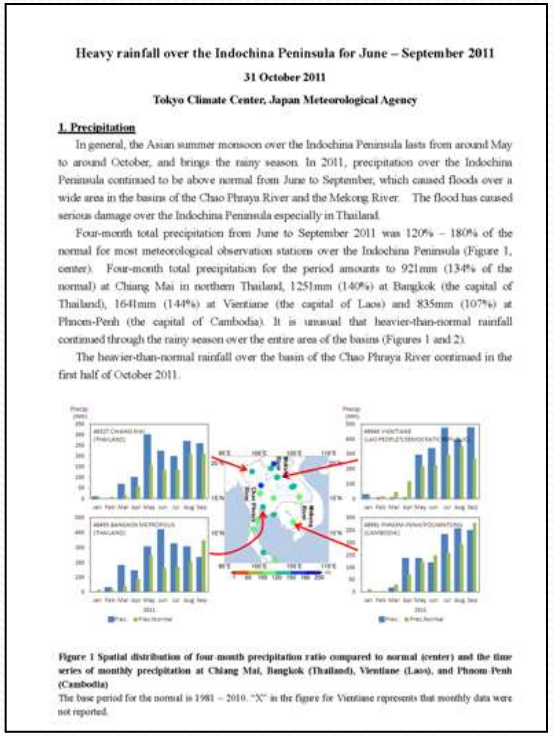
Climate database



One-month Probabilistic Forecast for Southeast Asia



Asian Monsoon Monitoring



Heavy rainfall over the Indochina Peninsula for June – September 2011

31 October 2011

Tokyo Climate Center, Japan Meteorological Agency

1. Precipitation

In general, the Asian summer monsoon over the Indochina Peninsula lasts from around May to around October, and brings the rainy season. In 2011, precipitation over the Indochina Peninsula continued to be above normal from June to September, which caused floods over a wide area in the basins of the Chao Phraya River and the Mekong River. The flood has caused serious damage over the Indochina Peninsula especially in Thailand.

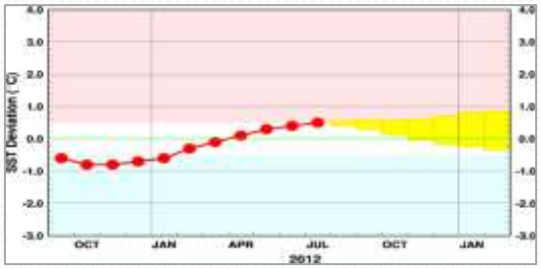
Four-month total precipitation from June to September 2011 was 120% – 180% of the normal for most meteorological observation stations over the Indochina Peninsula (Figure 1, center). Four-month total precipitation for the period amounts to 921mm (134% of the normal) at Chiang Mai in northern Thailand, 1251mm (140%) at Bangkok (the capital of Thailand), 1641mm (144%) at Vientiane (the capital of Laos) and 835mm (107%) at Phnom-Penh (the capital of Cambodia). It is unusual that heavier-than-normal rainfall continued through the rainy season over the entire area of the basins (Figures 1 and 2).

The heavier-than-normal rainfall over the basin of the Chao Phraya River continued in the first half of October 2011.

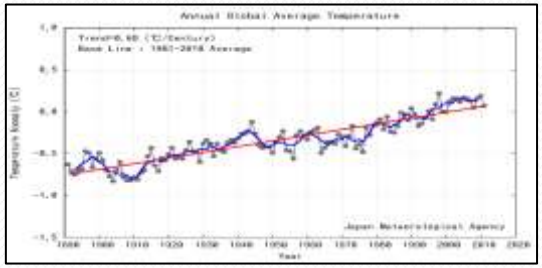
Figure 1 Spatial distribution of four-month precipitation ratio compared to normal (center) and the time series of monthly precipitation at Chiang Mai, Bangkok (Thailand), Vientiane (Laos), and Phnom Penh (Cambodia)

The base period for the normal is 1981 – 2010. "X" in the figure for Vientiane represents that monthly data were not reported.

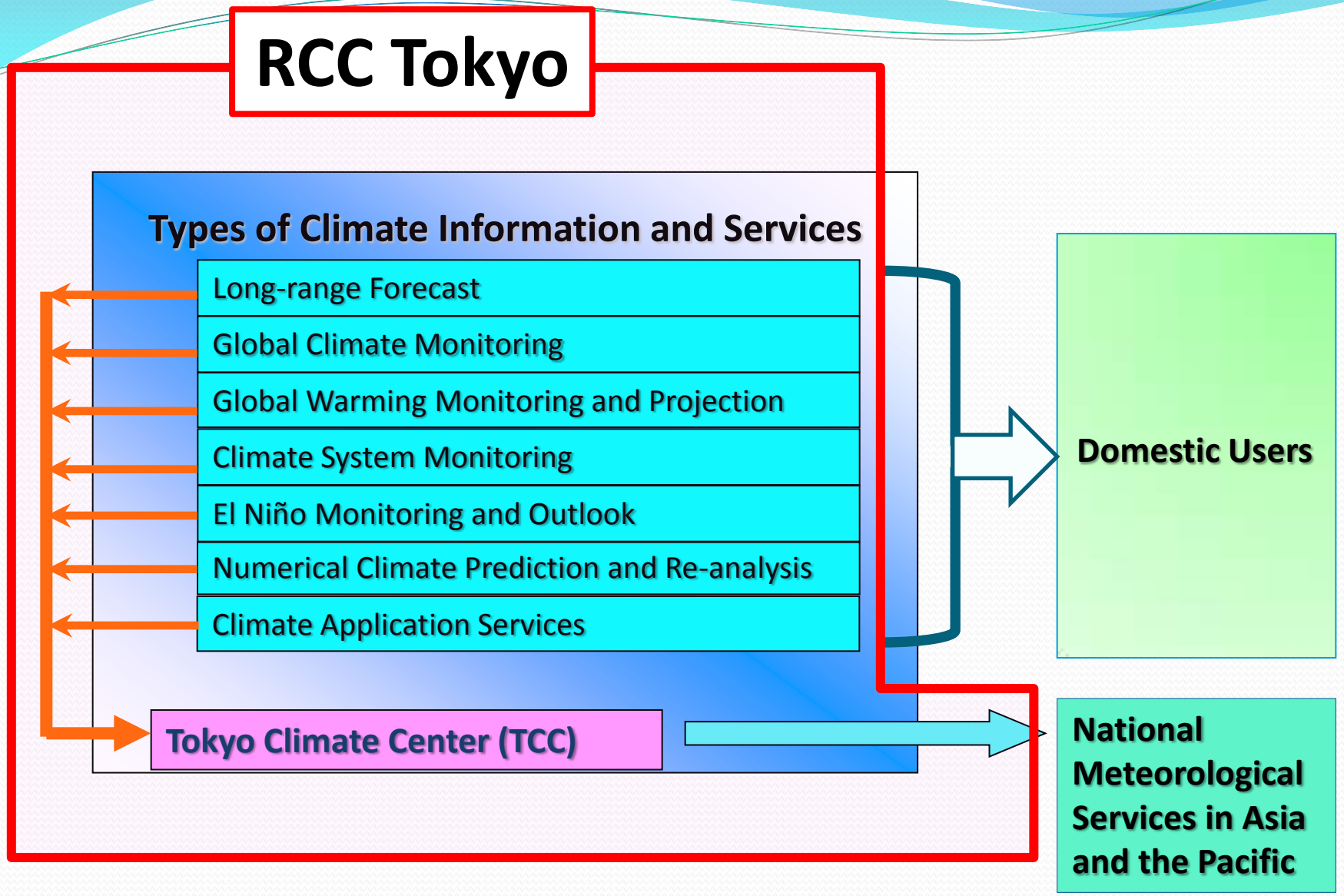
Report on extreme climate event (Heavy rainfall over the Indochina Peninsula in 2011)



El Niño outlook



Global Average Surface Temperature Anomalies


RCC Tokyo
Types of Climate Information and Services
Long-range Forecast
Global Climate Monitoring
Global Warming Monitoring and Projection
Climate System Monitoring
El Niño Monitoring and Outlook
Numerical Climate Prediction and Re-analysis
Climate Application Services
Tokyo Climate Center (TCC)
Domestic Users
National Meteorological Services in Asia and the Pacific

RCC Mandatory Functions

気象庁 Japan Meteorological Agency

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

WMO

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What are WMO RCCs?

WMO RCCs (Regional Climate Centers (RCCs) are centres of excellence that create regional products including long-range forecasts that support regional and national climate activities, and thereby strengthen the capacity of WMO Members in a given region to deliver better climate services to national users.

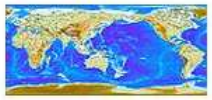
RCC Functions

WMO RCCs perform the following set of mandatory functions covering the domains of long-range forecasting (LRF), climate monitoring, data services and training.

- Operational Activities for Long-range Forecasting
- 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

Main Products

ClimatView



GPC Tokyo (a Global Producing Center for Long-range Forecasts

Introduction to ITACS

Monthly Highlights on

What's New

Links

Operational Activities for LRF

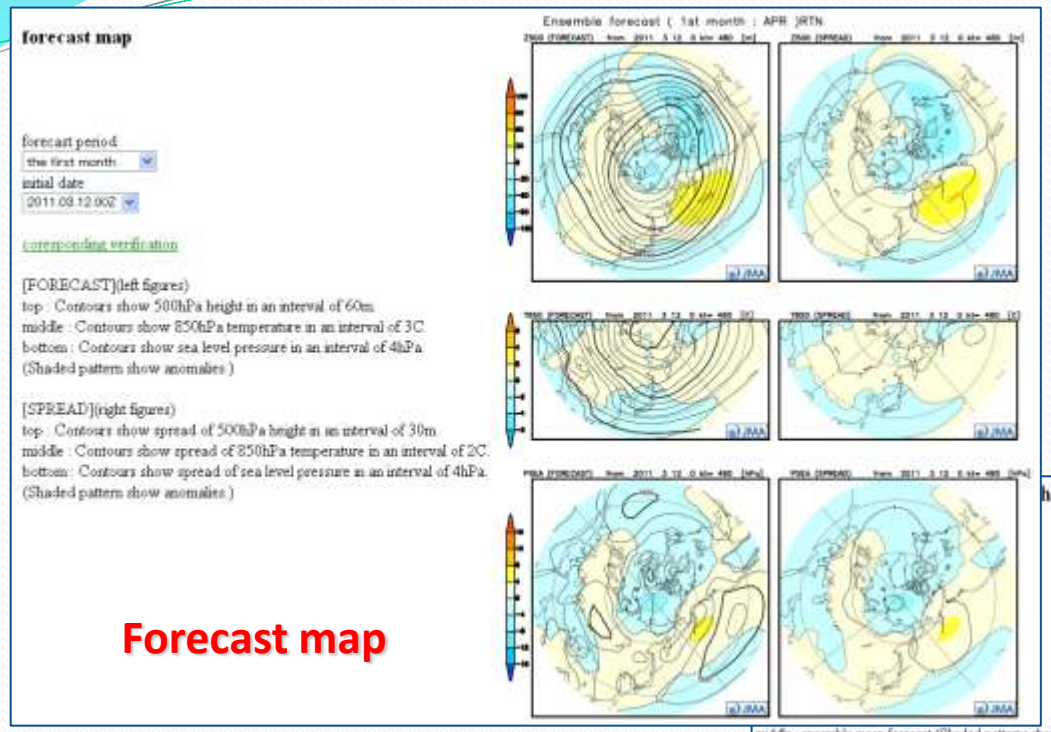
Operational Activities for Climate Monitoring

Operational Data Service, to support operational LRF and climate monitoring

Training in the use of operational RCC products and services

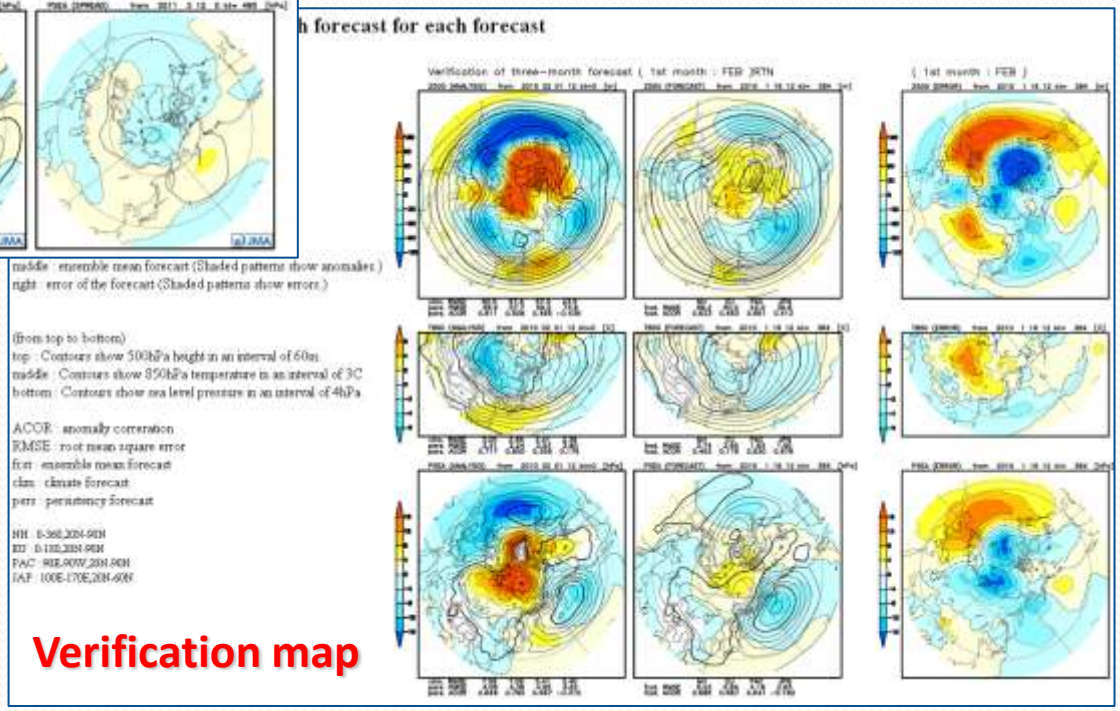
NMHSs will provide required and appropriate climate services.

Long Range Forecasts



Forecast map

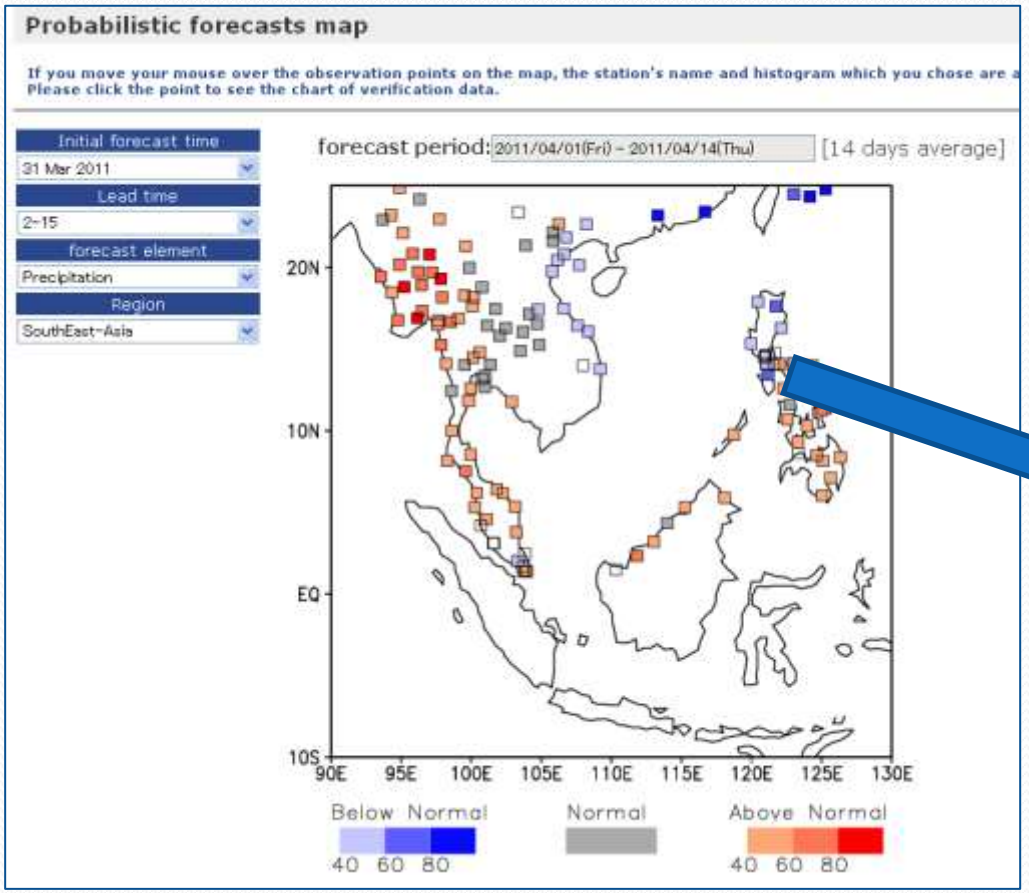
Forecast and verification maps for one-month, three-month and warm/cold season forecasts are available.



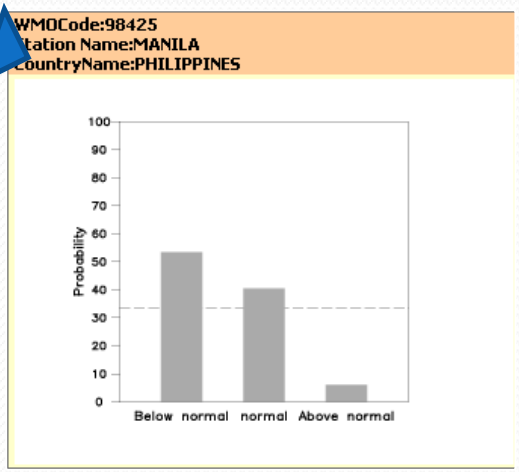
Verification map

Tailored Forecast Products

One-month Probabilistic Forecast for Southeast Asia



TCC provides tercile probabilistic forecasts of 2m temperature and total precipitation at a number of major stations in Southeast Asia.

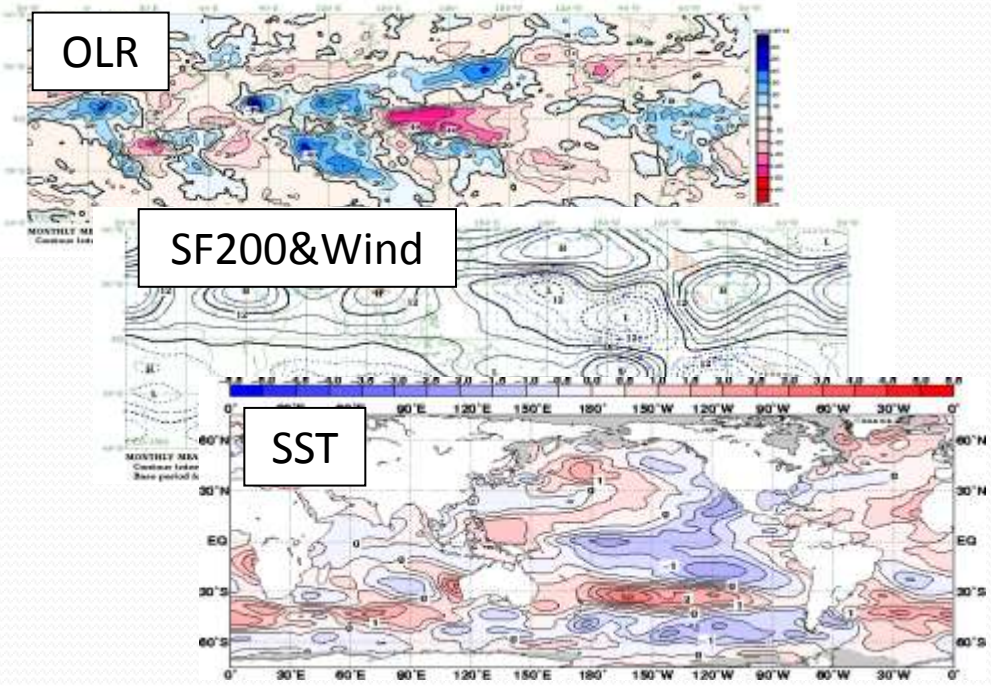


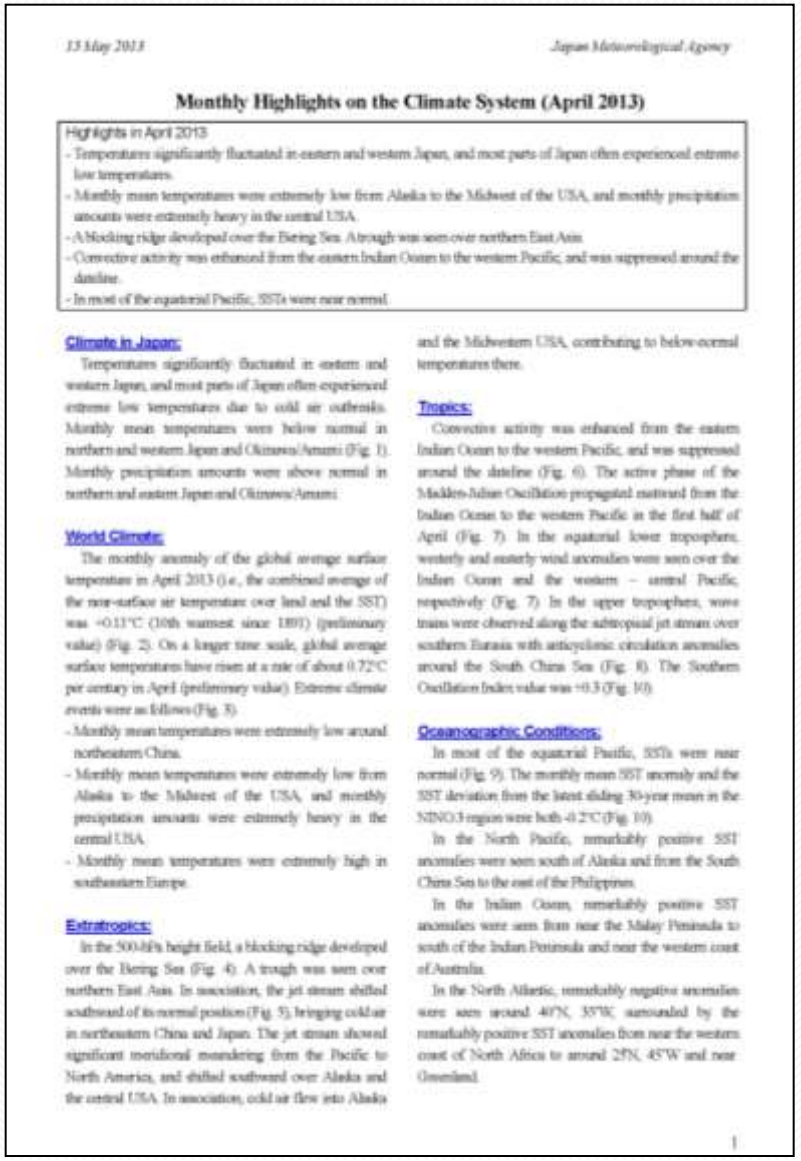
Initial Forecast Time: 31 March 2011

Lead time: 2-15 days, Element: Precipitation

Climate System Monitoring

JMA monitors the global atmospheric, oceanic and terrestrial climate system focusing on atmospheric circulation, convection, ocean conditions and snow/ice coverage. 'Monthly Highlights on the Climate System' a monthly bulletin focusing on the monthly highlights of the monitoring results.





13 May 2013 *Japan Meteorological Agency*

Monthly Highlights on the Climate System (April 2013)

Highlights in April 2013
- Temperatures significantly fluctuated in eastern and western Japan, and most parts of Japan often experienced extreme low temperatures.
- Monthly mean temperatures were extremely low from Alaska to the Midwest of the USA, and monthly precipitation amounts were extremely heavy in the central USA.
- A blocking ridge developed over the Bering Sea. A trough was seen over northern East Asia.
- Convective activity was enhanced from the eastern Indian Ocean to the western Pacific, and was suppressed around the dateline.
- In most of the equatorial Pacific, SSTs were near normal.

Climate in Japan:

Temperatures significantly fluctuated in eastern and western Japan, and most parts of Japan often experienced extreme low temperatures due to cold air outbreaks. Monthly mean temperatures were below normal in northern and western Japan and Okinawa/Amami (Fig. 1). Monthly precipitation amounts were above normal in northern and eastern Japan and Okinawa/Amami.

World Climate:

The monthly anomaly of the global average surface temperature in April 2013 (i.e., the combined average of the near-surface air temperature over land and the SST) was +0.13°C (10th warmest since 1891) (preliminary value) (Fig. 2). On a longer time scale, global average surface temperatures have risen at a rate of about 0.72°C per century in April (preliminary value). Extreme climate events were as follows (Fig. 3).
- Monthly mean temperatures were extremely low around northeastern China.
- Monthly mean temperatures were extremely low from Alaska to the Midwest of the USA, and monthly precipitation amounts were extremely heavy in the central USA.
- Monthly mean temperatures were extremely high in southeastern Europe.

Extratropics:

In the 500-hPa height field, a blocking ridge developed over the Bering Sea (Fig. 4). A trough was seen over northern East Asia. In association, the jet stream shifted southward of its normal position (Fig. 5), bringing cold air in northeastern China and Japan. The jet stream showed significant meridional meandering from the Pacific to North America, and shifted southward over Alaska and the central USA. In association, cold air flew into Alaska and the Midwestern USA, contributing to below-normal temperatures there.

Tropics:

Convective activity was enhanced from the eastern Indian Ocean to the western Pacific, and was suppressed around the dateline (Fig. 6). The active phase of the Madden-Julian Oscillation propagated eastward from the Indian Ocean to the western Pacific in the first half of April (Fig. 7). In the equatorial lower troposphere, westerly and easterly wind anomalies were seen over the Indian Ocean and the western – central Pacific, respectively (Fig. 7). In the upper troposphere, wave trains were observed along the subtropical jet stream over southern Eurasia with anticyclonic circulation anomalies around the South China Sea (Fig. 8). The Southern Oscillation Index value was +0.3 (Fig. 10).

Oceanographic Conditions:

In most of the equatorial Pacific, SSTs were near normal (Fig. 9). The monthly mean SST anomaly and the SST deviation from the latest sliding 30-year mean in the NINO.3 region were both -0.2°C (Fig. 10).

In the North Pacific, remarkably positive SST anomalies were seen south of Alaska and from the South China Sea to the east of the Philippines.

In the Indian Ocean, remarkably positive SST anomalies were seen from near the Malay Peninsula to south of the Indian Peninsula and near the western coast of Australia.

In the North Atlantic, remarkably negative anomalies were seen around 40°N, 35°W, surrounded by the remarkably positive SST anomalies from near the western coast of North Africa to around 25°N, 45°W and near Greenland.

Interactive Tool for Climate Analysis

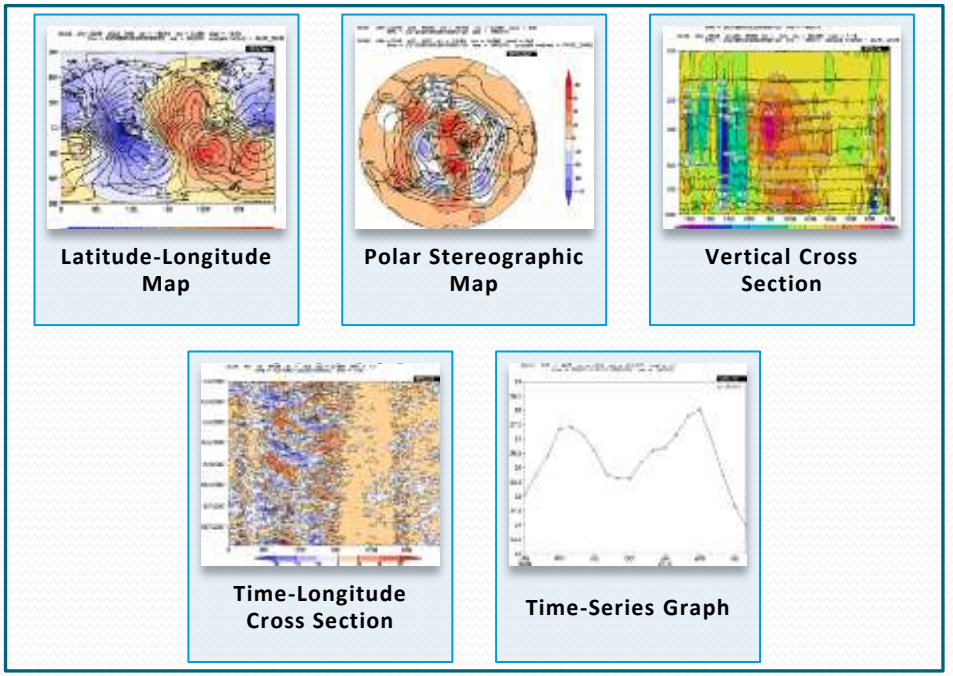
JMA has developed an

Interactive Tool for Analysis of the Climate System (ITACS)

- A web-based application software for climatological analysis such as composite, correlation, EOF and SVD.

Data

- Japanese 25-year Reanalysis (JRA-25) (1979-2004)
- JMA Climate Data Assimilation System (JCDAS) (2004-present)
- Daily Sea Surface Analysis for Climate Monitoring and Predictions (COBE-SST)
- CLIMAT, OLR



Data Service

- Gridded values of numerical prediction models (updated every week)
- Gridded Hindcast data since 1979
- Daily Sea Surface Analysis for Climate Monitoring and Predictions (COBE-SST) since 1891 (updated every month)
- Link to Japanese 25-year Reanalysis Project

Report on an extreme climate event

NMHSs are expected to actively contribute to climate risk management, and must issue appropriate information in a timely manner when extreme events occur. Against this background, TCC is committed to assisting NMHSs in fulfilling their roles.

In summer 2011, precipitation over the Indochina Peninsula continued to be above normal from June to September, which caused floods over a wide area in the basins of the Chao Phraya River and the Mekong River. The flood has caused serious damage over the Indochina Peninsula especially in Thailand.

On 31 October, 2011, TCC issued a report entitled "Heavy rainfall over the Indochina Peninsula for June – September 2011" on its website.

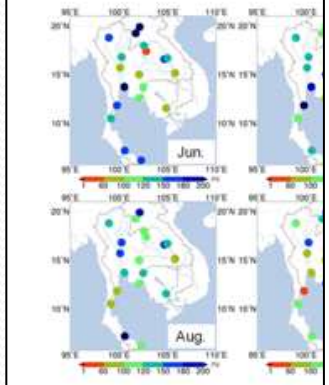


Figure 2 Spatial distributions of monthly precipitation
The base period for the normal is 1981 – 2010.

2. Activity of the Asian summer monsoon

Four-month averaged cumulus convective a
over 10° – 20°N of South and Southeast Asia (I
monsoon was active. The heavy rainfall over t
the active monsoon.

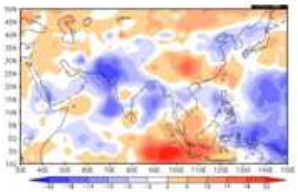


Figure 3 Cumulus convective activity (June – September 2011)
The shading indicates four-month averaged outgoing longwave radiation (OLR) anomaly (W/m^2) for June – September 2011. It can be inferred that negative OLR anomalies (blue-color) show enhanced cumulus convection compared to the normal. The base period for the normal is 1981 – 2010. Original data provided by NOAA.

Heavy rainfall over the Indochina Peninsula for June – September 2011

31 October 2011

Tokyo Climate Center, Japan Meteorological Agency

1. Precipitation

In general, the Asian summer monsoon over the Indochina Peninsula lasts from around May to around October, and brings the rainy season. In 2011, precipitation over the Indochina Peninsula continued to be above normal from June to September, which caused floods over a wide area in the basins of the Chao Phraya River and the Mekong River. The flood has caused serious damage over the Indochina Peninsula especially in Thailand.

Four-month total precipitation from June to September 2011 was 120% – 180% of the normal for most meteorological observation stations over the Indochina Peninsula (Figure 1, center). Four-month total precipitation for the period amounts to 921mm (134% of the normal) at Chiang Mai in northern Thailand, 1251mm (140%) at Bangkok (the capital of Thailand), 1641mm (144%) at Vientiane (the capital of Laos) and 835mm (107%) at Phnom-Penh (the capital of Cambodia). It is unusual that heavier-than-normal rainfall continued through the rainy season over the entire area of the basins (Figures 1 and 2).

The heavier-than-normal rainfall over the basin of the Chao Phraya River continued in the first half of October 2011.

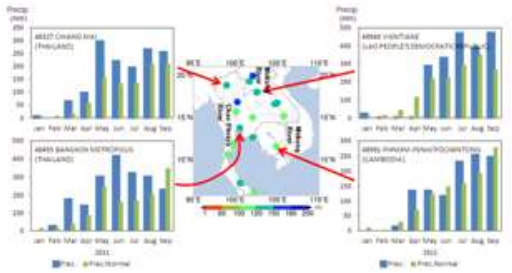


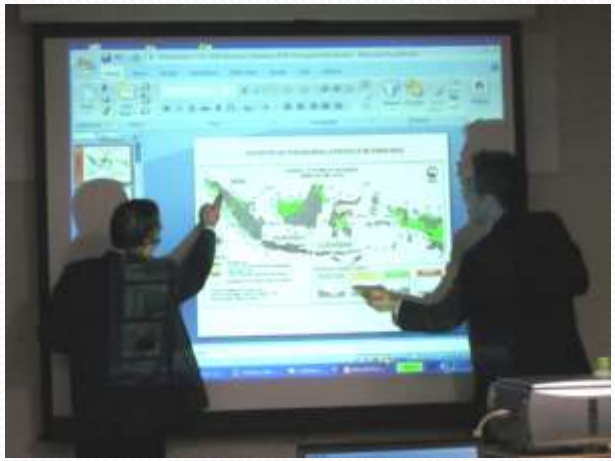
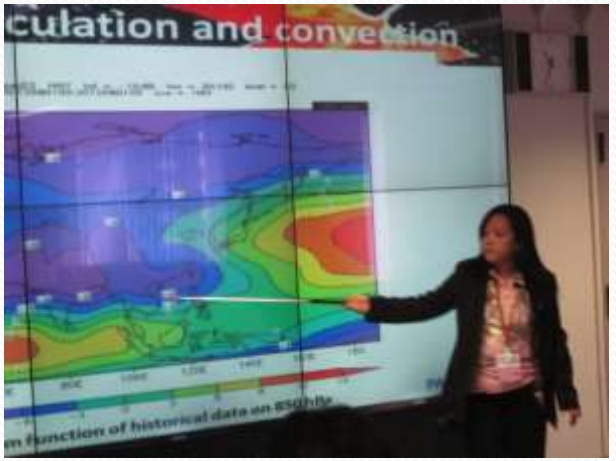
Figure 1 Spatial distribution of four-month precipitation ratio compared to normal (center) and the time series of monthly precipitation at Chiang Mai, Bangkok (Thailand), Vientiane (Laos), and Phnom-Penh (Cambodia)
The base period for the normal is 1981 – 2010. "X" in the figure for Vientiane represents that monthly data were not reported.

TCC Annual Training Seminar

As part of TCC's capacity-building activity in its role as RCC, TCC holds annual training seminars on the application of its climate monitoring and prediction products.

Each seminar deals with a different theme depending on TCC's progress in climate and analysis capabilities, such as the introduction of upgraded climate models.

	Theme	Participants
Nov. 2008	Climate Information and Forecasting	13: China, Hong Kong, India, Indonesia, Iran, Korea (2), Lao, Malaysia, Mongolia, Philippines, Thailand, Viet Nam
Dec. 2009	Climate Analysis using Reanalysis Data	11: Bangladesh, Indonesia, Laos, Malaysia, Mongolia, Pakistan, Papua New Guinea, Philippines, Sri Lanka, Thailand, Viet Nam
Jan. 2011	Application of Seasonal Forecast Gridded Data to Seasonal Forecast Products	19: Bangladesh, Hong Kong, Indonesia, Kazakhstan, Laos, Malaysia, Maldives, Myanmar, Nepal, Pakistan, Philippines (2), Qatar, Singapore, Sri Lanka, Thailand, Uzbekistan, Viet Nam
Nov. 2011	One month Forecast Products	13: Bangladesh, Cambodia, Hong Kong, Indonesia, Laos, Malaysia, Mongolia, Myanmar, Pakistan, Philippines, Sri Lanka, Thailand, Viet Nam
Nov. 2012	Climate Analysis Information	12: Bangladesh, Hong Kong, Indonesia (2), Laos, Malaysia, Mongolia, Myanmar, Nepal, Philippines, Sri Lanka, Thailand, Viet Nam
Nov. 2013	Seasonal Forecast Products	16: Bangladesh, Cambodia, Hong Kong, Indonesia (3), Laos, Malaysia, Mongolia, Myanmar, Nepal, Papua New Guinea, Philippines, Sri Lanka, Thailand, Viet Nam

Exercise session

Presentation on results of the exercise