Joint Meeting for the Seasonal Prediction of the East Asian Winter Monsoon
6-8 November 2012, Seoul, Republic of Korea

Activities to enhance climate services at the national level in Japan

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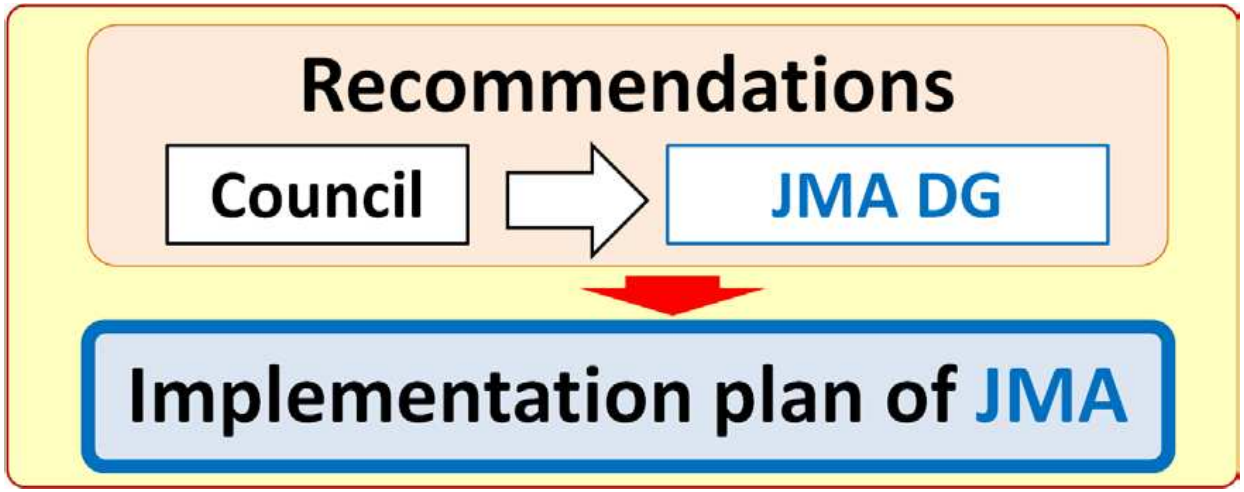
The Meteorological Council as an advisory body to the Director-General of the JMA

In Japan, **the Meteorological Council (hereafter, the Council)** has been established as an advisory body to the Director-General (DG) of **the Japan Meteorological Agency (JMA)**. In 2011-2012, at the request of the DG, **the Council** deliberated on **how to improve and strengthen JMA's climate services** for climate affected sectors to avoid and mitigate losses and damages caused by climate variability including extreme events and climate change.



The Council submitted to the DG a report including **three recommendations** in February 2012.
Based on the recommendations, **JMA** has been conducting activities to improve and enhance climate information and its application in Japan.

Council: 13 experts from various sectors including climate science, agrometeorology, energy, transportation, information study, ecological economies, financial risk management, distribution/retail business, international cooperation, and private service provider. It is officially called “the Meteorological Sub-committee of the Council for Transport Policy”.

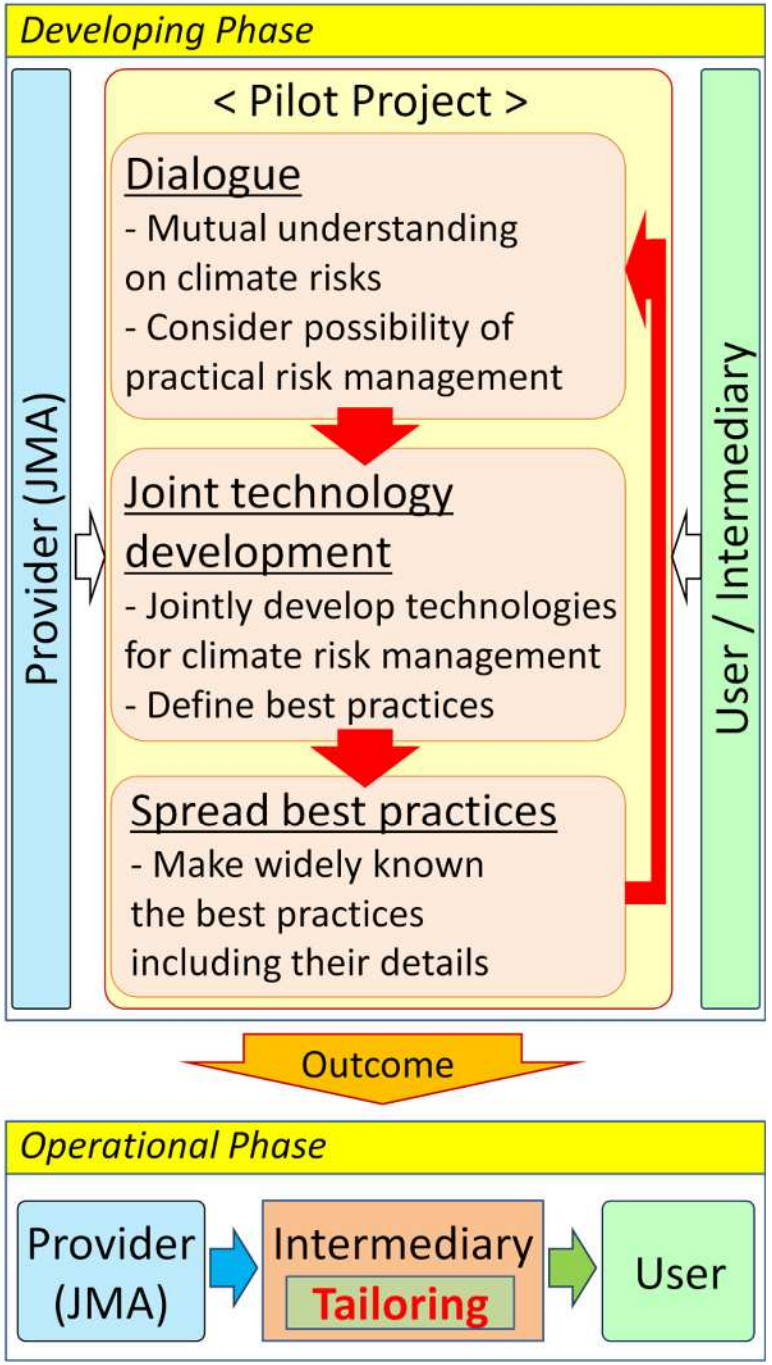
Best Practices for Climate Risk Management (Recommendation 1 by the Council)

Recommendation 1:
Best Practices for Climate Risk Management

Establishing mechanisms to develop best practices for climate risk management in collaboration of climate information providers and users

Activity

Conduct pilot projects to find best practices



Developing an early warning system to mitigate temperature stress on rice production

Conduct a pilot project to find **best practices for climate risk management**, which targets agriculture

1. Climatological factor

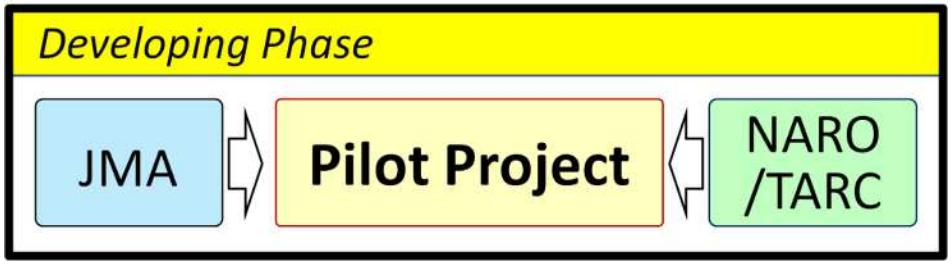
Tohoku region is frequently affected in summer by cold north-easterly winds (Yamase winds) or by high temperature, which have a great impact on rice crops.

2. Effective countermeasure

Controlling water temperatures in rice fields by adjusting water levels is an effective countermeasure to combat the adverse effects of extreme temperatures on rice crops.

3. Useful climate prediction

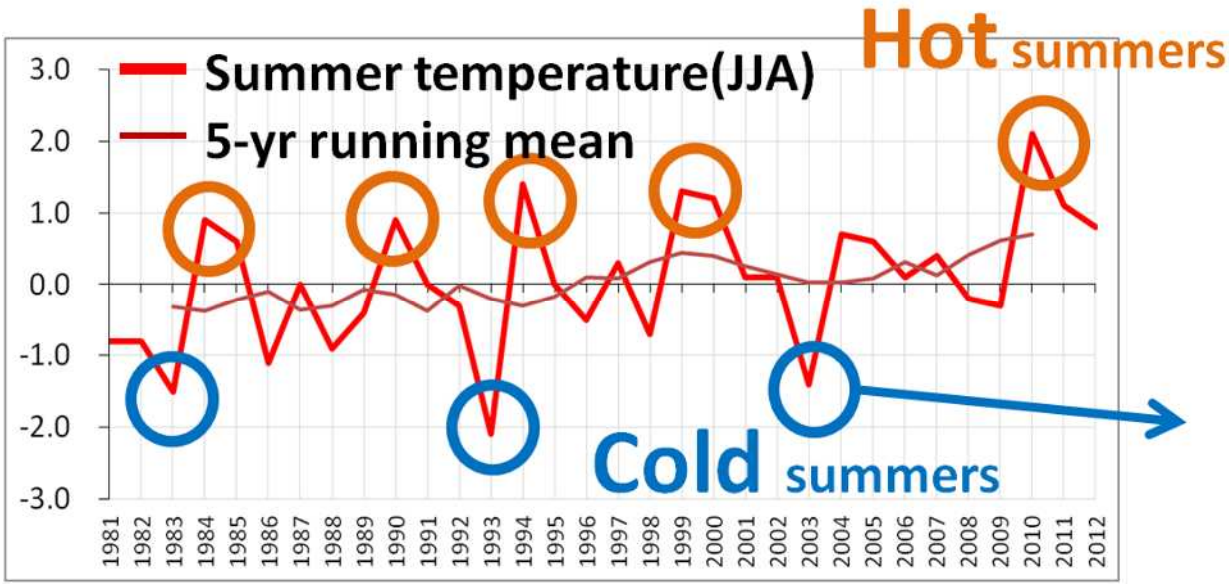
Climate prediction information is considered useful for water temperature control, as farmers require one to two weeks to prepare for the water level adjustment countermeasure.



NARO/TARC: National Agriculture and Food Research Organization / Tohoku Agricultural Research Center

Background

- Rice is an essential crop in Japan.
- Tohoku region produces it in large amount (28% of Japan's rice harvest) with high quality.
- Cold/hot summer conditions cause damages to rice.



Time series of temperature anomalies of JJA (summer) in the Tohoku region 1981-2012

Rice Blast

Dialogue and Sharing knowledge

NARO/TARC has not only **agricultural knowledge** but also **a web system to provide agricultural information** based on temperature prediction up to one week.

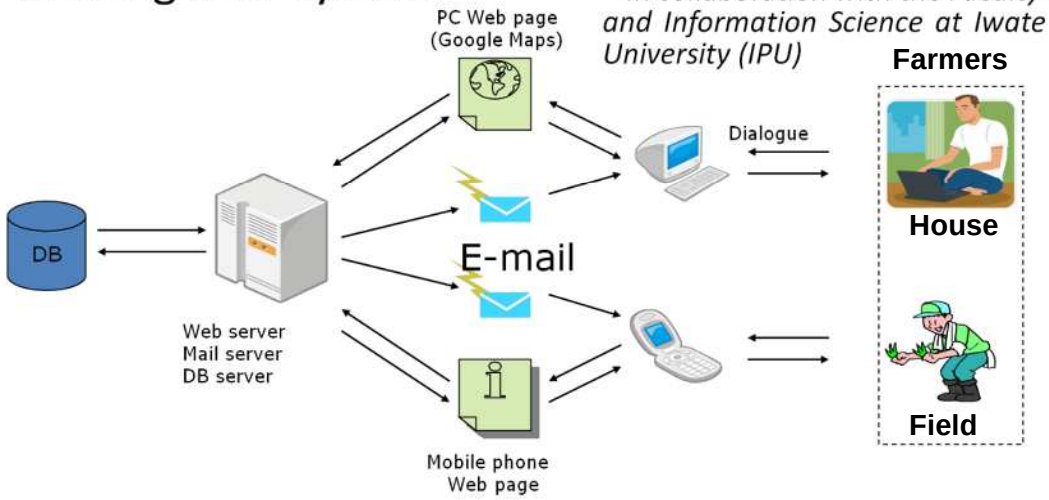
- Alarming temperature and risk for rice crop

Period	**Alarming T7d**	**Risk**
From the middle of July to the beginning of August	20°C or below	Sterility
August	27°C or above	Poor grain filling

(T7d: seven-day mean temperature)

- Existing web system

* In collaboration with the *Faculty of Software and Information Science at Iwate Prefectural University (IPU)*



Dialogue

- Climate prediction information for **one to two weeks ahead** is considered useful for farmers to prepare for the countermeasure.
- Farmers need customized and **high-resolution** data.

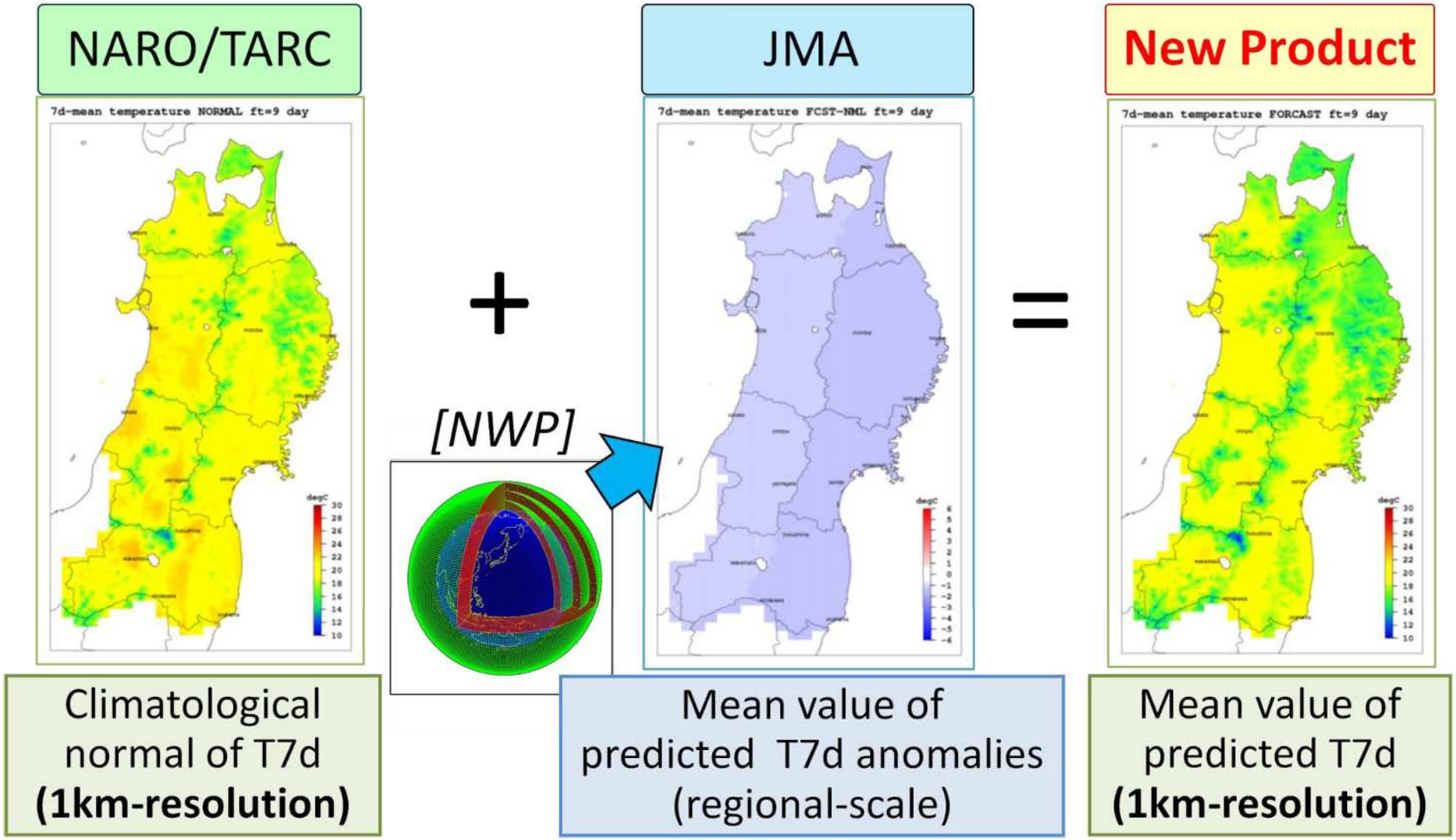
NARO /TARC

JMA

- Temperature prediction skill covering **the period up to two weeks ahead** has been improved.
- **High-resolution** data could be developed from Numerical Weather Prediction (NWP) data by using statistical downscaling method.

Joint Development

Making seven-day mean temperature (T7d) prediction at **a 1-km resolution** up to **2 weeks ahead** and verifying its skill with hindcast (re-forecast) data



Tailoring and experimental provision of information

Users can view **customized information** for their registered points.
When the predicted probability of T7d (seven-day mean temperatures) reaching the alarming temperature is high at a registered point, **an alert is automatically sent to users**.

E-mail

Issued on 14 August, 2011
Growth stage of rice: The beginning of grain filling

<Management information of cultivation >
Caution for the high-temperature-related rice crop damage.
Period : From 15 to 21 August
Predicted 7-day mean temperature :28°C
(Criteria temperature is 26°C or more)
(Experimental provision)
High temperature condition is also predicted from 22 to 28 August.
Be careful of following information.

(Experimental provision)
<Predicted probability of high temperature up to 2 weeks ahead>
Attention for the high-temperature-related rice crop damage .
Period : Around from 22 to 28 August
Predicted probability of 7-day temperature at 27°C or above: 32%.
Probability of climatological occurrence: 8%.
Be careful of following information

NARO /TARC

Provision of tailored climate information

Feedback by questionnaire survey

Users

Improved User Accessibility to Climate Information (Recommendation 2 by the Council)

Recommendation 2: Improved User Accessibility to Climate Information

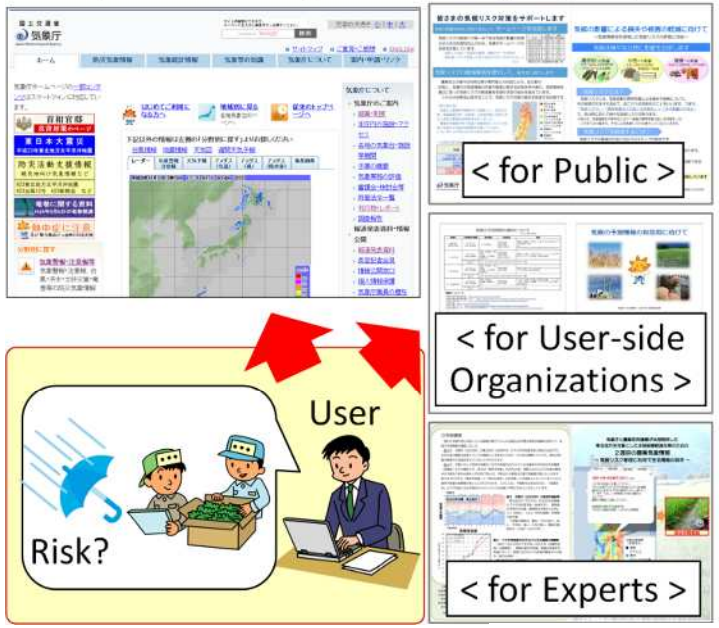
Improving user accessibility to climate information , in order to enable various users to easily assess climate impacts on their sectors

Activity

Enrich climate database and improve its accessibility

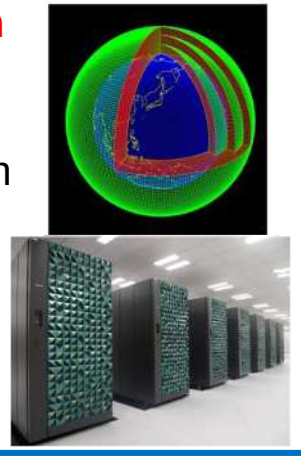
- Produce value-added and more usable information and made them available on user-friendly websites, etc., through dialogue with users

[JMA website] [Leaflets]



Improve climate prediction information

- Improve skill of prediction
- Make prediction information more understandable
- Prepare more tailored information for users



Tool for the support to climate risk management (future plan)

[JMA website]

Imaginary drawing of the tool on the JMA website

Subtracting a meteorological data value for last year from the one for this year,
“N”-day, “N”-year, or “N”-station averaging of meteorological data,
conditional search of meteorological data,
regression among a user’s variable and meteorological variables,
and so on.

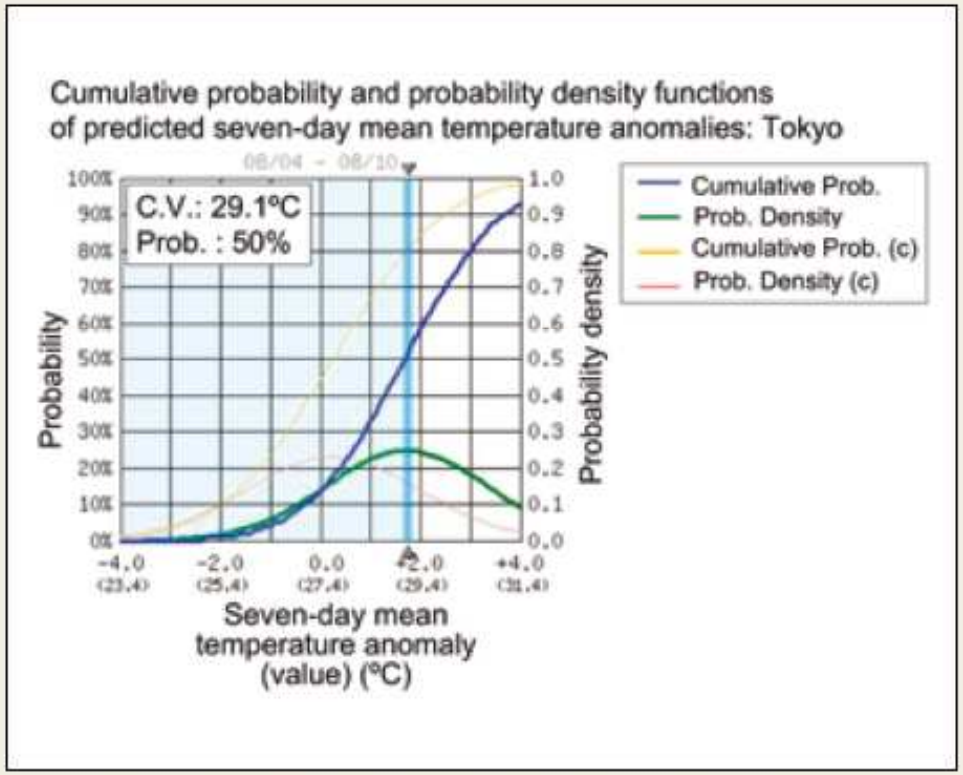
Detailed probabilistic prediction products for the forecast from one to two weeks ahead

JMA provides detailed probabilistic prediction products for 11 regions in Japan through JMA website. These products provide users with information on probabilities within the range of their own threshold values. The products are:

- Daily tables of predicted T7d (seven-day mean temperatures) anomaly probabilities in five categories (very high, high, normal, low, and very low)
- Time sequences of these probabilities
- Cumulative probability functions (CPFs) and probability density functions (PDFs) of predicted T7d anomalies.

Probability of predicted seven-day mean temperature anomaly for five categories for 4-10 August 2010, issued on 30 July for the Tohoku region (originally in Japanese)

Very Low	Low	Normal	High	Very High
– -2.9 °C	-2.8 – -0.9 °C	-0.8 – +1.1 °C	+1.2 – +2.7 °C	+2.8 °C –
0%	3%	26%	41%	30%



Cumulative probability function (CPF) and probability density function (PDF) of predicted T7d anomalies for 4-10 August 2010, issued on 30 July for Tokyo. The horizontal axis shows the T7d anomaly. The blue and green lines show the CPF and PDF for the prediction, while the yellow and pink lines show those for the occurrence of climatology values. Users can change the critical value (the light-blue line) on the website to see the cumulative probability applicable to the area shaded in light blue (originally in Japanese).

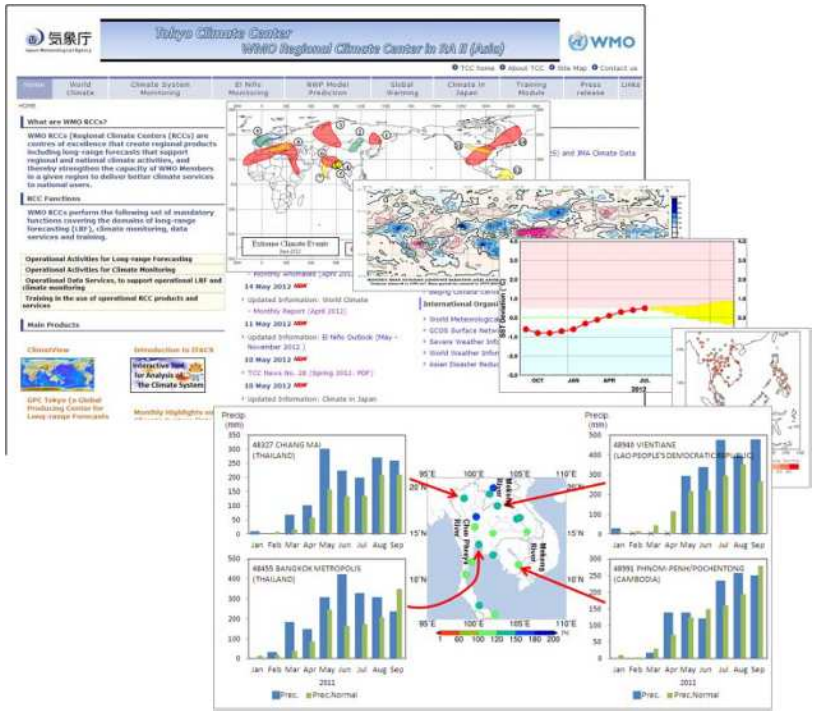
Enhanced International Cooperation (Recommendation 3 by the Council)

Recommendation 3: Enhanced International Cooperation

Contributing to improvement of risk management for extreme climate events happening in the world, and **promoting international cooperation**

Activity

Improve information services to domestic users regarding extreme climate events abroad which may affect economic activities in Japan.



Enhance activities of the Tokyo Climate Center (WMO Regional Climate Center) to further assist NMHSs in their climate services.

JMA has been improving information services to domestic users regarding extreme climate events abroad which may affect economic activities in Japan.

For example, heavy monsoon rains caused widespread flooding in Thailand and other areas of the Indochina Peninsula in 2011. On 12 October, 2011, JMA issued a report entitled “Heavy rainfall over the Indochina Peninsula for June – September 2011” in Japanese to provide a brief summary of the situation.

On 31 October, 2011, JMA/TCC (Tokyo Climate Center) issued the English version of the report on the TCC web site (http://ds.data.jma.go.jp/tcc/tcc/news/Heavy_rainfall_over_the_Indochina_Peninsula.pdf).

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.

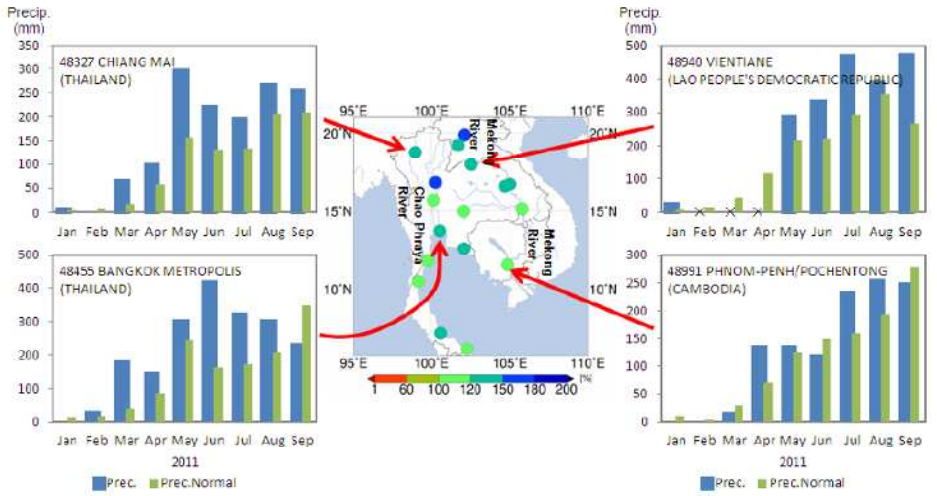


Figure 1 Spatial distribution of four-month precipitation ratio compared to normal (center) and the time series of monthly precipitation at Chiang Mai, Bangkok (Thailand), Vientiane (Laos), and Phnom-Penh (Cambodia)

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

From mid-January to mid February 2012, the Eurasian continent, especially in the mid-latitudes, experienced significantly lower-than-normal temperatures due to strong cold-air inflow. On 6 February, 2012, JMA issued a report entitled “Cold Wave over the Eurasian Continent” in Japanese to provide a brief summary of the situation.

On the same day, JMA/TCC issued the English version of the report on the TCC web site (http://ds.data.jma.go.jp/tcc/tcc/news/Cold_Wave_over_the_Eurasian_Continent.pdf).

Cold Wave over the Eurasian Continent

6 February 2012
Tokyo Climate Center, Japan Meteorological Agency

1. Overview

Since mid-January 2012, the Eurasian continent, especially in the mid-latitudes, has experienced significantly lower-than-normal temperatures due to strong cold-air inflow (Figure 1). As a result, temperatures have been extremely low from the northern part of East Asia to Central Asia (in and around Mongolia and Kazakhstan) since mid-January, and in Eastern Europe (in and around Ukraine) since the end of January. The influence of cold air has extended to Central to Western Europe as well as to all over Central Asia, such as Uzbekistan and Tajikistan, since the beginning of February.

2. Climatic conditions

Table 1 summarizes weekly extreme climate events from mid-January. Figure 1 shows weekly temperature anomalies from mid-January in the Northern Hemisphere. Figure 2 shows daily temperatures at some meteorological stations in affected countries.

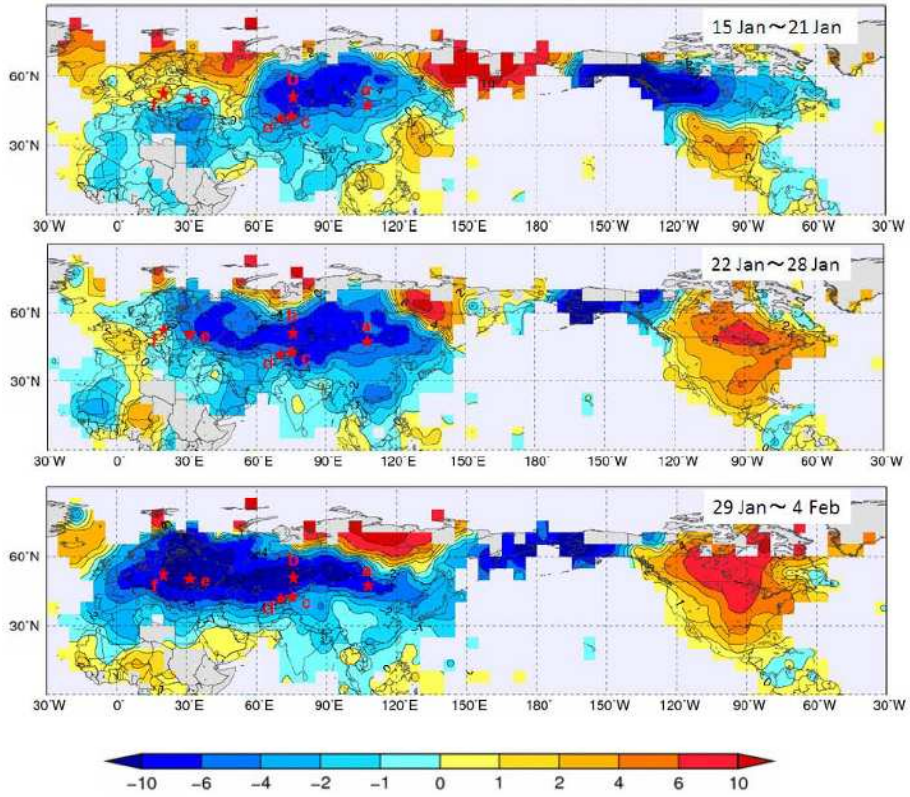


Figure 1 Weekly temperature anomalies in the Northern Hemisphere from 15 January 2012 (Unit: °C) (Based on SYNOP reports)

Daily temperature data at (a) Ulaanbaatar (Mongolia), (b) Astana (Kazakhstan), (c) Bishkek (Kyrgyzstan), (d) Tashkent (Uzbekistan), (e) Kiev (Ukraine) and (f) Warsaw (Poland) on the maps are shown in Figure 2.

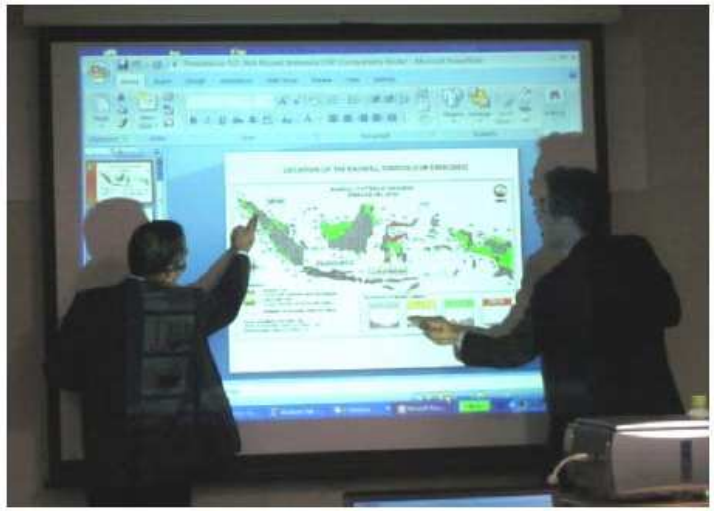
TCC (Tokyo Climate Center) seminar

TCC holds an annual training seminar as part of capacity-building activities related to its role as one of the Regional Climate Centers in WMO RA II.

In fiscal 2011, the Training Seminar on One-month Forecast Products took place from 7 to 9 November at JMA Headquarters in Tokyo. The event was attended by 13 experts from NMHSs in Asian countries. Through lectures and exercises, the participants learned how to produce one-month forecasts using guidance and gridded model outputs. After attending a series of lectures and engaging in practical exercises, individual participants gave presentations on the exercise results of statistical guidance relating to one-month forecasting for each country.

Lecture on JMA ensemble prediction system for seasonal prediction

Scene at the exercise session



Presentation by a participant on one-month forecast in his country

Expert visits to NMHSs in Asian countries

TCC experts visited NMHSs in the Philippines, Viet Nam and Lao PDR in March 2012 to provide follow-up for the TCC Training Seminar on one-month forecast held in November 2011, including practical exercises with the Interactive Tool for Analysis of the Climate System (ITACS) and the installation of a module for site-specific probabilistic guidance for one-month forecasting. The experts also discussed and exchanged views with attendees on improving climate services and engaging in possible future cooperation.

Discussion at Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA), Philippines

Exercise at National Center for Hydro-Meteorological Forecasting (NCHMF), Viet Nam

Lecture at Department of Meteorology and Hydrology (DMH), Lao PDR

Summary

1. **The Meteorological Council submitted to the DG a report including three recommendations in February 2012:**
   (1) Best Practices for Climate Risk Management
   (2) Improved User Accessibility to Climate Information
   (3) Enhanced International Cooperation

2. **Based on the recommendation 1, JMA has been developing techniques of climate risk management and putting it into practice by conducting pilot projects in collaboration with domestic climate information providers and users in Japan.**

3. **As for the recommendation 2, JMA plans to enrich climate database and improve its accessibility and continues efforts to improve climate prediction information.**

4. **As for the recommendation 3, JMA has been improving information services to domestic users regarding extreme climate events abroad which may affect economic activities in Japan. Also, JMA has been enhancing activities of the TCC, designated as WMO RCC, to further assist NMHSs in their climate services.**

Thank you!

JMA Mascot Character ‘Hare-run’
‘Hare’ means sunny weather in Japanese
‘Hare-ru’ means ‘it becomes sunny’.
‘Run-run’ means happiness feeling.