Tokyo Climate Center, Japan Meteorological Agency

TCC News

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Contents

Tokyo Climate Conference: Better Climate Information for a Safe and Sustainable Society

The Tokyo Climate Conference: Better Climate Information for a Safe and Sustainable Society was held in Tokyo, Japan, from 6 to 8 July 2009 with the participation of more than 70 experts from the Asia-Pacific Region.

The Japan Meteorological Agency (JMA) held the *Tokyo Climate Conference: Better Climate Information for a Safe and Sustainable Society* in Tokyo, Japan, from 6 to 8 July 2009, under the auspices of the World Meteorological Organization (WMO), the Government of Japan (Ministry of Foreign Affairs of Japan, Ministry of Education, Culture, Sports, Science and Technology, Ministry of Agriculture, Forestry and Fisheries, Ministry of Economy, Trade and Industry, Ministry of the Environment) and the Japan International Cooperation Agency.

Over 70 prominent scientists and experts participated in the event, including representatives from National Meteorological and Hydrological Services (NMHSs) and user organizations of climate information from 24 Asia-Pacific countries and 8 related international organizations. Discussions were conducted to facilitate the provision and application of user-oriented climate information through enhanced collaboration between climate service providers and users. In order to raise social awareness of climate information usage, a public symposium was held on 8 July.

The results of the discussion were formulated and adopted as the Conference Statement, which is expected to contribute as regional input to the World Climate Conference-3 (WCC-3) to be held in Geneva, Switzerland, from 31 August to 4 September 2009.

Program

Monday, 6 July
- Opening ceremony
- Keynote lectures
- Regional climate information: RCC and RCOF
- Best practices of climate information utilization in socio-economic sectors
- International cooperation on climate-related issues

Tuesday, 7 July
- Sectoral discussion
  (1): Agriculture
  (2): Water resource/hazard management
  (3): Regional cooperation
- Introduction to the draft Conference Statement and discussions

Wednesday, 8 July
- Public symposium
- Approval of the Conference Statement

Conference Statement

The Tokyo Climate Conference aimed to enhance collaboration toward the establishment of a new international framework for climate services. Participants shared the following views on the current situation and related challenges:
- In the Asia-Pacific region, where climate and its predictability differ from region to region and social and cultural background vary from country to country, it is necessary to take into account these differences and variation in climate information services and applications.
- In order to promote the application of climate information, improvement of forecast and monitoring accuracy is indispensable. In addition to technical development by NMHSs by themselves, use of supporting information provided by Global Producing Center for Long-range Forecasts (GPC) and Regional Climate Centers (RCCs) can make NMHSs possible to produce and provide new useful climate information.

– The Beijing Climate Center and the Tokyo Climate Center were recently designated as the first WMO RCCs, in recognition of their contribution to improving the capabilities of NMHSs' climate services in the Asian region.

Based on this recognition, the participants agreed to recommend the following actions to the relevant bodies.

– NMHSs are urged to play a major role in continuously providing operational climate service to meet national needs, taking into account social and cultural background of the nation.
– Users and potential users in the climate sensitive sectors are encouraged to contact with NMHSs, obtain climate information and communicate to NMHSs their requirements regarding the provision of climate information.
– RCCs are urged to make efforts to further support the capacity building of NMHSs based on their requirements and requested to periodically organize Regional Climate Outlook Forum in order to promote the application of climate information tailored to the users' circumstances and requirements.

The whole text of the Conference Statement is available at http://www.jma.go.jp/jma/en/News/TCC_statement.pdf.

Public Symposium

In order to raise social awareness of climate information usage, a public symposium was held on 8 July with an audience of more than 400 people .

At the opening ceremony, Mr. Tokio Kanou, Senior Vice-Minister of Land, Infrastructure, Transport and Tourism, gave an opening address, and His Excellency Mr. Paul Fivat, Ambassador of Switzerland to Japan, delivered a congratulatory address as a representative of the WCC-3 host country.

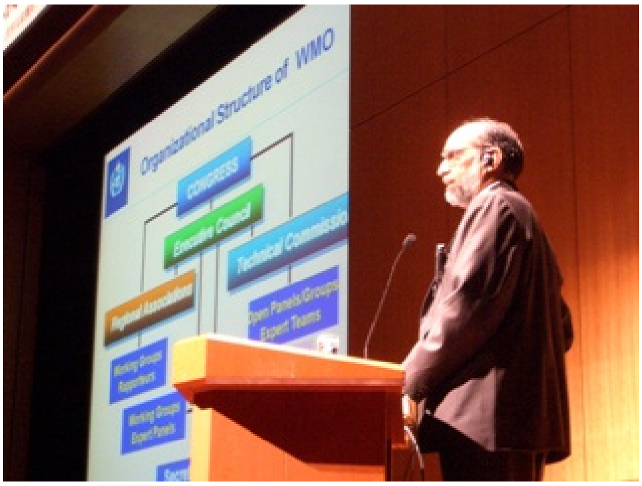
Dr. Avinash Tyagi, Director of the Climate and Water Department of WMO, introduced the objectives and expected outcomes of WCC-3.

Ms. Sae Nakarai, a well-known weather broadcaster, talked about her efforts to provide intuitive and clear-cut weather/climate information on TV.

Professor Roger Stone from the University of Southern Queensland, Australia, introduced successful examples of the utilization of seasonal forecasts and the El Niño outlook in Australia's agricultural sector.

Dr. Masahide Kimoto, Deputy Director and Professor of the Center for Climate System Research at the University of Tokyo, illustrated the increased utility of climate information in association with the development of climate modeling.

(Atsushi Goto, Office of International Affairs, JMA)



Dr Avinash Tyagi, Director of the Climate and Water Department, WMO, introduced WCC-3 at the public symposium

His Excellency Mr Paul Fivat, Ambassador of Switzerland to Japan, delivering a congratulatory address at the public symposium

Improvement of Information Services on the TCC Web Site

A number of new and updated data and products are now available on the TCC web site. This article introduces some of these developments.

1. Renewal of El Niño monitoring page

JMA provides El Niño condition diagnosis and outlook information on the TCC website's El Niño monitoring page at http://ds.data.jma.go.jp/tcc/tcc/products/elnino/index.html. Meanwhile, recent studies have indicated that SST anomalies in the tropical Indian Ocean and western tropical Pacific also affect the climate in Japan and other areas of the world (Figure 1).

Accordingly, JMA has defined new SST monitoring regions called IOBW and NINO.WEST (Figure 2), and SST information on these areas has also been available on the web page since July 2009. On the renewed page, SST deviation diagnosis and six-month outlooks for IOBW and NINO.WEST are provided. In addition, when a large SST anomaly is found in at least one monitoring region, the impact of such conditions on the climate will also be shown. We hope that the renewed page will contribute to climate prediction activities in many countries.

(Tsurane Kuragano, Climate Prediction Division)

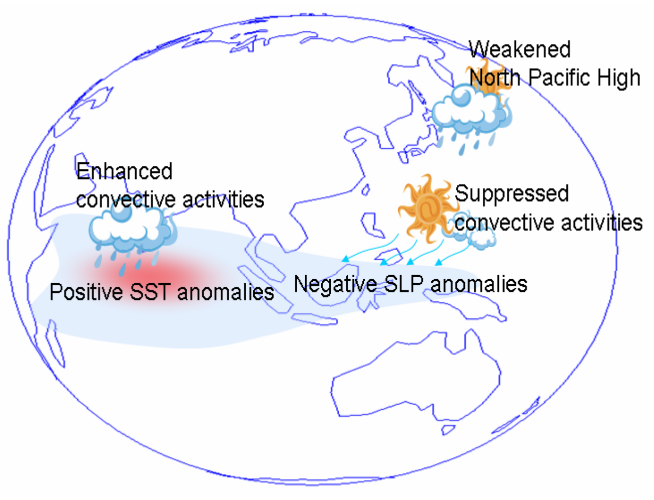


Figure 1 Effects of SST anomalies over the tropical Indian Ocean
Positive SST anomalies cause negative sea level pressure (SLP) anomalies in the tropical Indian Ocean and Indonesia. Northeasterly winds towards areas of low SLP suppress convective activities in the western tropical Pacific, which weaken the North Pacific high pressure system around Japan through negative PJ teleconnection pattern.

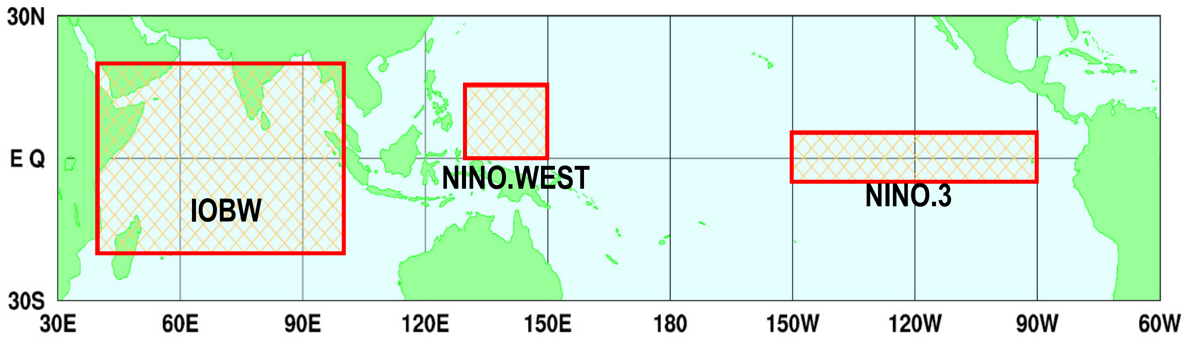


Figure 2 SST monitoring regions
IOBW (20°S – 20°N, 40°E – 100°E, Indian Ocean basin-wide): SST anomalies averaged in the IOBW region tend to follow those in NINO.3 with a lag of two to three months, and affect Japan's climate in post-El Niño summer through the process shown in Figure 1. NINO.WEST (0° – 15°N, 130°E – 150°E): SST anomalies averaged in the NINO.WEST region tend to fluctuate in a pattern opposite to those in NINO.3, and affect Japan's climate through convective activities in the region.

2. Renewal of web page for world climate conditions associated with El Niño/La Niña events

TCC has updated the web page for world climate conditions associated with El Niño/La Niña events. The new content shows information on the characteristics of surface air temperatures and precipitation amounts all over the world in relation to El Niño/La Niña events using the latest datasets. Similar information on western tropical Pacific and Indian Ocean SST variations is also available (Figure 3).

Figure 4 shows characteristics of temperature and precipitation for summer (June to August) in an El Niño phase. The figure indicates climatic tendencies, such as cooler-than-

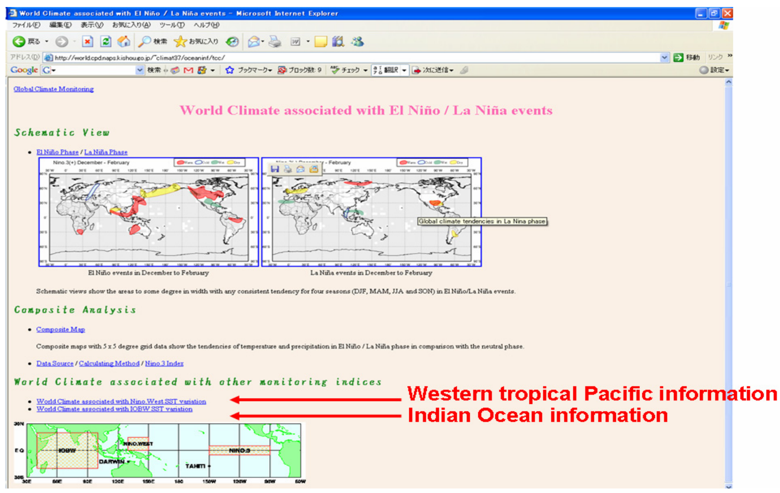


Figure 3 Renewed web page for world climate conditions associated with El Niño/La Niña events

normal temperatures from western Japan to central China and warmer-than-normal temperatures from the Philippines to Pakistan. Such schematic views are manually produced based on composite analysis of temperature and precipitation data.

Figures 5 and 6 are corresponding composite maps of temperature and precipitation, respectively.

Both monthly and three-month mean composite maps are available on the TCC web site at http://ds.data.jma.go.jp/tcc/tcc/products/climate/ENSO/index.htm.

(Takafumi Umeda, Climate Prediction Division)

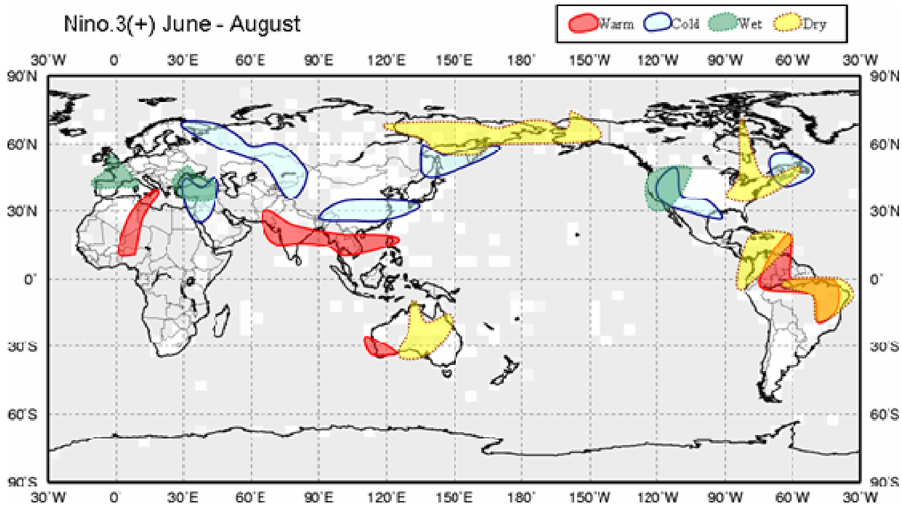


Figure 4 Schematic view of the world climate for June – August in an El Niño phase

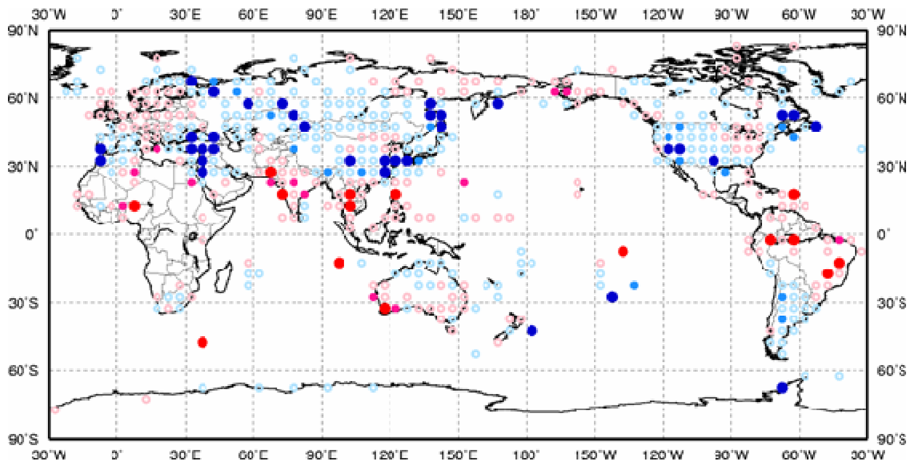


Figure 5 Composite map of temperatures for June – August in an El Niño phase
Red (blue): normalized temperature anomaly compared with neutral phase >= 0 (< 0)
Larger filled marks: significant at a confidence level of 95% or more
Smaller filled marks: significant at a confidence level of between 90% and 95%

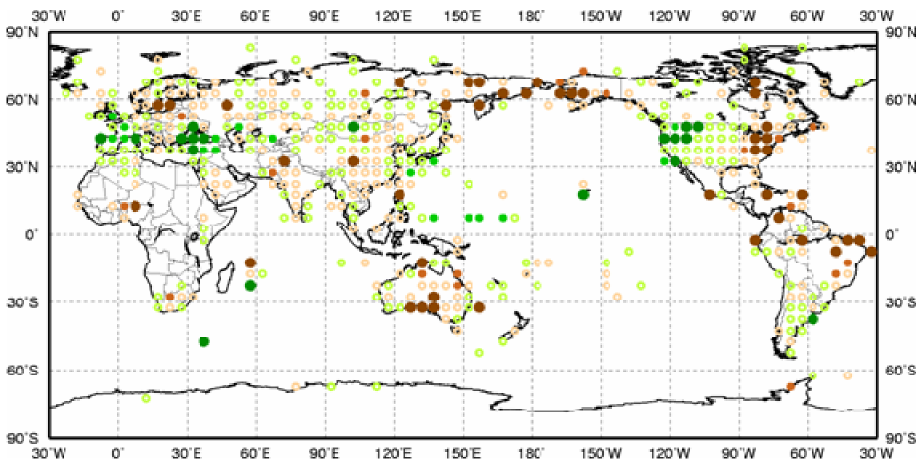


Figure 6 Composite map of precipitation for June – August in an El Niño phase
Green (brown): precipitation ratio compared with neutral phase >= 100% (< 100%)

3. Launch of MJO monitoring page

The Madden-Julian Oscillation (MJO) is an equatorial phenomenon whereby anomalous rainfall patterns propagate eastward along the equator for a period of 30 – 60 days. Since convective activities in the tropics have a significant influence on weather conditions not only in the tropics but also in the extra-tropics through teleconnections, MJO monitoring is very useful for mid- or long-range weather forecasts. An MJO monitoring page is now available on the TCC website.

JMA calculates the MJO Index, which is based on multivariate EOF analysis of 850-hPa zonal winds, 200-hPa zonal winds and OLR (15ºS – 15ºN) for the period 1980 – 2003, referring to Wheeler and Hendon (2004). This enables us to monitor and identify the active phase of the MJO and its eastward propagation in real time. For details (e.g. calculation procedures), please refer to the Bureau of Meteorology Research Centre (BMRC) web site and Wheeler and Hendon (2004).

Data from JRA-25 (Onogi et al. 2007) and JCDAS are used as atmospheric input . OLR is derived from observations by NOAA's polar orbital satellites, and provided by the Climate Prediction Center (CPC) of the National Centers for Environmental Prediction (NCEP) at the National Oceanic and Atmospheric Administration (NOAA). COBE-SST (JMA) datasets are used as the SST input.

Figure 7 shows an example of MJO phase monitor, plotting a time series of the two principal components (RMM1 and RMM2) from multivariate EOF (Figure 8). In association with the eastward propagation of the MJO, the trajectories of RMM1 and RMM2 form anti-clockwise circles in the phase space.

In addition to MJO phase monitor, the TCC web site provides various data including time series representations of RMM1 and RMM2 and CSV-format files showing the related values since 1980, which are updated every day. Statistical relationships with atmospheric circulation fields (composite maps for each phase, regression and correlation maps) are also outlined.

(Hiroshi Hasegawa, Climate Prediction Division)

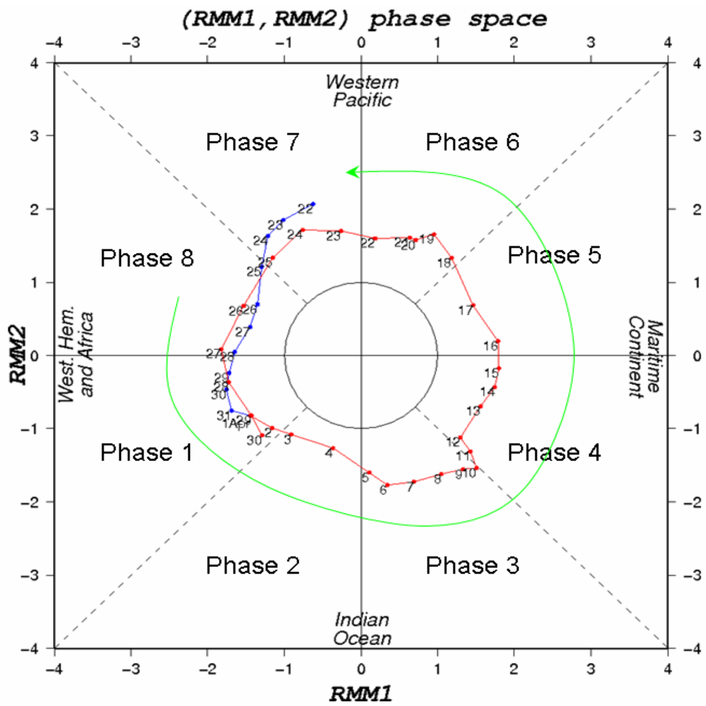


Figure 7 Example of MJO phase monitor (March – April 1990)

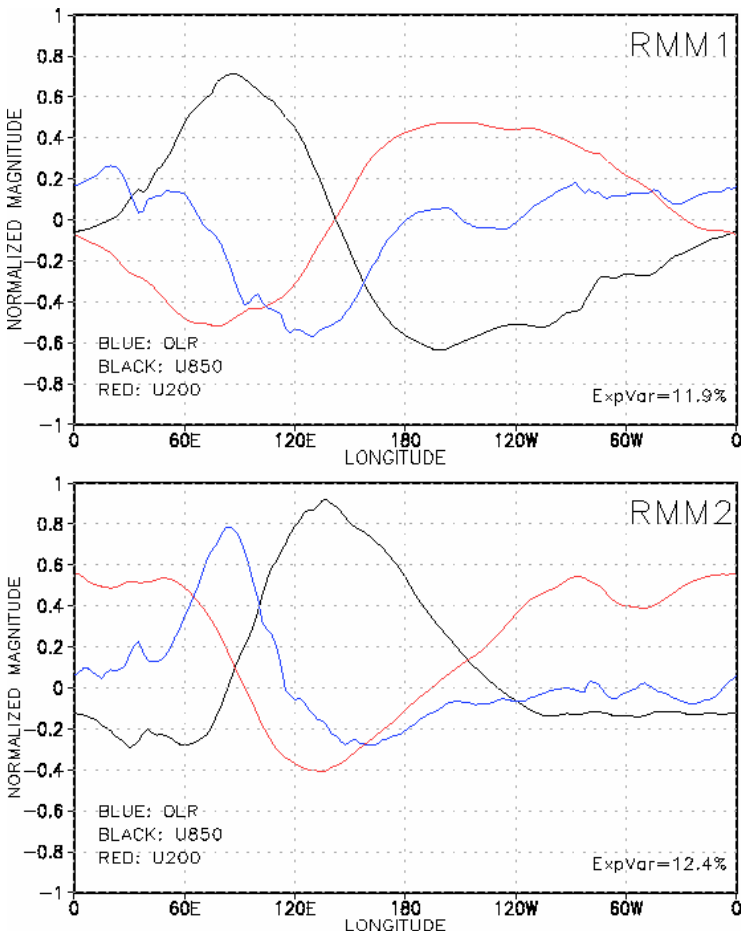


Figure 8 First and second EOF vectors derived from multivariate EOF (850- and 200-hPa zonal winds, and OLR)

Sea Ice in the Sea of Okhotsk for the 2008/2009 Winter Season

The sea ice extent in the Sea of Okhotsk was smaller than normal for almost the whole of the 2009 sea ice season, and the accumulated sea ice extent was the second lowest on record since 1971.

The sea ice extent in the Sea of Okhotsk was smaller than normal for almost the whole of the 2009 sea ice season (from December 2008 to May 2009) (Figure 9). It reached its seasonal maximum of 109.34 x 10^4 km^2 (slightly below the level for the previous season) on 5 March (Figures 9 and 10). The accumulated sea ice extent was the second lowest since 1971 (Figure 11) after the record low of 2006, and its ratio to the normal (the 1971 – 2000 average) was 64.4%.

Figure 11 shows overall trends for the period from 1971 to 2009. Although the sea ice extent in the Sea of Okhotsk shows large interannual variations, there is a slight decreasing trend in the accumulated sea ice extent of 180 [50 – 310] x 10^4 km^2 per decade (the numbers in square brackets indicate the two-sided 95% confidence interval), and in the maximum extent of 5.6 [1.2 – 9.9] x 10^4 km^2 per decade (equivalent to 3.5% of the area of the Sea of Okhotsk).

(Hiroshi Kunimatsu, Office of Marine Prediction)

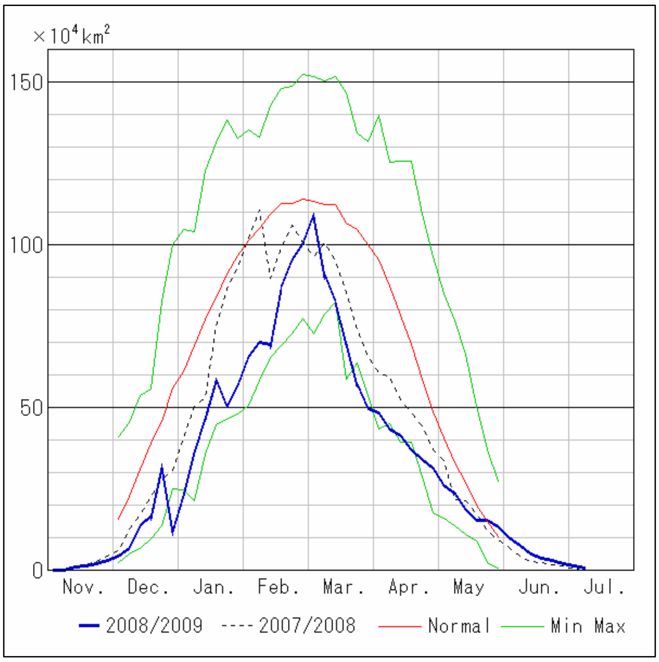


Figure 9 Seasonal variations of sea ice extent at five-day intervals in the Sea of Okhotsk from November 2008 to July 2009

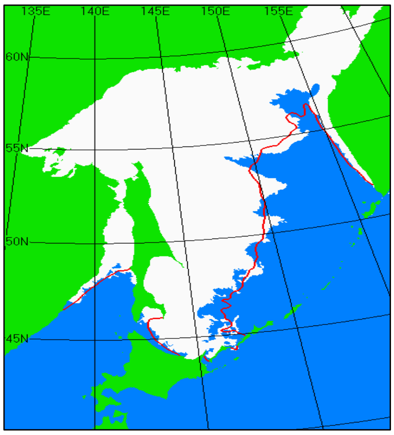


Figure 10 Sea ice conditions for 5 March 2009
The white area shows the observed sea ice extent, and the red line indicates the extent of normal coverage (1971–2000).

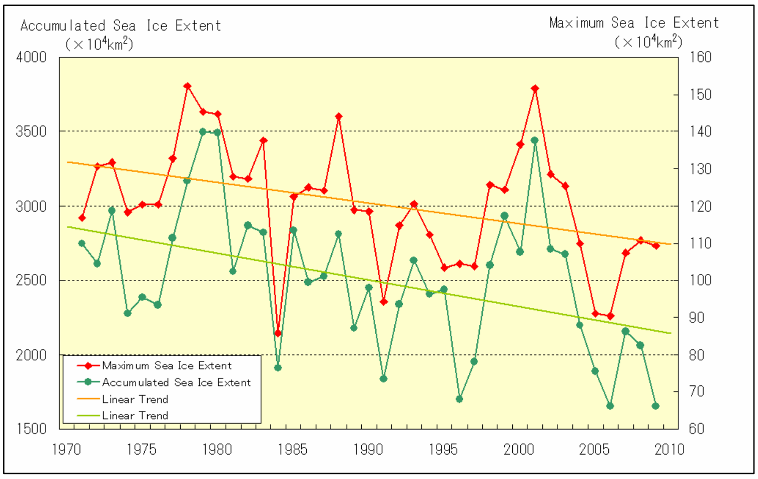


Figure 11 Interannual variations in the maximum sea ice extent (red lines) and accumulated sea ice extent (green lines) in the Sea of Okhotsk from 1971 to 2009
Accumulated sea ice extent: the sum of all five-day sea ice extent values from December of the previous year to May

Summary of Kosa (Aeolian Dust) over Japan in 2009

The number of days when any meteorological station in Japan observed Kosa, or Aeolian dust, from January to June 2009 was 17, which was below the normal value of 20.5. Kosa was widely observed throughout the country except in Hokkaido and the Nansei Islands from 16 to 19 March.

As of 30 June 2009, JMA carried out Kosa (Aeolian dust) observation at 76 meteorological stations. The phenomenon is recorded whenever it is observed by station staff.

The number of days when any meteorological station in Japan observed Kosa was 17 (normal: 20.5, i.e. the 1971 – 2000 average) from January through June 2009. The total number of stations observing

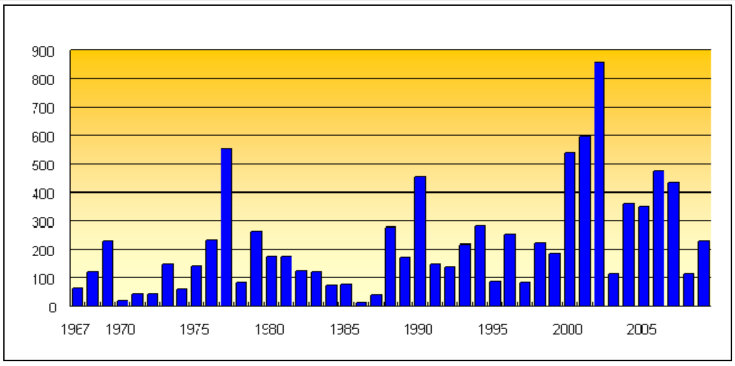


Figure 12 Annual total daily numbers of meteorological stations observing Kosa from 1967 to 2009
Statistics are presented considering changes in the number of meteorological stations. The number for the year 2009 stands as of 30 June.

Kosa over the same period (referred to below as the *annual total number of stations*) was 230 (normal: 177.5) (Figure 12). In 2009, Kosa was observed widely in February and March, while afterward it was seen sparsely only over the western part of Japan (Figure 13). Table 1 shows major Kosa events in 2009.

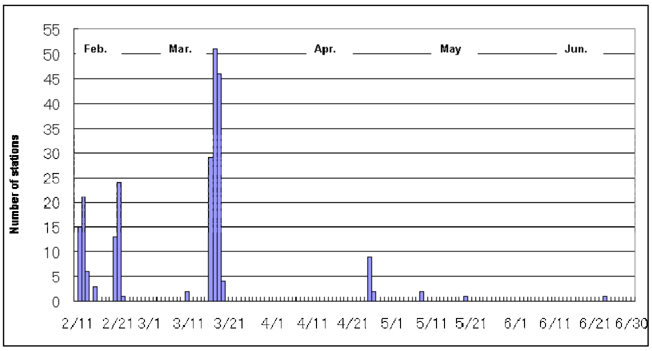


Figure 13 Daily number of meteorological stations that observed Kosa from 11 February to 30 June 2009 (total number of meteorological stations: 76)

Significant Kosa event in mid-March

Kosa was observed nationwide from 16 to 19 March except in Hokkaido and the Nansei Islands (Figure 14). In particular, two-thirds of the meteorological stations (i.e. 51 stations) observed Kosa on 17 March. This figure is the eighth highest since 1967 when JMA started recording statistics on Kosa. The highest figure was 58, recorded on 2 April 2007.

SYNOP (surface synoptic observations) reports indicate that Kosa and dust storms were observed in the Gobi Desert on 14 March. This event was also detected in infrared differential images of Japan's MTSAT weather satellite, which tracked Kosa spreading over Japan along with the movement of a cyclone (Figure 15). Although visibility of less than 5 km was not observed in Japan, many meteorological stations in the western part of the Korean Peninsula observed visibility of less than 2 km (Figure 14).

(Nagatoshi Inoue, Atmospheric Environment Division)

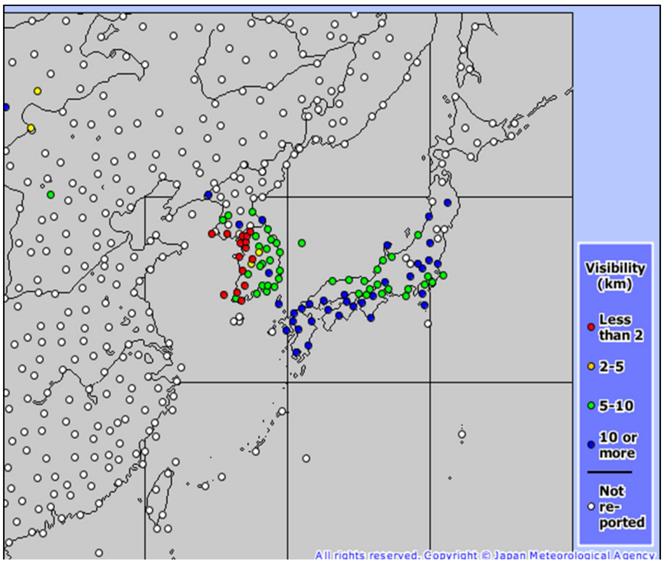


Figure 14 Stations observing Kosa or local sand/dust haze on 17 March

The colors indicate the lowest visibilities observed at these stations.

Table 1 Major Kosa events in 2009

Period	Number of stations observing Kosa	Largest daily number of stations observing Kosa	Region
11 – 13 February	21	21 (12 February)	From the Kii Peninsula to Kyushu
20 – 22 February	25	24 (21 February)	Kanto-Koshinetsu, Hokuriku, from Kinki to Kyushu, the Nansei islands
16 – 19 March	55	51 (17 March)	From Tohoku to Kyushu
25 – 26 April	9	9 (25 April)	From Kyushu to the Nansei Islands

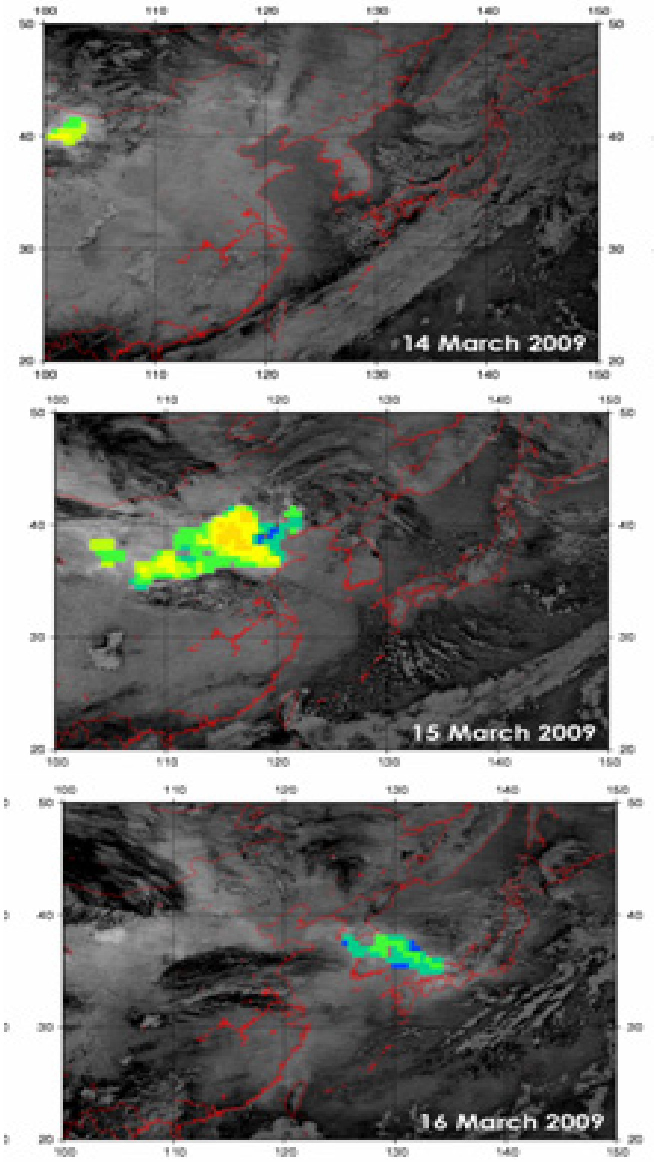


Figure 15 Kosa spreading over Japan detected in MTSAT infrared differential images at 03 UTC on 14 – 16 March 2009

The yellow, green and light blue areas represent Kosa concentration in descending order of concentration.

Unusually Wet and Cloudy Summer Weather in Japan

In July 2009, unusual wet and cloudy weather was dominant from Western to Northern Japan. JMA urgently held the meeting of the Advisory Panel on Extreme Climatic Events on 3 August 2009 to discuss the factor of such unusual weather.

Several developed cyclones and the lingering Bai-u front along the Japanese archipelago (consistent with the weak northward expansion of the North Pacific High) brought unusually wet and cloudy weather from western to northern Japan in July 2009. A record-breaking level of monthly total precipitation was set in northern Japan, and the Sea of Japan side of the country experienced its lowest monthly sunshine duration since 1946. Some crop damage and a rise in vegetable prices were reported by the media in association with this unsettled weather. The active Bai-u front also caused disaster conditions in western Japan in July 2009.

On 3 August 2009, the Japan Meteorological Agency (JMA) held an urgent meeting of the Advisory Panel on Extreme Climatic Events consisting of over 10 climatologists (chaired by Dr. Masahide Kimoto, Deputy Director and Professor of the Center for Climate System Research (CCSR) at the University of Tokyo) to discuss the factors contributing to such unusual weather. The panel officially stated that the atypical conditions were caused by the intensification, southward shift and persistent meandering pattern of the subtropical jet. These jet characteristics were observed on a hemispheric scale mainly due to significant warming of the tropical troposphere and a developing El Niño event. In particular, the southward shift of the subtropical jet was remarkable over East Asia in late July due to the equatorward shift of an active convection area in the western Pacific. The source of stationary Rossby wave packets along the subtropical jet was not clear, but it is suggested that a negative Silk Road pattern (Enomoto et al., 2004) appeared due to the positional relationship between the anomalous jet and the Tibetan Plateau. Although a negative Arctic Oscillation was dominant in July, its influence on the subtropical jet was unclear.

(Norihisa Fujikawa, Climate Prediction Division)

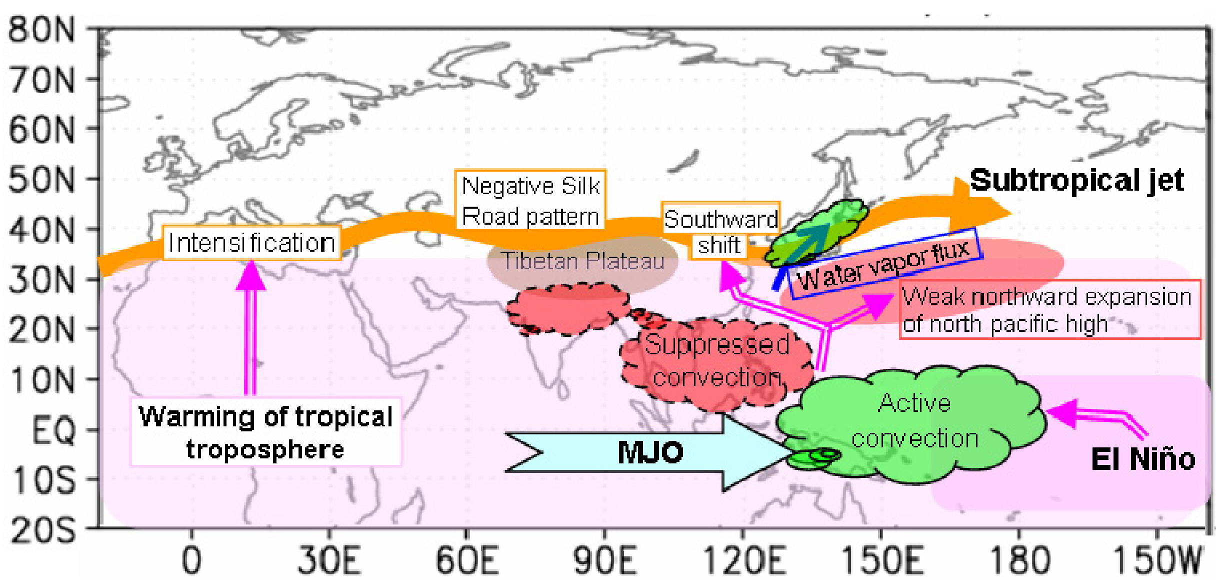


Figure 16 Schematic chart showing the factors behind the unusually wet and cloudy summer weather over Japan in July 2009

Designation of TCC and BCC as first RCCs in RA II

The Tokyo Climate Center (TCC) of the Japan Meteorological Agency (JMA) and the Beijing Climate Center (BCC) of the China Meteorological Administration (CMA) were formally designated as the first Regional Climate Centers (RCCs) in Regional Association II (Asia) at the sixty-first session of the WMO's Executive Council held in Geneva, Switzerland, from 3 to 12 June 2009. TCC and BCC started their operational climate-related activities as RCC on 1 July. In close cooperation between TCC and BCC, the Regional Climate Center Network in RA II website has been launched at http://www.rccra2.org/detail/index.htm.

(Kumi Hayashi, Tokyo Climate Center)

Any comments or inquiries on this newsletter and/or the TCC website would be much appreciated. Please e-mail to: tcc@climar.kishou.go.jp

(Chief Editor: Kumi Hayashi)

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