Tokyo Climate Center, Japan Meteorological Agency

TCC News

No. 29 Summer 2012

Contents Page

Upgrade of JMA's Supercomputer System

The Japan Meteorological Agency (JMA) began operating the latest generation of its Hitachi supercomputer system on 5 June, 2012, with the aim of improving the meteorological information services the Agency provides. The new system, known as Hitachi SR16000/M1, is about 30 times faster than its Hitachi SR11000 predecessor and has the capacity to make more than 800 trillion floating-point calculations per second. The new system allows JMA to run more sophisticated atmospheric and oceanic models, leading to better accuracy and precision in very short-range to long-range forecasting.

Using the upgraded supercomputer, JMA plans to improve the one-month forecast model and the seasonal forecast model in a couple of years. The new Japanese reanalysis, JRA-55, which covers from 1958 to 2012 will be completed in the first half of 2013, and its products will be available for operational and research uses around autumn of 2013.

(Kazutoshi Onogi, Climate Prediction Division)

Table 1 Comparison of Computer Specification

	Old	New
Model	Hitachi SR11000/K1 Hitachi SR11000/J1	Hitachi SR16000/M1
Theoretical peak performance	27.5 TFlops*	847 TFlops
Main memory capacity	13.1 TBytes	108 TBytes (including control)
Magnetic disk capacity	18.6 TBytes	348 TBytes

* TFlop: capacity to perform one trillion floating-point calculations per second

Left: The new supercomputer system used for JMA's weather and climate forecasting
Right: New housing for the supercomputer system located in Tokyo

Summary of Kosa (Aeolian dust) Events over Japan in 2012

Characteristics of Kosa events in 2012

From January to June 2012, the number of days on which meteorological stations in Japan observed Kosa was 11, which was below the 1981 – 2010 normal of 23.1 (Figure 1, left). The total number of stations observing Kosa over the same period was 90, which was also below the normal of 212.7 (Figure 1, right).

The first Kosa observation of the year in Japan was made on 24 March, which was the fifth-latest date since records began in 1967, and no further observations were recorded in the country during that month. From mid-January 2012, the Eurasian Continent (especially in the mid-latitudes) experienced significantly lower-than-normal temperatures due to strong cold-air inflow. As a result, the number of days with snow cover was higher than usual in arid areas such as the Gobi Desert and the Ocher Plateau where Kosa originates. Figure 2 shows a distinct difference in the number of days with snow cover for the area in March 2012 (left) and 2006 (right), when Kosa was observed at many stations in Japan.

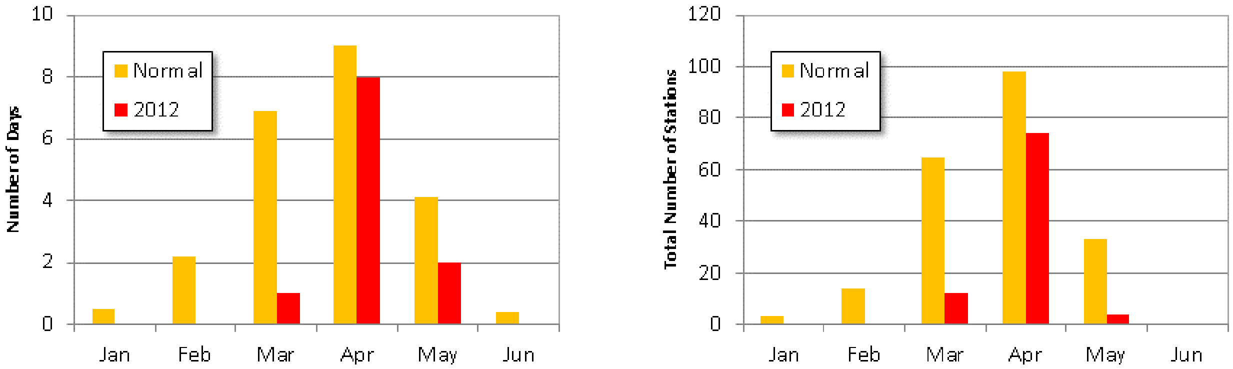


Figure 1 Monthly number of days when meteorological stations in Japan observed Kosa (left), and the monthly total number of stations observing Kosa (right) from January to June 2012

The red and yellow bars show values for 2012 and the 1981 – 2010 normals, respectively.

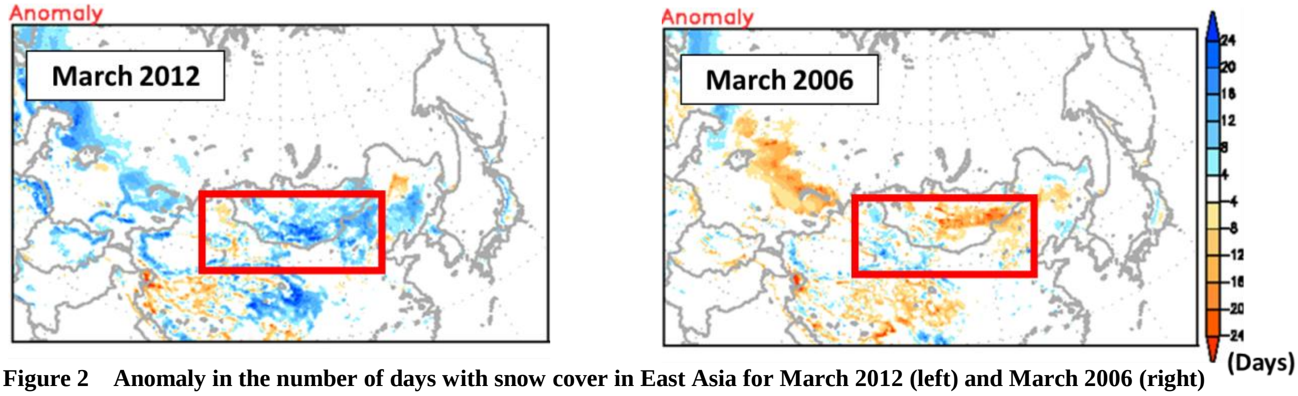


Figure 2 Anomaly in the number of days with snow cover in East Asia for March 2012 (left) and March 2006 (right)

The red boxes in the figures show arid areas such as the Gobi Desert and the Ocher Plateau where Kosa originates.

Significant Kosa event in late April

Kosa was observed at many stations in eastern and western Japan from 23 to 25 April, and minimum visibility figures of less than 5 km were recorded at several stations in western Japan (Figure 3).

A large dust storm formed around the Ocher Plateau from 18 to 19 April. Massive volumes of dust were blown up into the atmosphere and carried over to Japan by upper-air westerly winds. The results of analysis using infrared split-channel images from the MTSAT-2 satellite show that an area of concentrated dust seen around the lower Chang Jiang River early on the morning of 22 April subsequently moved over to western Japan (Figure 4).

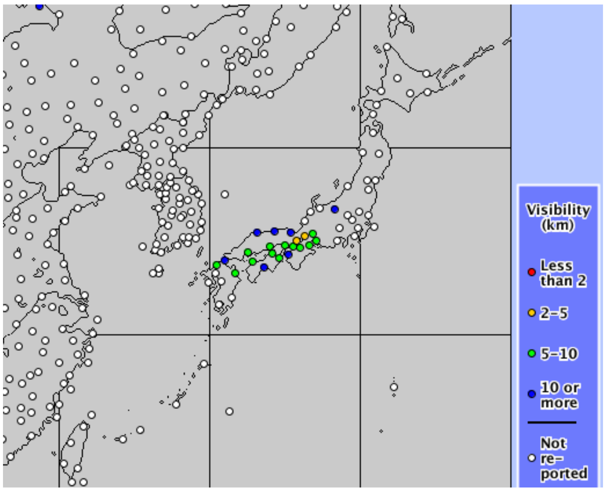


Figure 3 Meteorological stations observing Kosa and minimum visibility on 24 April

According to JMA's Kosa prediction model, the mass was expected to move over Japan on and after 23 April (Figure 5). Based on this forecast and surface observation reports from the areas in question, JMA released Kosa event information on 24 April in order to call attention to potential traffic hazards.

(Nozomu Ohkawara,
Atmospheric Environment Division)

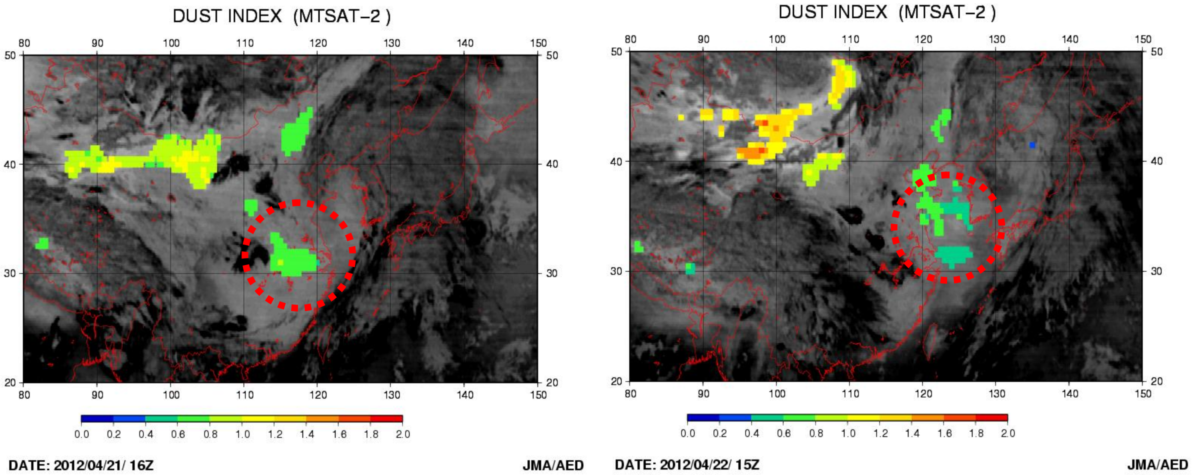


Figure 4 Kosa area analysis from MTSAT-2 satellite data at 01 JST on 22 April (16 UTC on 21 April, left) and at 24 JST on 22 April (15 UTC on 22 April, right)
The red dashed circles in the figures highlight the concentrated dust area that moved over to Japan.

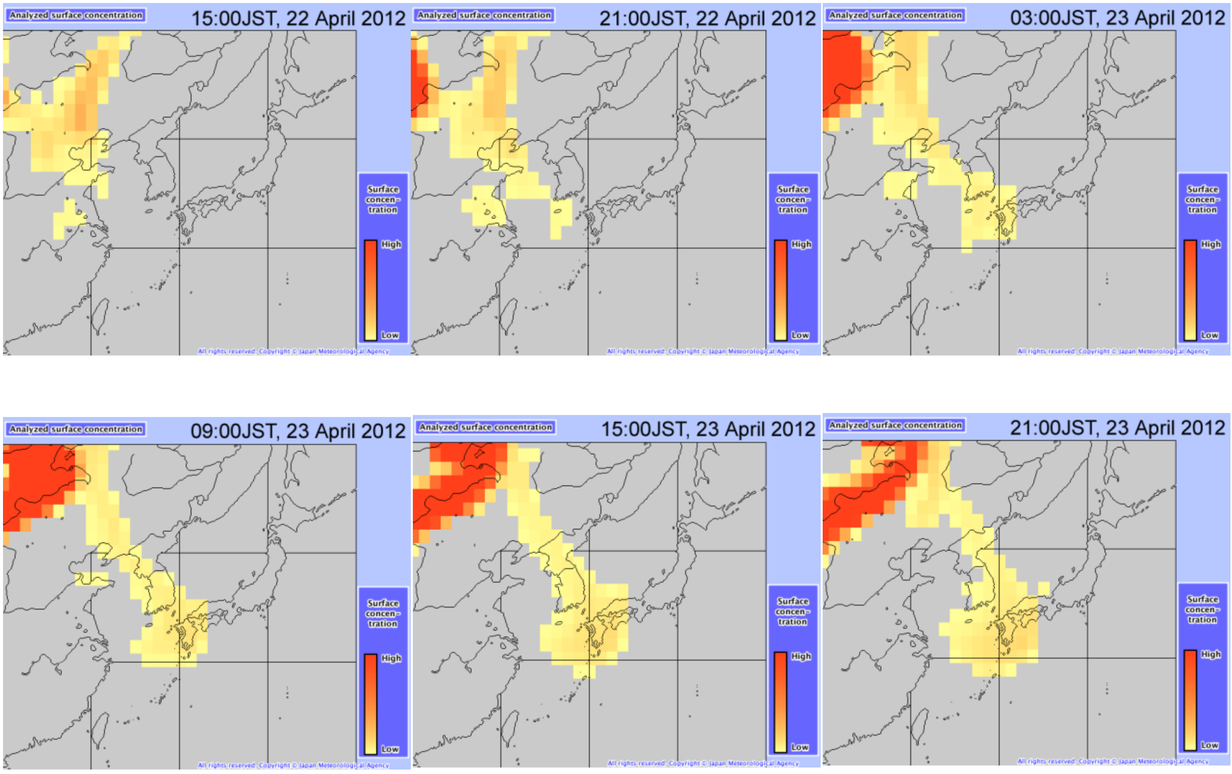


Figure 5 Forecast of surface dust concentration by JMA's Kosa prediction model for the period from 15 JST (06 UTC) on 22 April to 21 JST (12 UTC) on 23 April (initial time: 21 JST (12 UTC) on 21 April)
Kosa was expected to reach Japan early on the morning of 23 April.

Sea Ice in the Sea of Okhotsk for the 2011/2012 Winter Season

The sea ice extent in the Sea of Okhotsk was near normal for the 2012 sea ice season.

The sea ice extent in the Sea of Okhotsk was near normal for the 2012 sea ice season (from December 2011 to May 2012) (Figure 6). It reached its seasonal maximum of 112.26 x 10^4 km^2 (slightly below the normal of 116.92 x 10^4 km^2) on 31 March (Figures 6 and 7), exceeding the highest value for the previous season (Figures 6 and 8). Figure 8 shows overall trends for the period from 1971 to 2012. Although the sea ice extent in the Sea of Okhotsk shows large interannual variations, there is a long-term downward trend of 173 [63 – 282] x 10^4 km^2 per decade (the numbers in square brackets indicate the two-sided 95% confidence interval) in the accumulated sea ice extent, and another long-term downward trend of 5.8 [2.0 – 9.6] x 10^4 km^2 (equivalent to 3.7% of the area of the Sea of Okhotsk) per decade in the maximum extent.

(Ryohei Okada, Office of Marine Prediction)

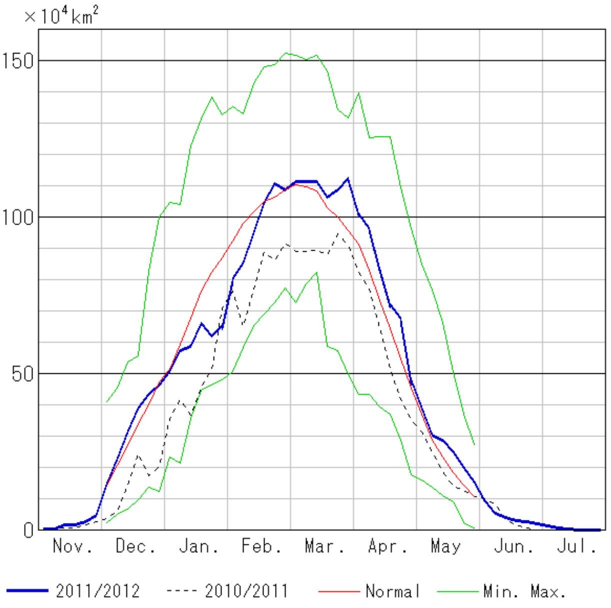


Figure 6 Seasonal variation of sea ice extent at five-day intervals in the Sea of Okhotsk from November 2011 to July 2012

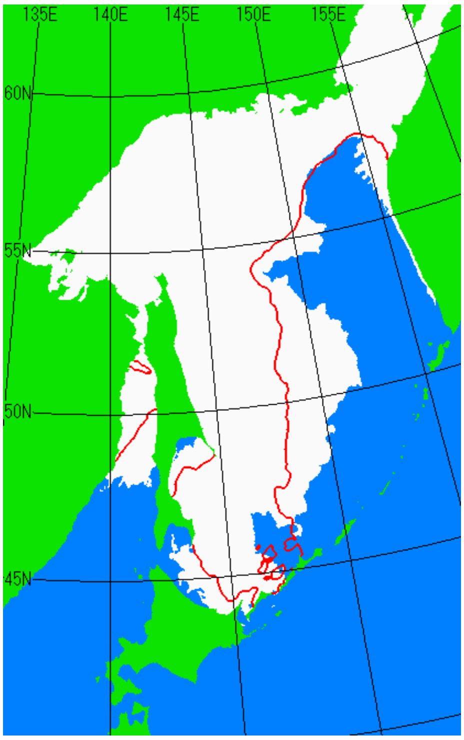


Figure 7 Sea ice situation on 31 March 2012
The white area shows the observed sea ice extent, and the red line indicates the extent of normal coverage (1981 – 2010).

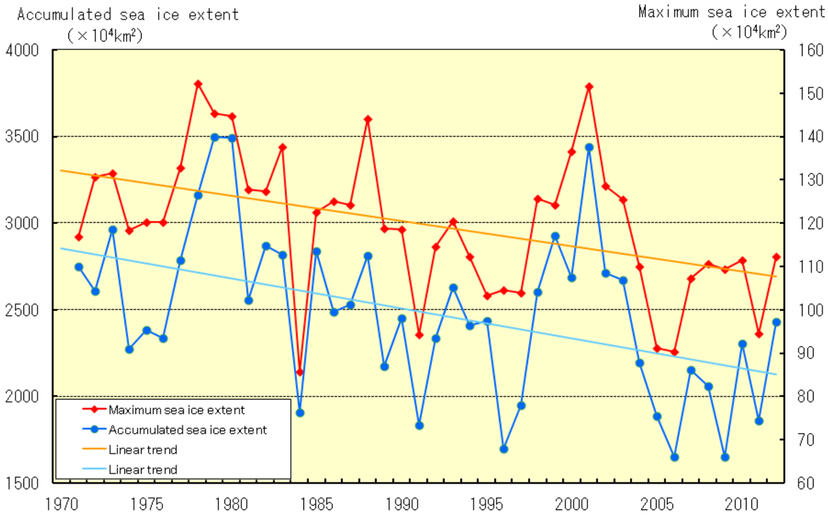


Figure 8 Interannual variations in the maximum sea ice extent (red line) and the accumulated sea ice extent (blue line) in the Sea of Okhotsk from 1971 to 2012
Accumulated sea ice extent: the sum of all five-day sea ice extent values from December to May

BMKG expert visit to TCC

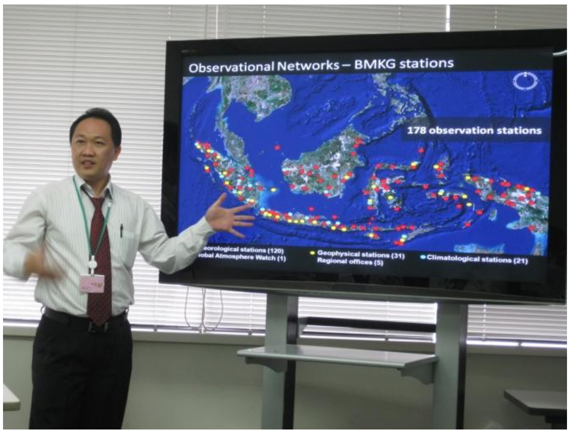
One of TCC's main tasks is to assist NMHSs in improving their climate services. In addition to running annual training seminars and arranging expert visits, TCC also receives visitors from NMHSs upon request.

Indonesia's Meteorological, Climatological and Geophysical Agency (BMKG) is currently developing its Climate Early Warning System (BMKG CEWS), which is scheduled to enter operation in 2013. In a related development, JMA commenced operational provision of Early Warning Information on Extreme Weather (EWIEW)* in March 2008 with the aim of contributing to meteorological risk management in climate-sensitive sectors in Japan. To support the effective development of BMKG CEWS, four experts from BMKG visited TCC in July 2012.

During the visit, the BMKG representatives gave informative presentations on their climate services, including those tailored to agriculture in Indonesia. TCC experts then led discussions on a number of relevant issues such as work procedures for the operational climate warning system in Japan and JMA's Ensemble Prediction System (EPS) for seasonal forecasting. Attendees from both organizations engaged in interesting and fruitful discussions on customized climate services and various other issues. The BMKG experts then had exercises on the application of TCC products including gridded EPS data. TCC hopes the visit will contribute to the efficient and effective development of BMKG's planned Climate Warning System.

* Japanese site: http://www.jma.go.jp/jp/soukei/
English site: http://www.jma.go.jp/en/soukei/
The amount of information available on the English site is limited.

(Teruko Manabe, Tokyo Climate Center)



Presentation by a BMKG expert

Presentation by a TCC expert

Exercises on the application of TCC products

BMKG experts and TCC staff members

Any comments or inquiry on this newsletter and/or the TCC website would be much appreciated. Please e-mail to tcc@met.kishou.go.jp.
(Editors: Teruko Manabe, Ryuji Yamada and Kenji Yoshida)

Tokyo Climate Center (TCC), Climate Prediction Division, JMA
Address: 1-3-4 Otemachi, Chiyoda-ku, Tokyo 100-8122, Japan
TCC Website: http://ds.data.jma.go.jp/tcc/tcc/index.html