Tokyo Climate Center, Japan Meteorological Agency

TCC News

No. 21 Summer 2010

Contents

Introduction of Seasonal Mean Global Average Temperature Provision by JMA

JMA will start to provide information on seasonal average global temperatures through the TCC website in September 2010.

The Japan Meteorological Agency (JMA) provides information on annual and monthly averages of global temperatures through the TCC website to assist with monitoring for the state of global warming. In addition to this information, seasonal mean temperature data (i.e., for winter, spring, summer and autumn in the Northern Hemisphere) will also be released in September 2010.

The new information, which is updated every three months, includes interannual variability graphs, long-term trend values and global distribution maps of seasonal temperature anomalies against the normal in the same way as for annual and monthly temperatures.

Recent seasonal mean temperatures show that this spring was tied with that of 1998 as the warmest on record since 1891 (partly because of the El Niño phenomenon that started last summer), and that last autumn was the second warmest and this winter was the fourth warmest on record .

The new information can be found together with annual and monthly temperature data at http://ds.data.jma.go.jp/tcc/tcc/products/gwp/temp/ann_wld.html.

(Hiroshi Ohno, Climate Prediction Division)

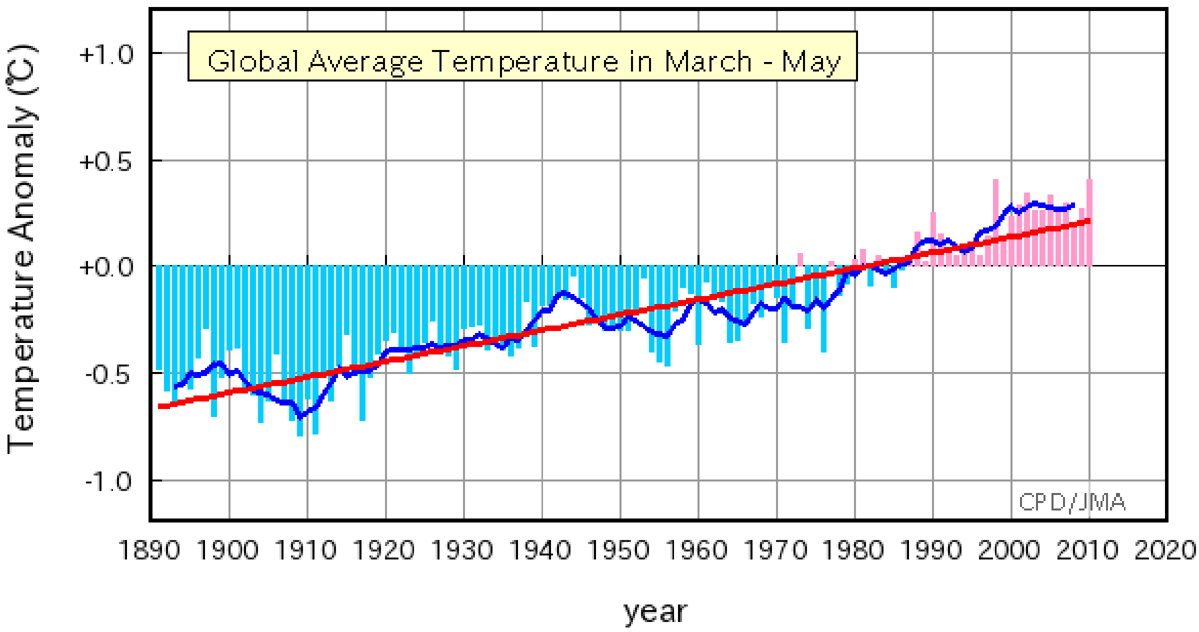

Figure 1 Long-term change in seasonally averaged surface temperature anomalies from March to May worldwide

Addition of new content: Introduction to the Interactive Tool for Analysis of the Climate System (ITACS)

JMA/TCC has developed the *Interactive Tool for Analysis of the Climate System* (ITACS) to assist National Meteorological and Hydrological Services (NMHSs) in analyzing the causes of extreme climate events. The ITACS will enable users not only to monitor current climate conditions but also to analyze the characteristics and factors that lie behind them and extreme climatic events.

TCC has added new content called Introduction to the Interactive Tool for Analysis of the Climate System (ITACS) in order to assist users.

To monitor and analyze the climate system, various types of charts can be drawn using the ITACS, including latitude-longitude maps, polar stereographic maps, cross sections and time-series graphs. The system is equipped with a variety of statistical analysis tools, such as composite, correlation, empirical orthogonal function (EOF) and singular value decomposition (SVD) analyses, making it easy for users to study climate systems without the need for complicated programming. Data sets available on the ITACS include JMA's atmospheric analysis data (JRA/JCDAS), outgoing longwave radiation (OLR) data provided by NOAA, and JMA's sea surface temperature analysis data (COBE-SST).

Users obtaining useful phenomena analysis results or applying operational products using ITACS are requested to introduce them in the interests of sharing usage and knowledge.

(Shotaro Tanaka, Takashi Yamada, Climate Prediction Division)

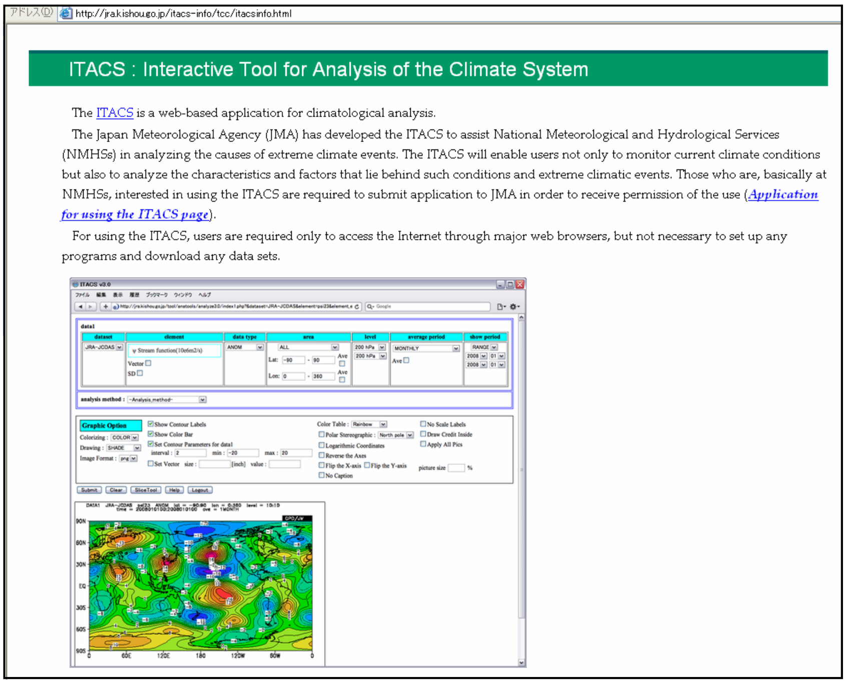

Figure 2 ITACS web page (http://jra.kishou.go.jp/itacs-info/tcc/itacsinfo.html)

Summary of Kosa (Aeolian dust) events over Japan in 2010

Characteristics of Kosa events in 2010

Looking at significant features of Kosa events in 2010, 63 out of 67 stations in Japan (the highest number ever recorded) observed the phenomenon on 21 March, and the number of days when any meteorological station in Japan recorded observation (referred to below simply as the number of days) was 15 – far higher than the 1971 – 2000 normal of 3.3 and a new record for May (Figure 3). The total number of days up to the end of June was as high as 30, which also exceeds the 1971 – 2000 normal of 19.3.

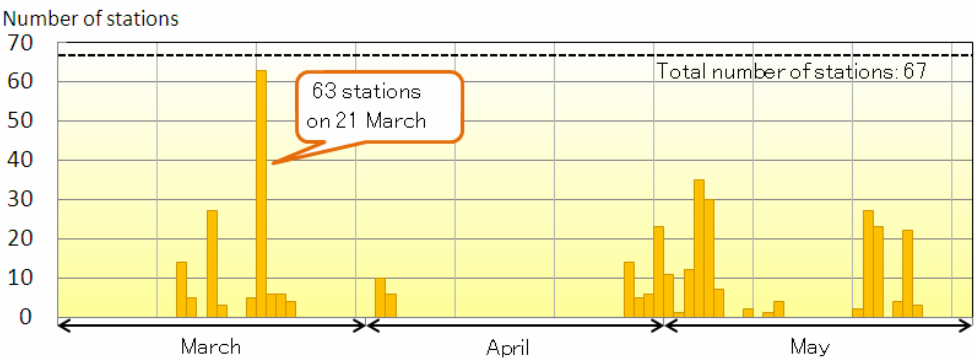

Figure 3 Daily numbers of stations observing Kosa from March to May in 2010

Kosa event on 21 March observed by the largest number of stations ever

Outline

Kosa originating from around the Gobi Desert from 18 to 19 March moved over to the area of Japan and was observed in the country from 20 to 24 March. On 21 March, it was seen at most Kosa observing stations (63 out of 67). The daily number of stations reporting the phenomenon was the highest on record since 1967 when statistics began (the previous record was 53 on 2 April, 2007).

During this event, visibility dropped to less than 2 km at Wajima, Omaezaki, Tsu, Nara, Kagoshima and Naha. The photographs in Figure 4 show the remarkable visibility deterioration experienced in Osaka. The event was also observed by the MTSAT geostationary meteorological satellite, which produced imagery clearly showing Kosa moving over to Japan (Figure 5).

The low visibility conditions caused by this Kosa event resulted in a number of flights cancellations in Kagoshima and Okinawa, and a pleasure boat that became lost was rescued by a patrol boat in Okinawa. It was reported that the Kosa event from 19 to 20 March in China affected the largest area since 2003 and reached the vicinity of Hong Kong, and that the concentration of suspended particulate matter was the highest since 2005 during the Kosa event from 20 to 21 March in the Republic of Korea. The Kosa information on the website of JMA was accessed more than 230,000 times on 21 March, which was a new record for the number of daily visits.

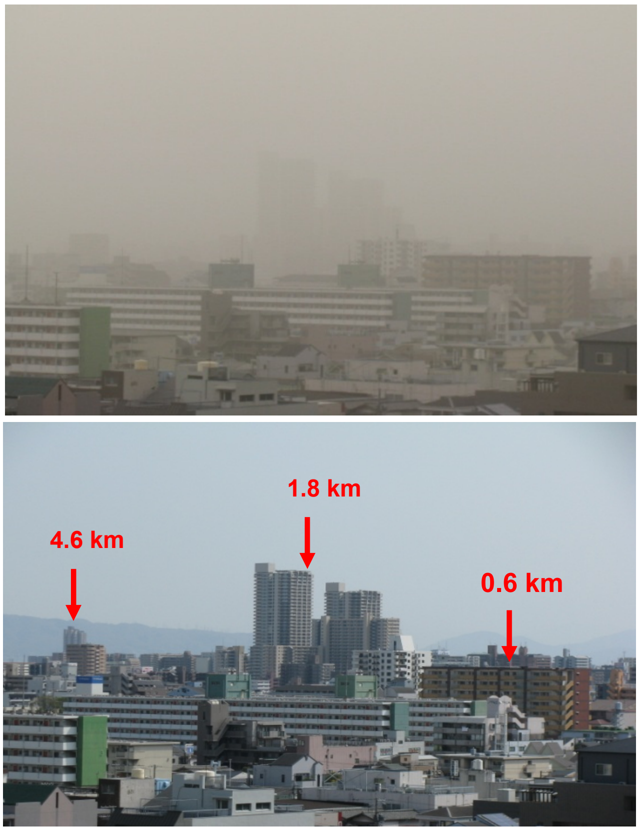

Figure 4 Views of Osaka on 21 (top) and 22 (bottom) March (courtesy of Mr Kenichi Adachi, Osaka District Meteorological Observatory)
The distance to the tall buildings in the center is about 1.8 km.

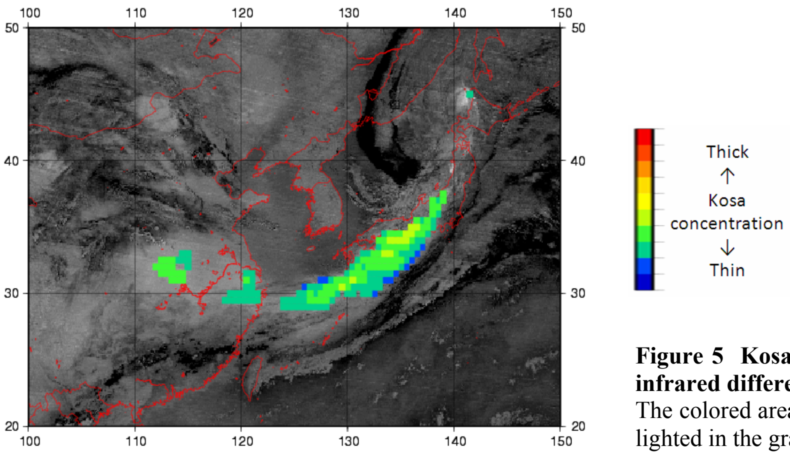

Figure 5 Kosa moving over to Japan captured in an MTSAT infrared differential image (00 UTC on 21 March)
The colored areas indicate the estimated Kosa extent, and are highlighted in the grayscale image.

Kosa forecast issued by JMA

JMA issued a Kosa forecast three days before the event stating that thick Kosa was expected to reach the vicinity of Japan after 20 March. Observation results proved that the event's timing and extent were appropriately forecasted (Figure 6).

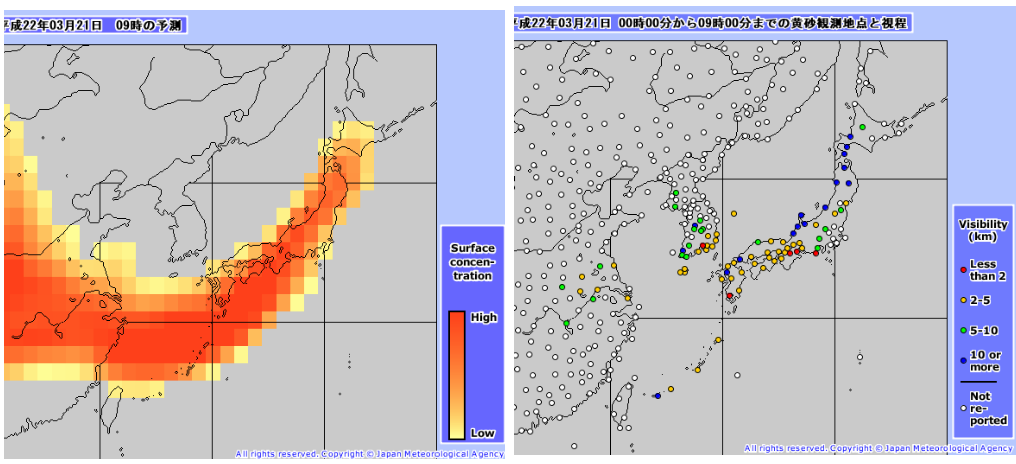

Figure 6 Kosa forecast (left) and observation (right) charts for 00 UTC on 21 March

Measurements at Ryori

At Ryori (an atmospheric environmental measurement station in northern Japan operated as part of international monitoring networks including the WMO's Global Atmosphere Watch (GAW)), measurements taken on 21 March using a sunphotometer* indicated a gradual decrease in the amount of aerosols and the proportion of large-sized particles characterizing Kosa from around 13:00 JST (Figure 7).

* A sunphotometer is an instrument that observes the amount and size distribution of aerosols in the total column atmosphere above the station by measuring solar radiation at different wavelengths.

Most frequent Kosa observation on record for May

In May 2010, the monthly total for the daily number of stations observing Kosa reached its highest level ever. The key factors were that the upper air flow in the atmosphere was favorable for transporting Kosa to Japan in the first half of May and that dust reaching the vicinity of the country remained there for a long time due to a slowly moving low-pressure area in the second half of the month. In the Kosa source regions including the Gobi and Taklamakan deserts and the Loess Plateau, Kosa was generated in May with a frequency similar to that seen in the past few years.

(Yoshihisa Mamiya, Atmospheric Environment Division)

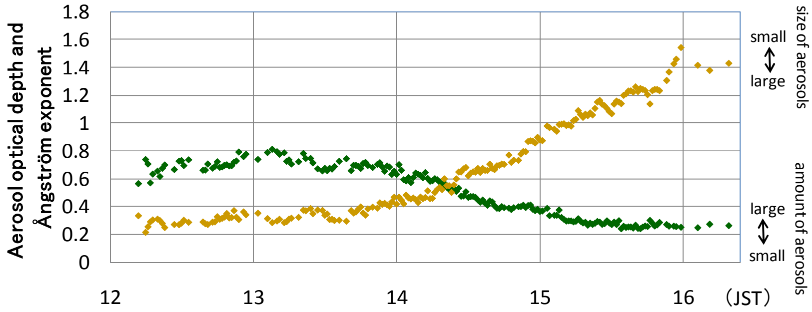

Figure 7 Aerosol optical depth at a wavelength of 500 nm (in green; higher values indicate larger aerosol amounts) and the Ångström exponent (in yellow; smaller values indicate larger aerosol sizes) measured using a sunphotometer at Ryori on 21 March
Data for periods when the sun was hidden by clouds are missing.

Sea Ice in the Sea of Okhotsk for the 2009/2010 Winter Season

The sea ice extent in the Sea of Okhotsk was smaller than normal from December 2009 to February 2010, and was near normal or larger than normal from March to May 2010.

The sea ice extent in the Sea of Okhotsk was smaller than normal from December 2009 to February 2010, and was near normal or larger than normal from March to May 2010 (Figure 8). It reached its seasonal maximum of 111.41 x 10^4 km^2 (below the normal) on 10 March (Figures 8, 9 and 10).

Figure 10 shows overall trends for the period from 1971 to 2010. Although the sea ice extent in the Sea of Okhotsk shows large interannual variations, there is a slight decreasing trend of 174 [55 – 294] x 10^4 km^2 per decade (the numbers in square brackets indicate the two-sided 95% confidence interval) in the accumulative sea ice extent, and another slight decreasing trend of 5.5 [1.3 – 9.7] x 10^4 km^2 (equivalent to 3.5% of the area of the Sea of Okhotsk) per decade in the maximum extent.

(Hiroshi Kunimatsu, Office of Marine Prediction)

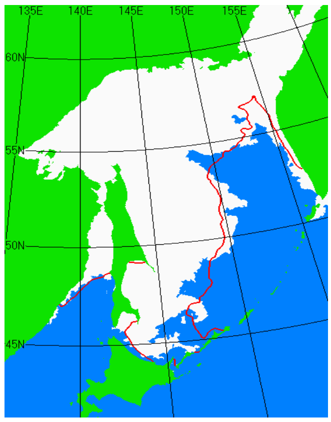

Figure 9 Sea ice conditions for 10 March 2010
The white area shows the observed sea ice extent, and the red line indicates the extent of normal coverage (1971 – 2000).

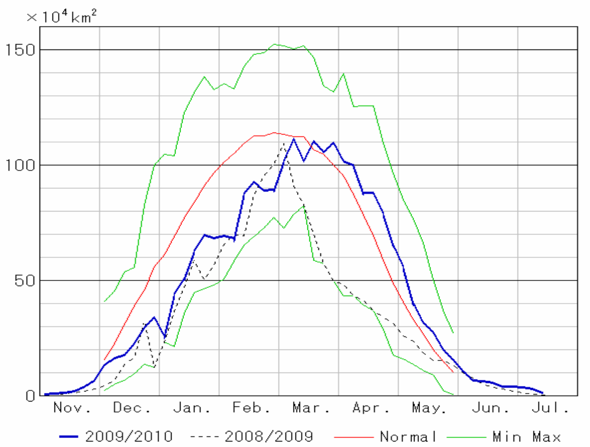

Figure 8 Seasonal variations of sea ice extent at five-day intervals in the Sea of Okhotsk from November 2009 to July 2010

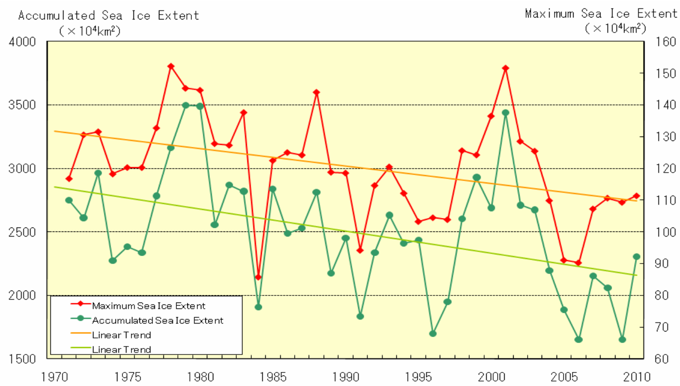

Figure 10 Interannual variations in the maximum sea ice extent (red lines) and accumulated sea ice extent (green lines) in the Sea of Okhotsk from 1971 to 2010
Accumulated sea ice extent: the sum of all five-day sea ice extent values from December of the previous year to May.

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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