Tokyo Climate Center, Japan Meteorological Agency

TCC News

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Contents **Page**

Sea Ice in the Sea of Okhotsk in the 2016/2017 Winter Season

The maximum sea ice extent in the Sea of Okhotsk for winter 2016/2017 was lower than the normal.

The sea ice extent in the Sea of Okhotsk for winter 2016/2017 was around the normal from December to early February, and then fell below the normal due to early melting (Figure 1). The seasonal maximum of 0.936 x 10^6 km^2 was reached on 5 February (Figures 1 and 2) and was below the normal of 1.169 x 10^6 km^2 (based on the 30-year average from 1980/1981 to 2009/2010). Figure 3 shows the overall trend of maximum sea ice extent from 1971 to 2017. Although values for the Sea of Okhotsk show large interannual variations, there is a long-term downward trend of 0.069 [0.036 – 0.102] x 10^6 km^2 per decade (the numbers in square brackets indicate the two-sided 95% confidence interval), which equates to a loss of 4.4 [2.3 – 6.5]% of the total sea area per decade.

(Ryohei Okada, Office of Marine Prediction)

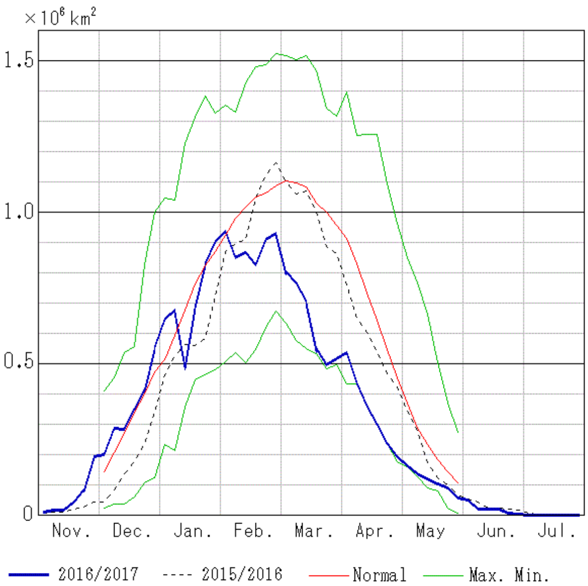


Figure 1 Seasonal variation of sea ice extent at five-day intervals in the Sea of Okhotsk from November 2016 to July 2017.
The normal is the 30-year average from 1980/1981 to 2009/2010.

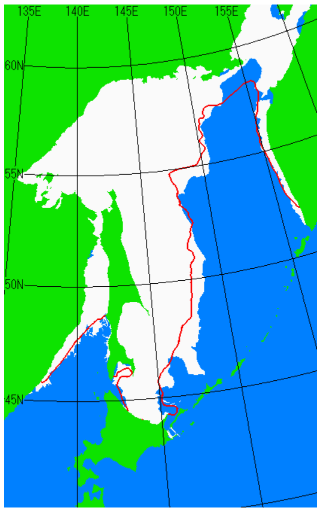


Figure 2 Sea ice situation on 5 February 2017.
The white area shows the observed sea ice extent, and the red line indicates the extent of normal coverage (the 30-year average from 1980/1981 to 2009/2010).

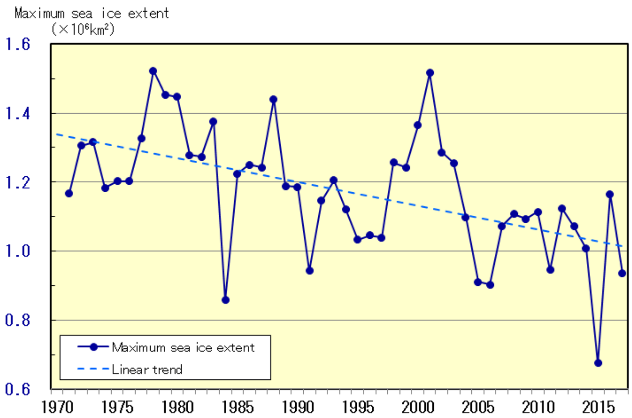


Figure 3 Interannual variation of maximum sea ice extent in the Sea of Okhotsk from 1971 to 2017.
Maximum sea ice extent: the greatest amount of sea ice extent observed during the year

Kosa (Aeolian Dust) Events over Japan in January–June 2017

Kosa (Aeolian dust) was observed in Japan on only three days between January and June 2017, representing the lowest frequency since 1967.

Kosa is an atmospheric phenomenon in which visibility is reduced when fine sand and dust are blown up from arid and semi-arid areas of the Asian continent and transported to Japan. It is most frequently observed from March to April, but there were no Kosa events during this period in 2017 (Figure 4), with the first event lasting from 6 to 8 May. As there were no Kosa events in June, the phenomenon was seen only on these three days at any meteorological station in Japan during the first half of 2017 (Figure 4). This was the lowest frequency since 1967 (Figure 5).

Extratropical cyclone activity is a major factor determining the frequency of Kosa events. The kinetic energy of high-frequency variations at 850 hPa is used as a metric of extratropical cyclone activity, and the March – April mean value was below normal (1981 – 2010 average) over East Asia (Figure 6). This may have resulted in a suppression of sand and dust storms in arid and semi-arid regions of China and Mongolia and dust transportation to Japan.

Observation and model prediction for the 6–8 May Kosa event

Figure 7 shows meteorological stations reporting Kosa and visibility from 6 to 8 May 2017. The phenomenon was recorded at 18, 46 and 44 of 59 manned stations in Japan on 6, 7 and 8 May, respectively. Most stations reported visibility of more than 10 km, although some in Hokkaido and Kyushu recorded lower values.

The Aeolian dust prediction model implemented by JMA in January 2004 was upgraded in February 2017 with a new dust emission flux calculation scheme and horizontal resolution enhancement from TL159 (approximately 110 km) to TL479 (approximately 40 km). Figure 8 compares predicted surface dust concentrations between the old and new models for 7 May 2017, which both corresponded closely to actual observation around Japan (Figure 7 b) in terms of quality. However, significant quantitative overestimation is observed with the old model in terms of spatial distribution and visibility (converted from predicted surface dust concentration; Figure 8 a) compared to actual observation (Figure 7 b). In contrast, the new model predicted distribution more adequately (Figure 8 b).

Maps of predicted distribution of surface concentration and the total amount of dust in East Asia are available at http://www.jma.go.jp/en/kosafcst/index.html.

(Daisaku Uesawa, Atmospheric Environment Division)

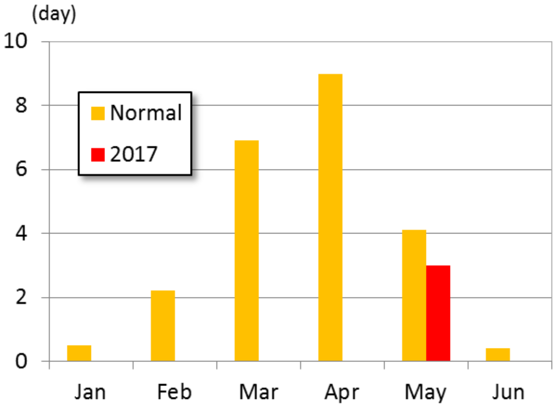


Figure 4 Occurrence of Kosa in Japan.
The normal (i.e., the 1981 – 2010 average) shows that more than 95% of Kosa is observed from January to June. The phenomenon is observed visually and reported as part of present weather phenomena at 59 manned stations in Japan.

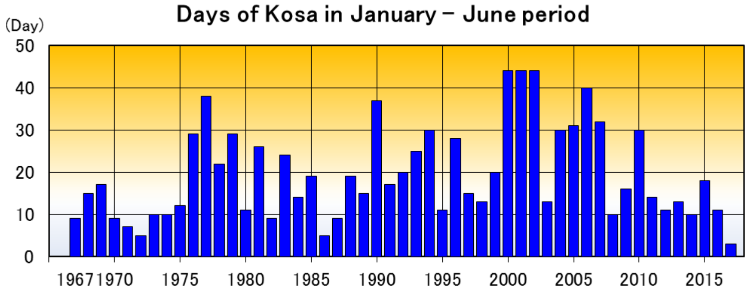


Figure 5 Interannual variability in Kosa occurrence in Japan from January to June.

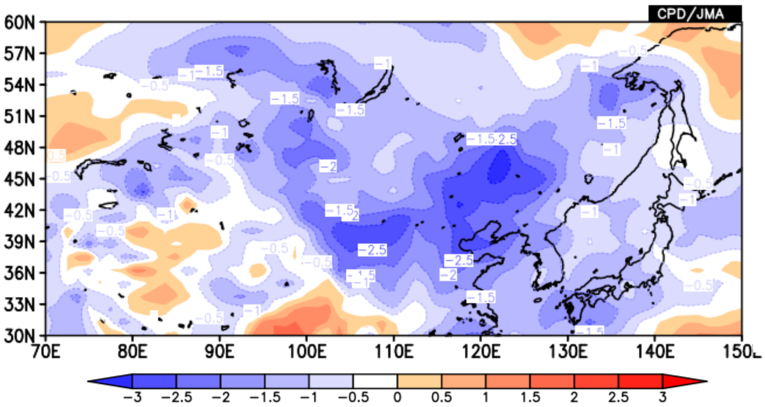


Figure 6 Normalized anomalies of kinetic energy of high-frequency variation at 850 hPa averaged from March to April 2017.
The base period for the normal is 1981 – 2010. Negative (positive) values indicate lower (higher) extratropical cyclone activity compared to the normal.

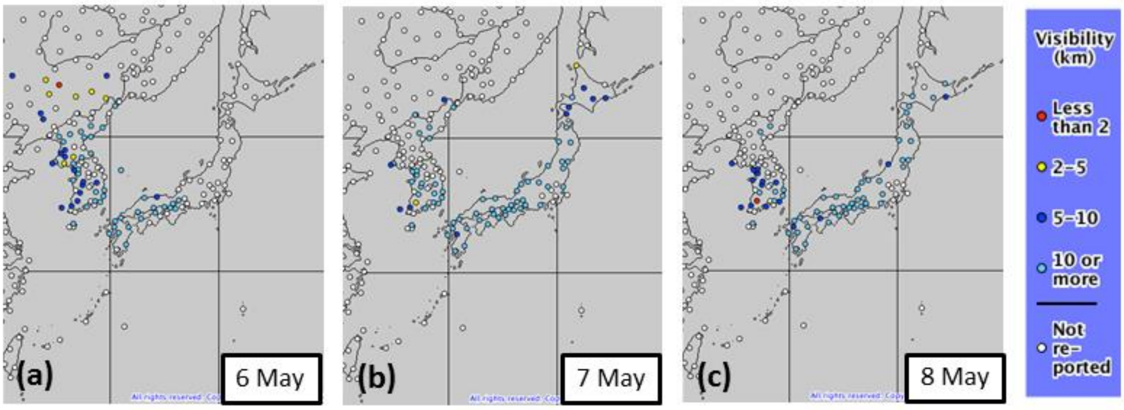


Figure 7 Meteorological stations reporting Kosa and visibility from 6 to 8 May 2017.
Visibility is denoted by color plots.

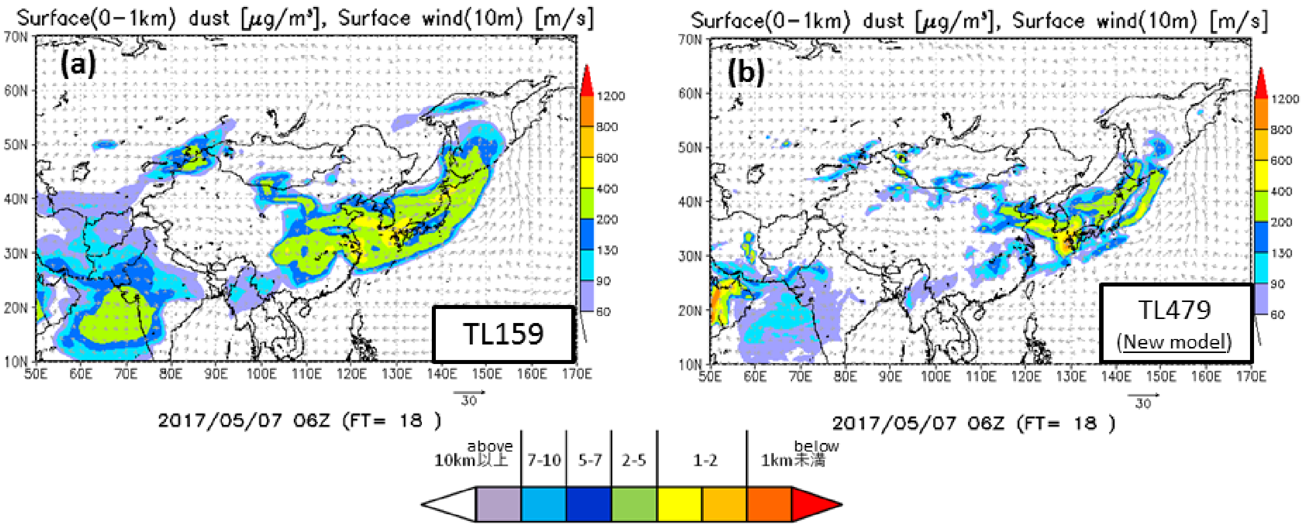


Figure 8 18-hour forecasts of surface dust concentration for 06 UTC 7 May 2017 based on (a) JMA's old dust model and (b) its new dust model.
The color bar at the bottom shows the relationship between predicted surface dust concentration (denoted by color shading) and visibility.

TCC Experts Visit Malaysia

TCC arranges expert visits to NMHSs to support capacity building for climate services and facilitate the effective transfer of technical expertise on TCC products and tools.

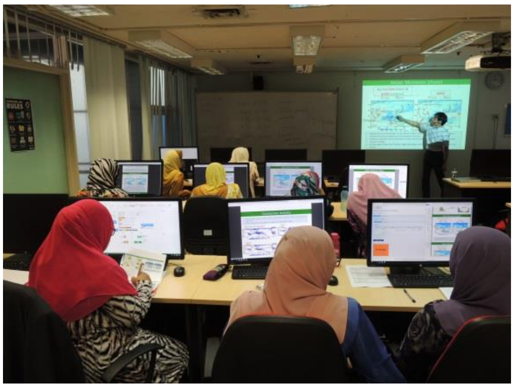
As part of such efforts, two TCC experts visited the Malaysian Meteorological Department (MMD) from 25 to 27 July 2017 to hold training on the generation of climate analysis information with focus on statistical and dynamical relationships between primary modes of global-scale climate variability and regional/local climates in the target country. The training was also intended to promote the effective use of TCC's Interactive Tool for Analysis of the Climate System (iTacs). The visit was conducted as follow-up to the 2016 TCC Training Seminar (see TCC News No. 46 and the TCC website for details), and provided a valuable platform for discussions on future collaboration between MMD and TCC.

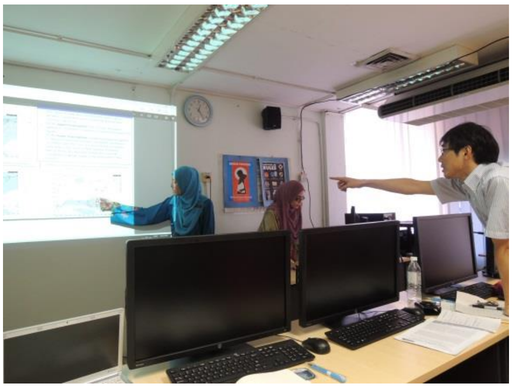
With 17 MMD staff in attendance, the seminar began with an exercise on the basic operation of TCC's handy iTacs web application tool for climate analysis.

On the second day, TCC experts gave presentations on expertise and techniques necessary to identify the statistical relationship between temperature and precipitation in Malaysia and primary modes of global climate variability, such as El Niño-Southern Oscillation (ENSO) and the Indian Ocean Dipole (IOD) Mode. The trainers then outlined how to interpret statistical results from the viewpoint of climatological and meteorological dynamics. The attendees then split into seven groups for focused investigation on the relationship between ENSO and various Malaysian cities' climate. On the last day, the groups presented their findings and deepened their learning through active discussion.

The visit provided prominent opportunities for both TCC and MMD, with attendees learning extensively about primary modes and expected impacts on the regional climate of Malaysia and TCC staff gaining interesting insights on the Malaysian climate through fruitful discussions. TCC will continue to arrange expert visits to NMHSs in Southeast Asia and elsewhere as necessary to assist with operational climate services.

(Hiroshi Ohno and Hirotaka Sato, Tokyo Climate Center)





You can also find the latest newsletter from Japan International Cooperation Agency (JICA).
JICA's World (July 2017)
https://www.jica.go.jp/english/publications/j-world/1707.html
JICA's World is the quarterly magazine published by JICA. It introduces various cooperation projects and partners along with the featured theme. The latest issue features "The Gender Issues in Conflict and Disaster Supporting the weak and vulnerable in our society".

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: Kiyotoshi Takahashi, Yasushi Mochizuki and Atsushi Minami)

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