

## Seasonal Highlights on the Climate System (March 2018 – May 2018)

### Highlights (March 2018 – May 2018)

- La Niña event, which had persisted since boreal autumn 2017, is likely to have ended in boreal spring 2018 (see [El Niño Outlook](#) updated on 11 June 2018).
- Seasonal mean temperatures were significantly above normal all over Japan. Especially seasonal mean temperature in eastern Japan was the highest on record for boreal spring since 1946.
- Seasonal mean temperatures were extremely high from Honshu region of Japan to the Korean Peninsula, from northern Mongolia to southeastern China, and from southeastern Europe to the northwestern Middle East.
- Convective activity was enhanced from Eastern Africa to the central Indian Ocean, and from Micronesia to Hawaii.
- In the 500-hPa height field, wave trains were seen from the North Atlantic to northern Eurasia along the subpolar jet stream. Positive anomalies extended zonally over the mid-latitude of the North Pacific and the North Atlantic.
- The subtropical high was stronger than normal over the North Pacific and the North Atlantic.

### [Climate in Japan](#) (Fig. S1):

- Seasonal mean temperatures were significantly above normal all over Japan. Especially, seasonal mean temperature in eastern Japan was the highest on record for boreal spring since 1946.
- Seasonal precipitation amounts were above normal from northern to western Japan, and were significantly below normal in Okinawa/Amami.
- Seasonal sunshine durations were above normal from eastern Japan to Okinawa/Amami.

### [World Climate](#) (Fig. S2):

- Seasonal mean temperatures and seasonal precipitation amounts were both extremely high from Honshu region of Japan to the Korean Peninsula. Seasonal precipitation amounts were extremely low from Okinawa region of Japan to southeastern China. Seasonal mean temperatures were extremely high from northern Mongolia to southeastern China.
- Seasonal mean temperatures were extremely high from southeastern Europe to the northwestern Middle East. Seasonal precipitation amounts were extremely high in and around the southern UK and in and around southwestern Europe, and were extremely low from northern to central Europe.

### [Oceanographic Conditions](#) (Fig. S3):

- In the equatorial Pacific, remarkably positive SST anomalies were observed in the western part and negative SST anomalies were observed from the central part to the eastern part.
- In the North Pacific, remarkably positive SST anomalies were observed from the East China Sea to the south of Alaska and from the east of the Philippines to the western coast of Central America.
- In the South Pacific, remarkably positive SST anomalies were observed from the eastern coast of Australia to the area near 35°S, 90°W, and remarkably negative SST anomalies were observed in the eastern part of the tropical region.
- In the Indian Ocean, remarkably positive SST anomalies were observed in the Arabian Sea and the Bay of Bengal.
- In the North Atlantic, remarkably positive SST anomalies were observed from the Gulf of Mexico to the area off the western coast of Europe, and remarkably negative SST anomalies were observed south of Greenland.

**Tropics:**

- Convective activity was enhanced from Eastern Africa to the central Indian Ocean, from Micronesia to Hawaii, and was suppressed from the South China Sea to the seas east of Japan, the central to eastern equatorial Pacific (Fig. S4).
- In the upper troposphere, cyclonic circulation anomalies were seen from the South China Sea to the seas east of the Philippines and over the central to eastern Pacific (Fig. S5).
- In the lower troposphere, anti-cyclonic circulation anomalies were seen over the central to eastern Pacific, and cyclonic circulation anomalies were seen to the east of the Philippines.
- In the sea level pressure field, negative anomalies were seen over the western Pacific and positive anomalies were seen from the South China Sea to the seas east of Japan and over the eastern Pacific.

**Extratropics:**

- In the 500-hPa height field (Fig. S6), wave trains were seen from the North Atlantic to northern Eurasia along the subpolar jet stream, with positive anomalies over northern Europe and the northeastern part of East Asia and negative anomalies from Western Russia to Western Siberia. Positive anomalies extended zonally over the mid-latitude of the North Pacific and the North Atlantic.
- The westerly jet stream in the Northern Hemisphere split into two branches over northern Eurasia and displaced northward from its normal position in and around Japan (Fig. S7).
- In the sea level pressure field (Fig. S8), positive anomalies were seen over the central part of North America and northern Europe, and negative anomalies were seen from the northeastern part of the North Atlantic to western Europe and Siberia. Positive anomalies extended zonally over mid-latitude from Japan to the North Pacific. The subtropical high was stronger than normal over the North Pacific and the North Atlantic.
- Temperatures at 850-hPa were above normal over the western USA, southern Europe and over mid-latitude from East Asia to the North Pacific, and below normal over the northeastern part of North America and from Western Russia to Western Siberia. (Fig. S9).

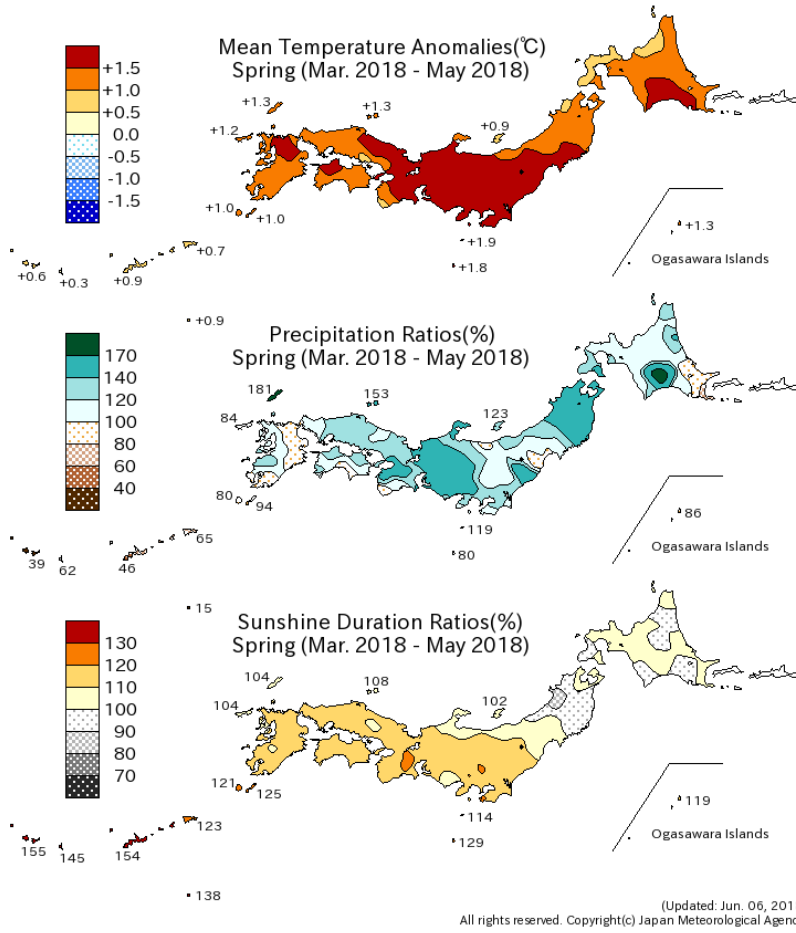


Fig. S1 Seasonal climate anomaly/ratio over Japan (March 2018 - May 2018)  
Top: temperature anomalies (degree C)  
Middle: precipitation ratio (%)  
Bottom: sunshine duration ratio (%)  
The base period for the normal is 1981-2010.

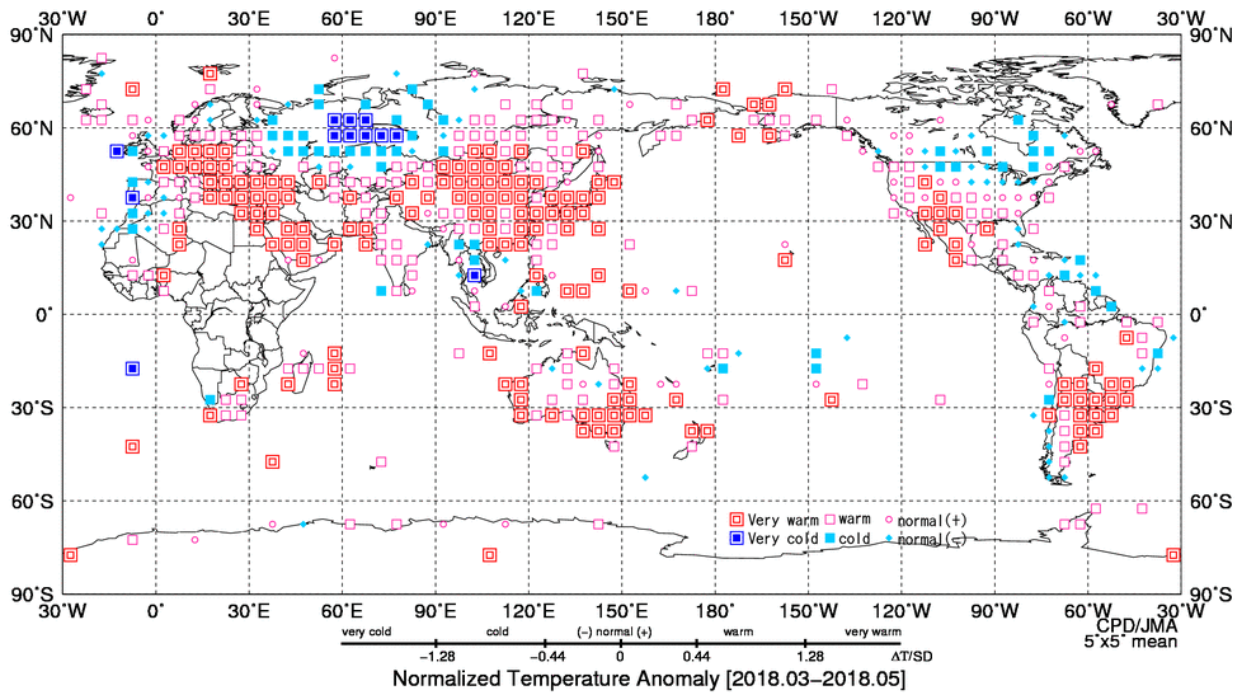


Fig. S2 Three-month mean temperature anomaly (normalized) category (March 2018 - May 2018)

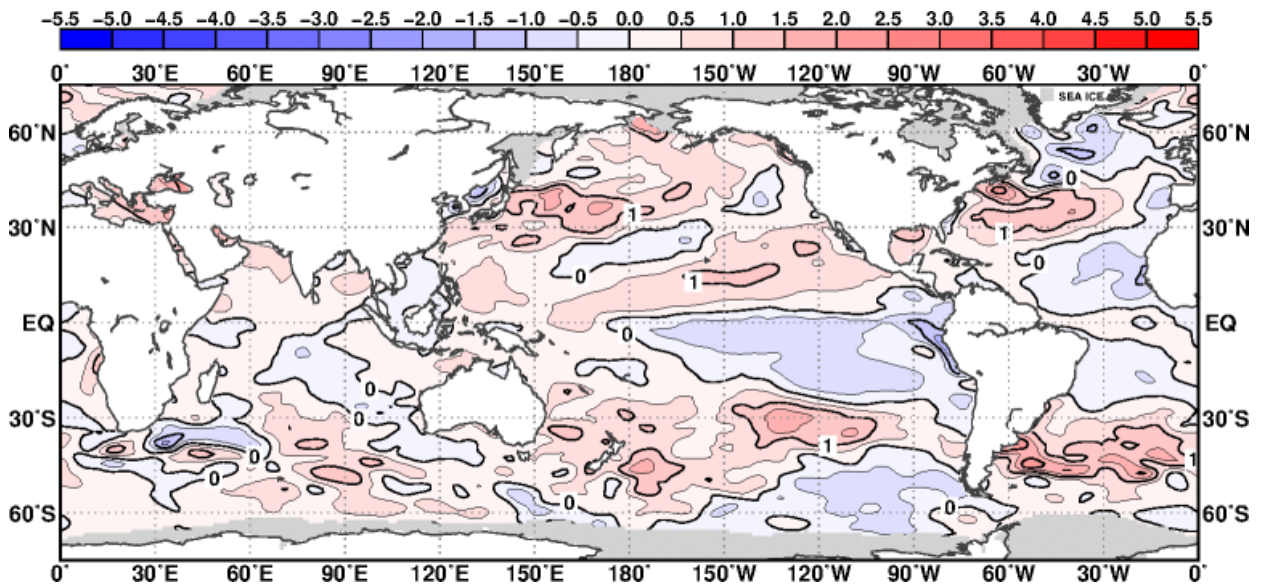


Fig. S3 Three-month mean sea surface temperature anomaly (March 2018 - May 2018)  
 The contour interval is 0.5 degree C. The base period for the normal is 1981-2010. Maximum coverage with sea ice is shaded in gray.

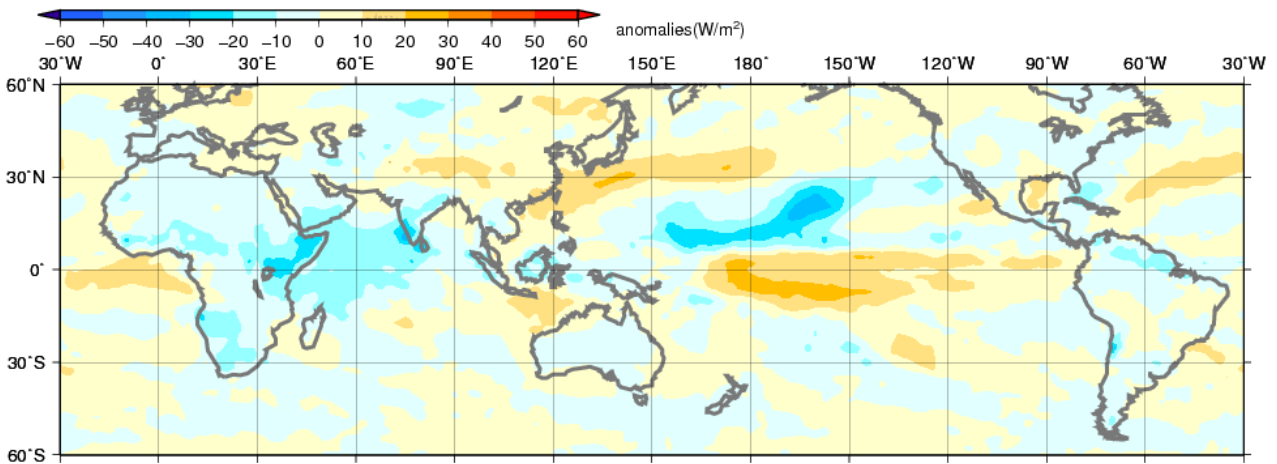


Fig. S4 Three-month mean Outgoing Longwave Radiation (OLR) anomaly (March 2018 - May 2018)  
 The contour interval is 10 W/m<sup>2</sup>. The base period for the normal is 1981-2010. Original data provided by NOAA.

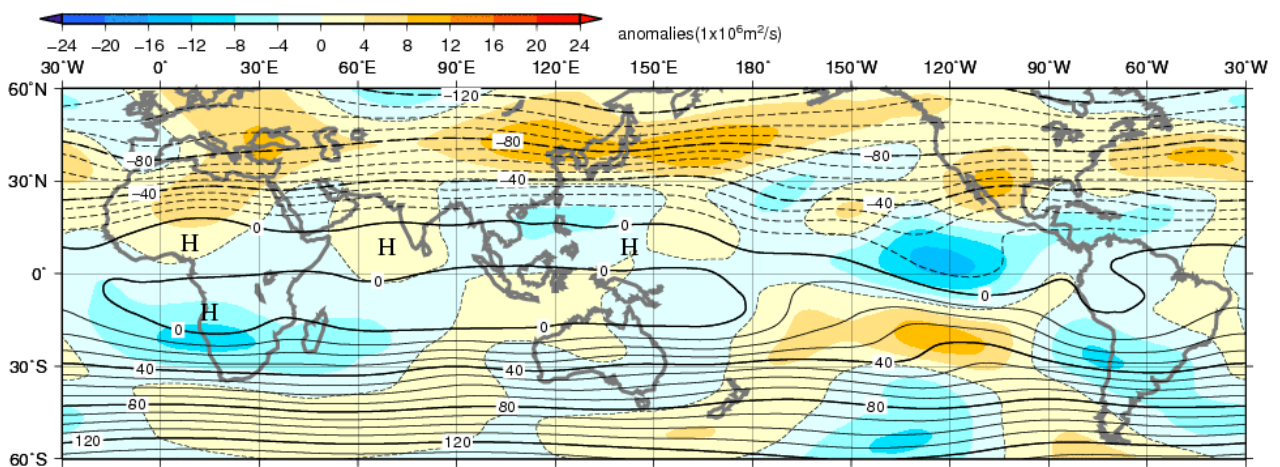


Fig. S5 Three-month mean 200-hPa stream function and anomaly (March 2018 - May 2018)  
 The contour interval is 10x10<sup>6</sup> m<sup>2</sup>/s. The base period for the normal is 1981-2010.

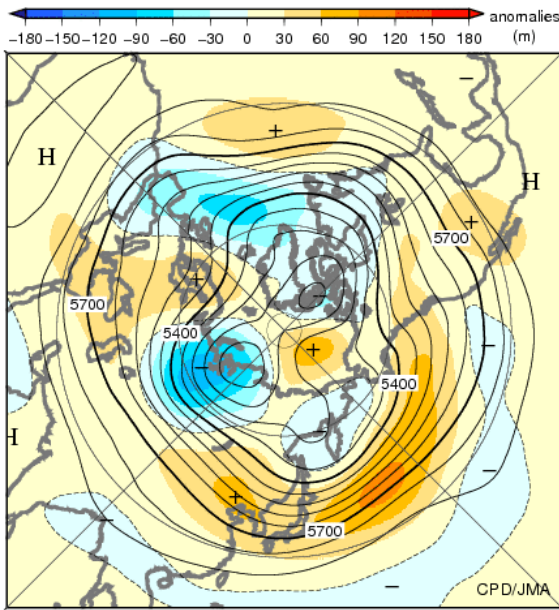


Fig. S6 Three-month mean 500-hPa height and anomaly in the Northern Hemisphere (March 2018 - May 2018)

The contours show 500-hPa height at intervals of 60 m. The shading indicates its anomalies. The base period for the normal is 1981-2010.

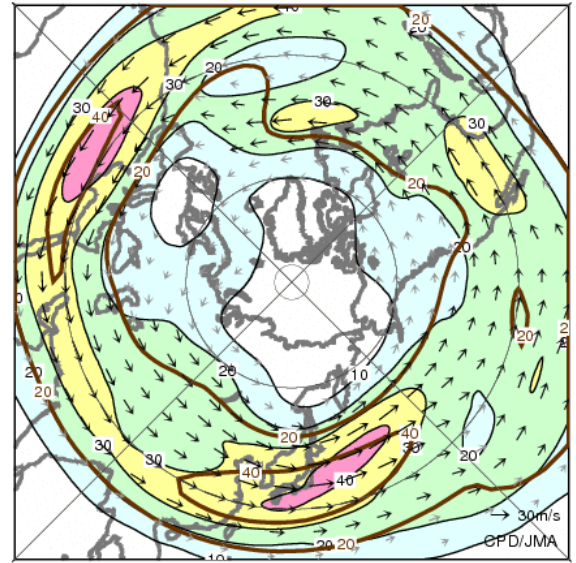


Fig. S7 Three-month mean 200-hPa wind speed and vectors in the Northern Hemisphere (March 2018 - May 2018)

The black lines show wind speed at intervals of 10 m/s. The brown lines show its normal at intervals of 20 m/s. The base period for the normal is 1981-2010.

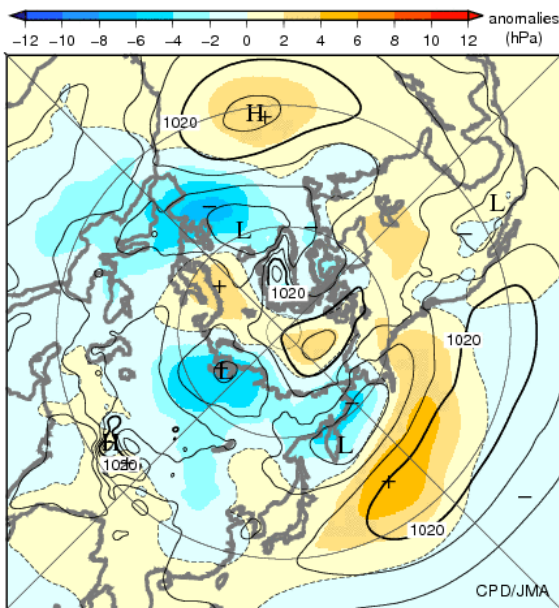


Fig. S8 Three-month mean sea level pressure and anomaly in the Northern Hemisphere (March 2018 - May 2018)

The contours show sea level pressure at intervals of 4 hPa. The shading indicates its anomalies. The base period for the normal is 1981-2010.

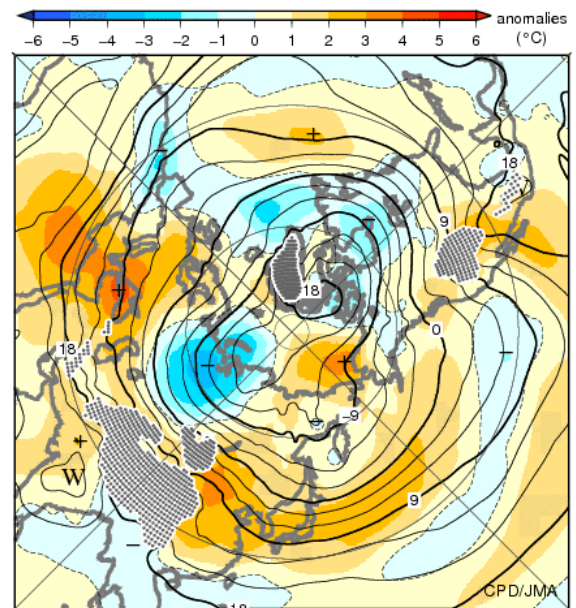


Fig. S9 Three-month mean 850-hPa temperature and anomaly in the Northern Hemisphere (March 2018 - May 2018)

The contours show 850-hPa temperature at intervals of 3 degree C. The shading indicates its anomalies. The base period for the normal is 1981-2010.

Detailed information on the climate system is available on the Tokyo Climate Center's website.  
<https://ds.data.jma.go.jp/tcc/tcc/index.html>  
 This report is prepared by the Tokyo Climate Center, Climate Prediction Division, Global Environment and Marine Department, Japan Meteorological Agency.