

## Seasonal Highlights on the Climate System (September 2018 – November 2018)

### Highlights (September 2018 – November 2018)

- It is considered that El Niño conditions are present in the equatorial Pacific (see [El Niño Outlook](#) updated on 10 December 2018).
- Seasonal mean temperatures were above normal in northern and eastern Japan.
- Seasonal mean temperatures were extremely high from the northern to northwestern part of Southeast Asia, in and around central Europe, in the eastern USA, and in northeastern Australia.
- Convective activity was enhanced over the seas east of New Guinea, over the latitudinal bands of 10°N and from western Africa to the Middle East.
- In the 500-hPa height field, positive anomalies were clearly seen around Alaska and northern Europe. Negative anomalies were seen from central Canada to the seas west of the UK and around China.
- The subtropical jet stream displaced southward from its normal position from Eurasia to the Pacific Ocean. The westerly jet stream was weaker than normal over mainland Japan.

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

- Seasonal mean temperatures were above normal in northern and eastern Japan.
- Seasonal precipitation amounts were above normal from eastern Japan to Okinawa/Amami.
- Seasonal sunshine durations were above normal in northern Japan and Okinawa/Amami.

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

- Seasonal mean temperatures were extremely high from the northern to northwestern part of Southeast Asia, in and around central Europe, in the eastern USA, and in northeastern Australia.
- Seasonal mean temperatures were extremely low from northeastern China to southern Uzbekistan and from southeastern to southern Canada.
- Seasonal precipitation amounts were extremely high from northern to western Saudi Arabia, from southern France to central Algeria, from the northeastern USA to western Mexico, and from southern Brazil to northern Argentina.
- Seasonal precipitation amounts were extremely low in and around Germany and from central Mozambique to the northern part of South Africa.

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

- In the equatorial Pacific, positive SST anomalies were observed in almost the entire region, in particular remarkably positive SST anomalies were observed in the western part.
- In the North Pacific, remarkably positive SST anomalies were observed from western to central parts of the tropical region, in the area near the western coast of Central America, from south of Japan to far east of Japan, and from the Sea of Okhotsk to the western coast of North America.
- In the South Pacific, remarkably positive SST anomalies were observed in the western tropical region, and from the area near New Zealand to the area near 25°S, 90°W.
- In the Indian Ocean, remarkably positive SST anomalies were observed from the eastern coast of Africa to the Arabian Sea, and southeast of Madagascar, and remarkably negative SST anomalies were observed south of Sumatra and near the southwestern coast of Australia.
- In the North Atlantic, remarkably positive SST anomalies were observed in the equatorial area, and from the Gulf of Mexico to the area near 40°N, 20°W, and remarkably negative SST anomalies were observed south of Greenland.

**Tropics:**

- Convective activity was enhanced over the seas east of New Guinea, over the latitudinal bands of 10°N in the central to eastern Pacific and from western Africa to the Middle East, and was suppressed over the eastern Indian Ocean and from the South China Sea to the seas east of the Philippines (Fig. S4).
- In the upper troposphere, cyclonic circulation anomalies straddling the equator were seen from the eastern part of Africa to the Maritime Continent, and anticyclonic circulation anomalies straddling the equator were seen over the central Pacific. Wave train was seen from the central tropical North Pacific to North America (Fig. S5).
- In the lower troposphere, anticyclonic circulation anomalies straddling the equator were seen from the Indian Ocean to the Maritime Continent, and cyclonic circulation anomalies straddling the equator were seen over the Pacific.
- In the sea level pressure field, positive anomalies were seen from the Indian Ocean to the Maritime Continent, and negative anomalies were seen over the central to eastern tropical Pacific.

**Extratropics:**

- In the 500-hPa height field (Fig. S6), positive anomalies were clearly seen around Alaska and northern Europe. Negative anomalies were seen from central Canada to the seas west of the UK and around China.
- The westerly jet stream displaced northward from its normal position and stronger than normal from North America to the North Atlantic. The subtropical jet stream displaced southward from its normal position from Eurasia to the Pacific. The westerly jet stream was weaker than normal over mainland Japan.
- In the sea level pressure field (Fig. S8), positive anomalies were seen from northern Europe to Central Asia and from Alaska to Canada, and negative anomalies were seen over Western Siberia.
- Temperatures at 850-hPa were above normal around Alaska and Europe, and below normal over the eastern part of North America (Fig. S9).

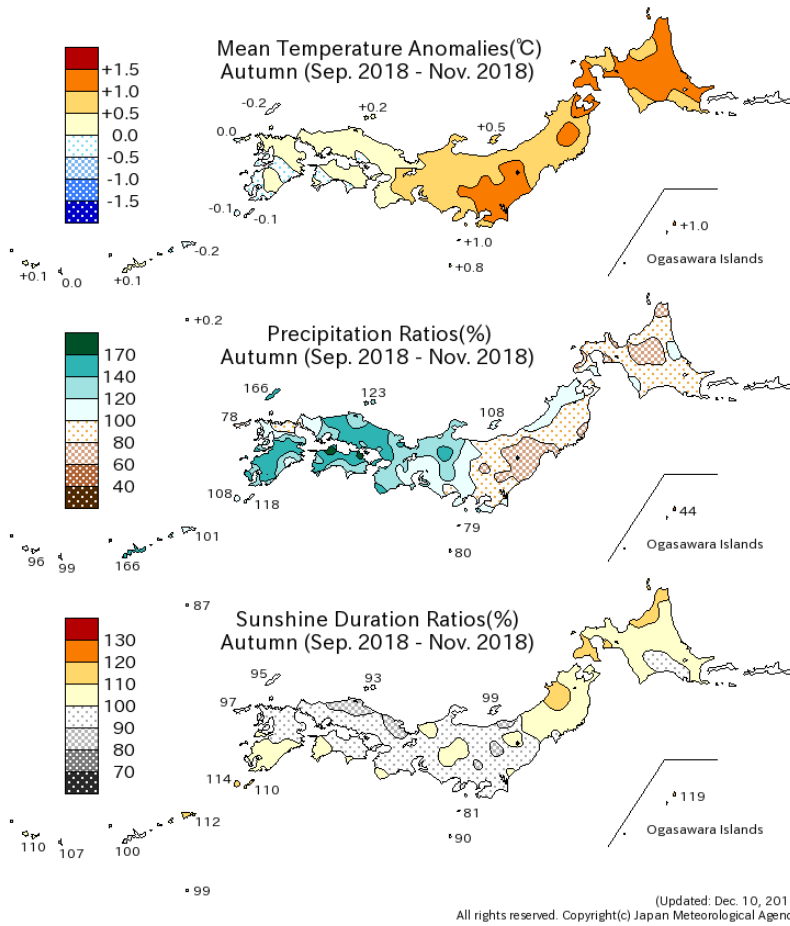


Fig. S1 Seasonal climate anomaly/ratio over Japan (September 2018 - November 2018)  
Top: temperature anomalies (degree C)  
Middle: precipitation ratio (%)  
Bottom: sunshine duration ratio (%)  
The base period for the normal is 1981-2010.

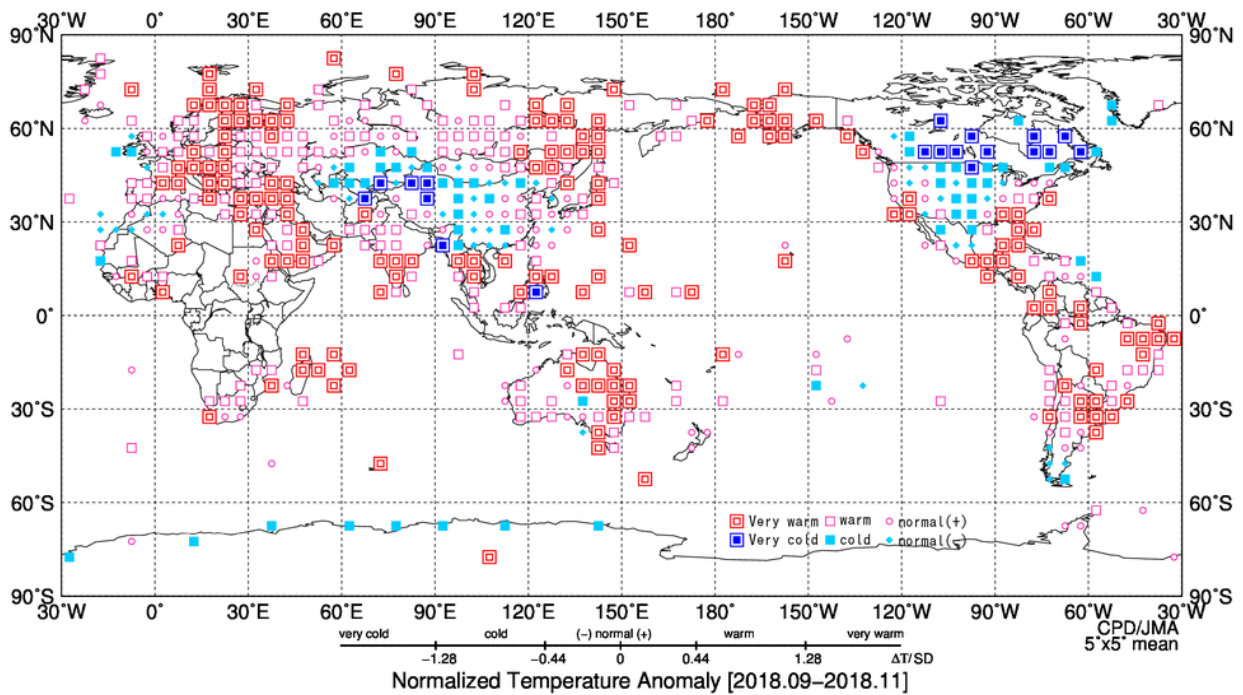


Fig. S2 Three-month mean temperature anomaly (normalized) category (September 2018 - November 2018)

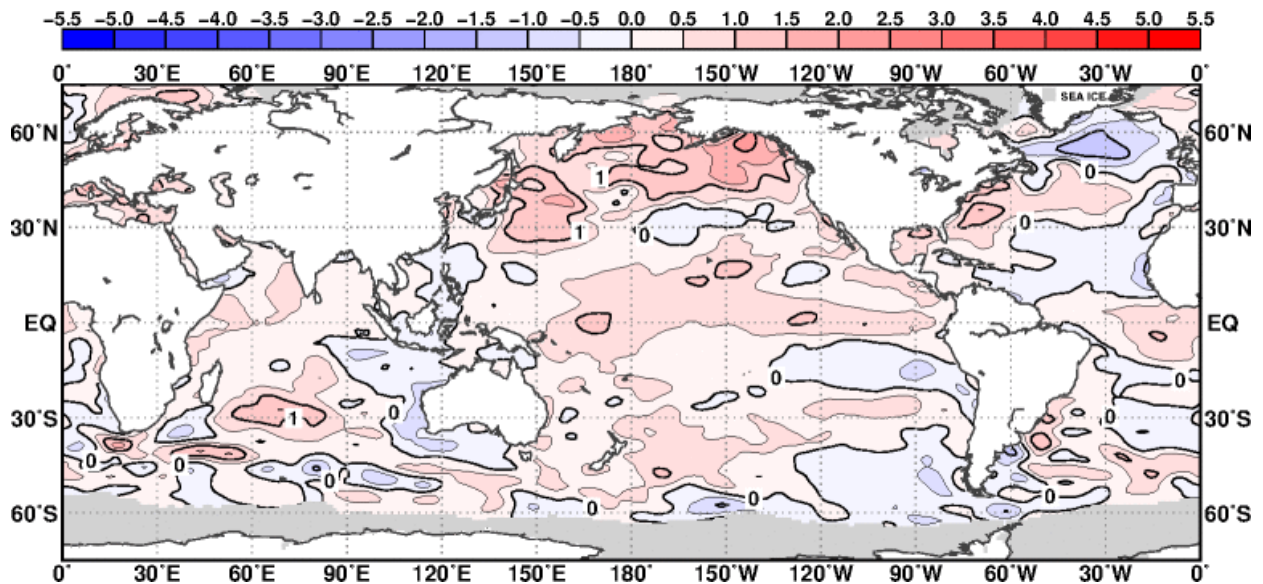


Fig. S3 Three-month mean sea surface temperature anomaly (September 2018 - November 2018)  
 The contour interval is 0.5 degree C. The base period for the normal is 1981-2010. Maximum coverage with sea ice is shaded in gray.

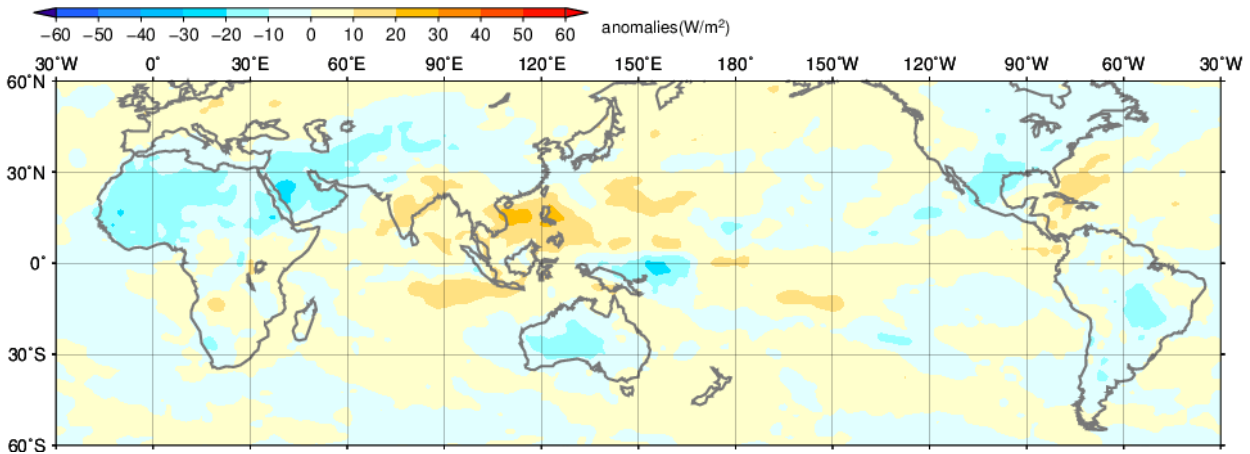


Fig. S4 Three-month mean Outgoing Longwave Radiation (OLR) anomaly (September 2018 - November 2018)  
 The contour interval is 10 W/m<sup>2</sup>. The base period for the normal is 1981-2010. Original data provided by NOAA.

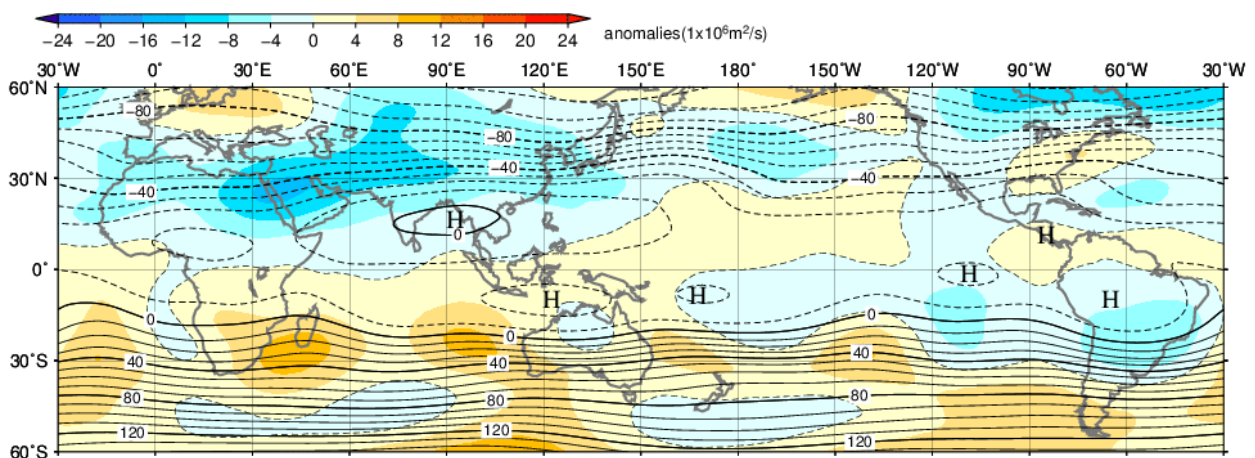


Fig. S5 Three-month mean 200-hPa stream function and anomaly (September 2018 - November 2018)  
 The contour interval is 10x10<sup>6</sup> m<sup>2</sup>/s. The base period for the normal is 1981-2010.



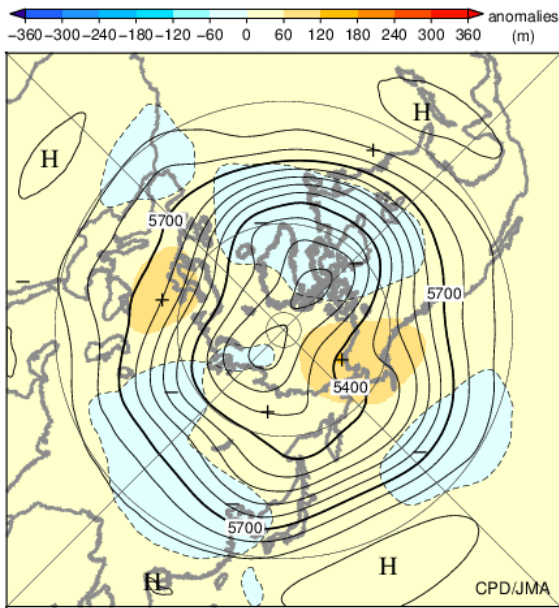


Fig. S6 Three-month mean 500-hPa height and anomaly in the Northern Hemisphere (September 2018 - November 2018)

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.

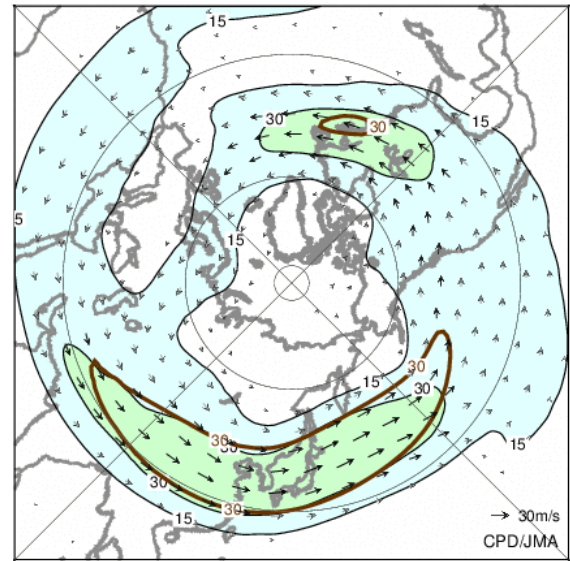


Fig. S7 Three-month mean 200-hPa wind speed and vectors in the Northern Hemisphere (September 2018 - November 2018)

The black lines show wind speed at intervals of 15 m/s. The brown lines show its normal at intervals of 30 m/s. The base period for the normal is 1981-2010.

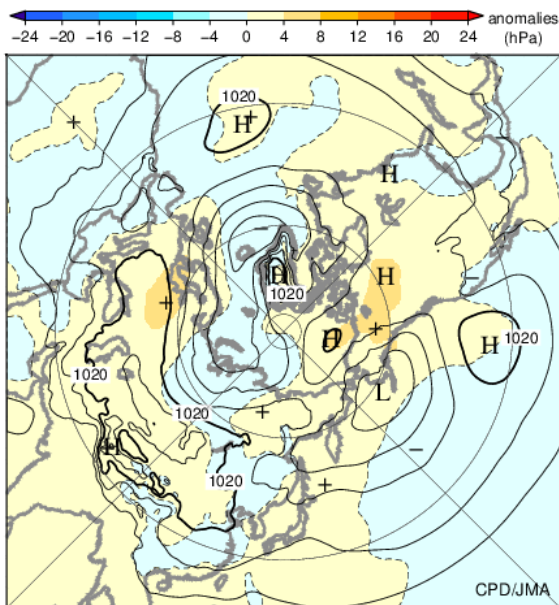


Fig. S8 Three-month mean sea level pressure and anomaly in the Northern Hemisphere (September 2018 - November 2018)

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.

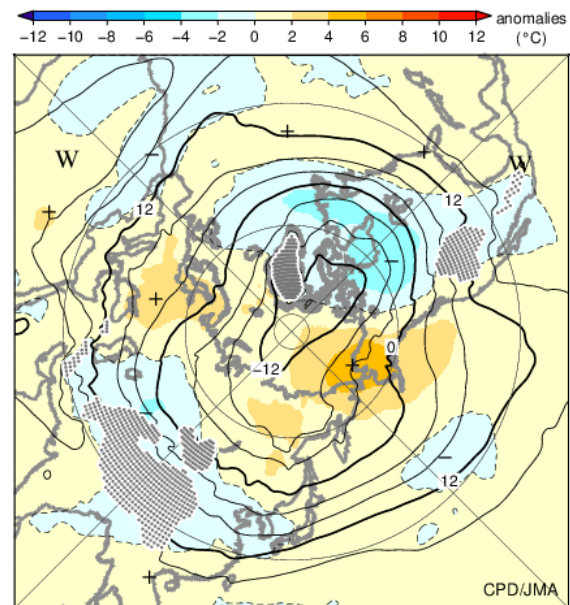


Fig. S9 Three-month mean 850-hPa temperature and anomaly in the Northern Hemisphere (September 2018 - November 2018)

The contours show 850-hPa temperature at intervals of 4 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.