

ENSO impact to atmospheric circulation system for summer

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Abstract

ENSO is the most dominant mode of the climate system and the most reliable signal for seasonal prediction. To this day, when numerical prediction techniques are advanced well, ENSO is still important as the source of predictability.

In order to promote the understanding of the influence of ENSO on atmospheric circulation and support seasonal prediction, JMA conducted statistical analysis using the second Japanese global reanalysis (JRA-55), which covers the period starting in 1958, and plans to update the web contents of the ENSO statistics in this year (2015).

Principal statistical characteristics seen in summer during El Niño events are as follows.

- In the 200hPa stream function field, the subtropical jet stream shifts southward of its normal position and meanders over Eurasian continent with a ridge over central China and a trough over the Korean peninsula.
- In the 850hPa stream function field, cyclonic circulation anomalies are seen around Japan and east of the Philippines, and anti-cyclonic circulation anomalies are seen to the southeast of Japan.
- In the 500hPa height field, negative anomalies are seen over the area zonally from northeastern East Asia to south of Alaska, which are related to a positive feedback from high-frequency eddies.

These characteristics seen in the statistical analysis are generally consistent with those seen in the steady response of atmospheric circulation to diabatic heating anomalies in the tropics using a Linear Baroclinic Model (LBM).