

Influence of a SH SSW in September 2019 on tropical tropospheric circulation and deep convective activity

*Kunihiko Kodera¹, Shunnsuke Noguchi², Nawo Eguchi³, Tomoe Nasuno²

1. Meteorological Research Institute, 2. JAMSTEC, 3. Kyushu University

A large stratospheric sudden warming (SSW) occurred in early September 2019 in the southern hemisphere (SH). Although stratospheric polar vortex was not broken up as the SSW in September 2002, changes associated with the Brewer-Dobson circulation were large and the tropical lower stratospheric temperature was largely decreased. A possible impact of the 2019 SH SSW on development of the tropical convection along the ascending branch of the Hadley circulation was demonstrated by Noguchi et al. (2020) by means of ensemble mean forecast experiment.

In the present study, we show that enhanced tropical convective activity induced by the SSW lead global development of tropical storms and cyclones in the Eastern and Western Pacific as well as the Atlantic sectors. Changes in the tropical convection also modified a distribution of subtropical high and subtropical jet. Accordingly, trajectory of the cyclone was influenced through change in environmental wind field. For instance, tropical cyclone Lingling, formed on 31 August over Philippine Sea, which has been forecasted to hit southwest of the Korean peninsula around 7 September, finally went slightly westward and landed on North Korea due to development of Bonin subtropical high. This development of Bonin high also produced a very high temperature over Japan in early September 2019, could also be related to an effect of this SH SSW on tropical convection.

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