

The impact of lower stratospheric temperature change on Typhoon

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In recent years, it is statistically clarified that the stratospheric dynamical change, such as sudden stratospheric warming (SSW) and quasi-biennial oscillation (QBO), affects on the cumulus convective activity in tropical zone. For example, the study examining the effect of stratospheric conditions during SSW has found that the activity of cumulus convection becomes deeper due to descending the unstable region from the lower stratosphere [e.g., Eguchi et al., 2015; Kodera et al., 2015]. For this reason, the importance of a quantitative understand of stratospheric effects on the troposphere has been recognized internationally [e.g., SATIO-TCS (Stratospheric And Tropospheric Influences On Tropical Convective Systems) on SPARC]. Although there are a few previous studies, it is not clear the relationship between the stratosphere and typhoons, yet. Therefore, we researched the effects of temperature changes at the lower stratosphere on typhoons by using the two-dimensional axial symmetry model (Rouunno and Emanuel, 1987). We changed temperature profile at the lower stratosphere and checked the changes in typhoon's wind speed, height, etc. As a result, it was found that the upper troposphere becomes unstable, and the upper, lower, radial, tangential wind velocity increases due to deep convection when the temperature in the stratosphere is lower than the control simulation. At the presentation, we will show the effect of temperature change at the lower stratosphere on the typhoon activity in detail.

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