Possible Impact of the 2019 Southern Hemisphere Stratospheric Sudden Warming on Tropical Cyclone activities over the western North Pacific

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The predictability of the Southern Hemisphere stratospheric sudden warming (SSW) in September 2019 and its impact on tropical cyclone (TC) activities in the Northern Hemisphere are examined with large lagged-ensemble forecasts of Nonhydrostatic Icosahedral Atmospheric Model (NICAM). A total of 96 ensemble forecasts are grouped into the ones with successful SSW prediction (NICAM_SSW) and the others without it (NICAM_noSSW). The NICAM_SSW shows a relatively cold tropical stratosphere and a reduced static stability around the tropopause. These anomalies are extended to 20˚N, providing a favorable condition for the development of tropical deep convection. An enhanced convection is particularly pronounced over the Maritime Continent and the equatorial western Pacific where deep convections frequently form. This SSW-induced convective anomaly results in more frequent TC genesis over the western Pacific. The comparison between NICAM_SSW and NICAM_noSSW also reveals the westward-shifted TC tracks as TC genesis becomes more frequent over 150˚E-180˚E. This result suggests that the Southern Hemisphere SSW can affect TC activities in the western North Pacific.

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