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THE STRUCTURE AND DEVELOPMENT OF ARCTIC CYCLONES

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Arctic cyclones are unique cyclone which develop on the Arctic, impact on the Arctic climate, such as a rapid decrease in sea ice associated with an extreme Arctic cyclone in August 2012.

We investigated Arctic cyclones using reanalysis data JRA25/JCDAS and JRA55 dynamically and statistically, and conducted a numerical simulation using the nonhydrostatic icosahedral atmospheric model (NICAM) to understand the mechanisms of Arctic cyclone. Arctic cyclones are large scale cyclone, vertically connect with the core of upper polar vortex and tend to live longer than the other cyclones do. Arctic cyclone has intense symmetric primary circulation centered at the folded tropopause and weak secondary circulation in common with the tropical cyclone, a pair of lower stratospheric dry warm core and tropospheric cold core like the cold vortex. Adiabatic warming by downdraft is one of key effect for developing lower stratospheric warm core. It maintains the intensity of the warm core and cyclonic circulation of Arctic cyclones.