

Connection of Predictability of Major Stratospheric Sudden Warmings to Polar Vortex Geometry

MASAKAZU TAGUCHI¹

¹ *Department of Earth Science, Aichi University of Education, Kariya, Japan*

This study explores a possible connection between predictability variations of major stratospheric sudden warmings (MSSWs) during Northern winter and the geometry of the polar vortex (Taguchi 2015). We compare 1-month hindcast (HC) data from 1979 to 2012 of the Japan Meteorological Agency to the Japanese 55-year Reanalysis data. Our results present unprecedented evidence that the error variations of medium range (≈ 14 day) forecasts for MSSWs do depend on the polar vortex geometry: the errors are larger for MSSWs of the vortex split type when the polar vortex is highly stretched as measured by high aspect ratio and large wave 2 amplitude. For such cases, the HC data tend to miss observed vortex splits, with the too strong vortex staying over the pole. On the other hand, the errors are relatively small for other MSSWs, e.g., those of the vortex displacement type. This study is the first, to the author's knowledge, that shows clear and convincing evidence for the connection, although it has been speculated on in the literature.

Key words: predictability, stratospheric sudden warmings, polar vortex geometry

Reference

Taguchi, M., 2015: *Atmospheric Science Letters*, accepted.