

## Propagation of forecasting errors in an ensemble forecast before and during a stratospheric sudden warming in January 2007

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By using a product of 1-month ensemble forecast system of Japan Meteorological Agency, we analyzed its spread among ensemble members before an stratospheric sudden warming (SSW) observed in January 2006, and found propagation of forecasting errors horizontally from the Pacific to the Atlantic in the troposphere, then vertically into the stratosphere over the Atlantic. Those propagations were associated with downstream development of baroclinic waves and an upward Rossby wave packet propagation, respectively, both of which were found to be important processes for the SSW occurrence.

Such analysis based on the spread is consistent with that of the sensitivity analysis where the predictions of tropospheric anti-cyclonic circulation anomaly over the troposphere, which was developed due to the downstream development and also emanated the wave packet into the stratosphere, and the SSW were found to be sensitive to the initial errors over the Pacific, especially associated with a developing cyclone on the initial dates for the forecast.