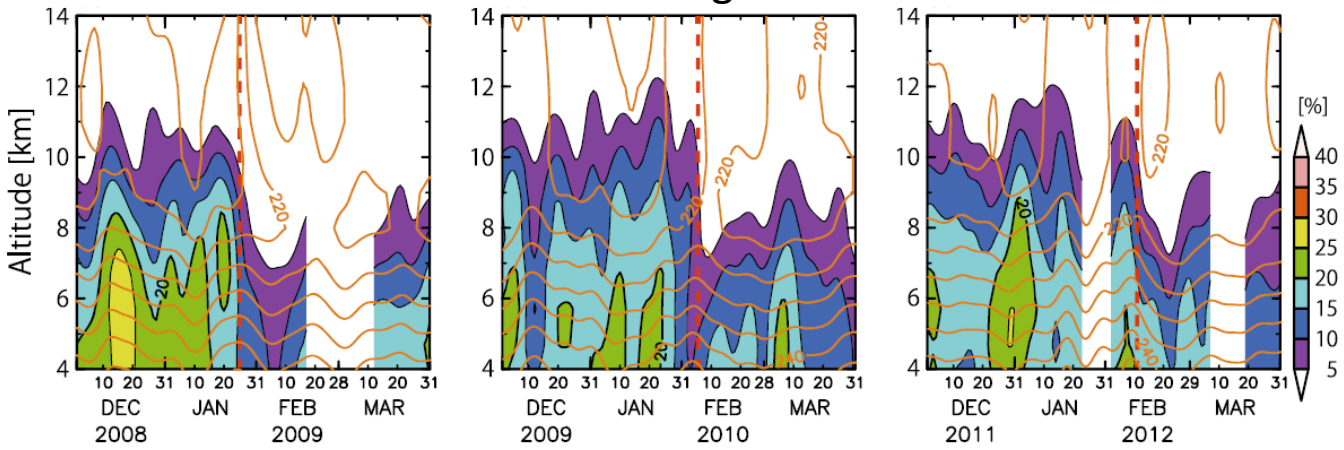
Variability of upper tropospheric clouds in the polar region during stratospheric sudden warmings

- This study examines the variability of upper tropospheric clouds in the polar region during stratospheric sudden warmings (SSWs) in 2009, 2010, and 2012 using satellite observations and reanalysis data.
- The cloud frequency decreases in the altitude range of 8–12km rapidly soon after SSWs.
- In the timing of decrease in cloud frequency, the downward residual mean flow in the transformed Eulerian mean system associated with SSWs becomes strong around the tropopause heights.
- By means of analyses based on a recent theory of three-dimensional residual mean flow, it is shown that the horizontal structure of the vertical flow is consistent with the geographical distribution of clouds in the altitude range of 9–11 km.

(Kohma and Sato, 2014, J. Geophys. Res.)



Time-altitude sections of zonal mean cloud frequency (color) and temperature (contour)