



Analysis of an explosive cyclone linked to a tropopause undulation. Part II:

Atmospheric circulation and instability

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An explosive cyclone which was responsible for heavy snowfall and strong wind in Korean Peninsula occurred on 1 January 1997. The primary purpose of the present study is to investigate the dynamical instability responsible for the severe weather during the development of explosive cyclone including the analyses of meteorological fields. The present analyses were made employing NCEP/NCAR reanalysis data, GMS water vapor images, and surface and upper level charts. Analysis of surface and upper charts show that during the tropopause undulation surface low was located on cyclonic shear side of the jet streams at upper level. In addition, a cutoff low was found on the upper level chart of 500 hPa during the tropopause undulation. Analysis of water vapor images indicate that a region of very dry air was located over the southwest of the center of explosive cyclone. The region corresponds to the area of positive anomaly of potential vorticity on the isentropic surface of 305K. A detailed analysis suggests that the explosive cyclone was linked to the tropopause undulation, and the severe weather was caused partly by both convective instability and conditional symmetric instability. The lowest level of the tropopause was 670 hPa for the period from 0000 UTC 31 December 1996 to 1800 UTC 2 January 1997.