

## Supplementary material

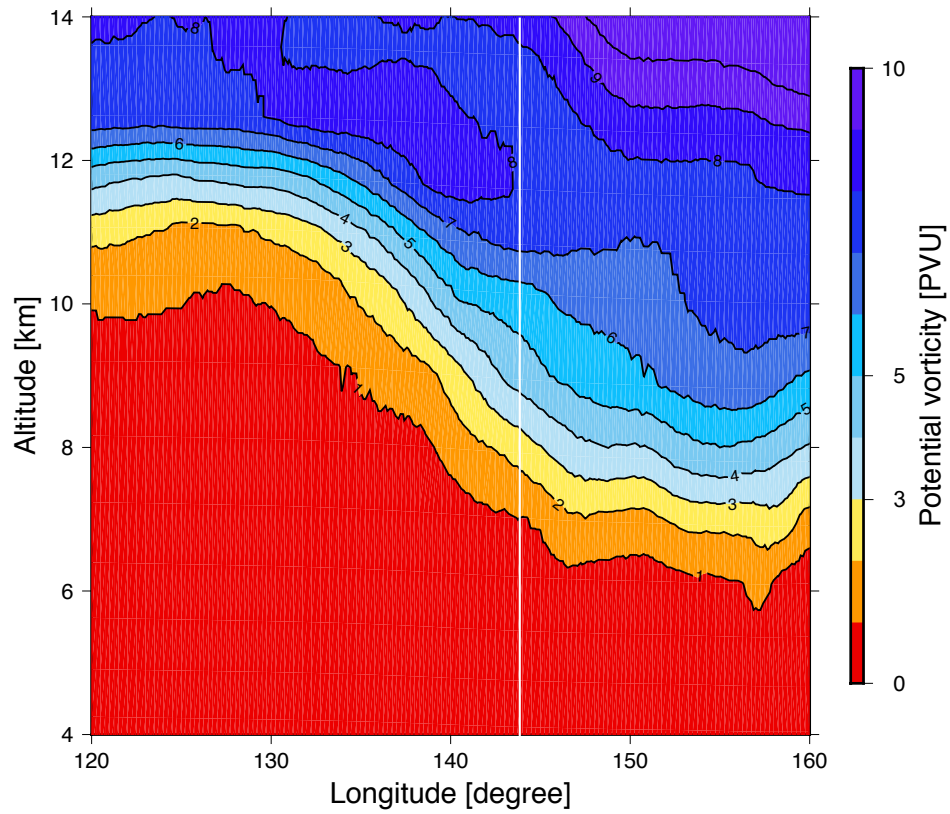


Figure S1. Altitude-longitude cross section between 42° and 45°N of potential vorticity values from the ERA5 at 02:00 UTC on 27 April 2016. Vertical white line indicates the location (longitude) of Rikubetsu.