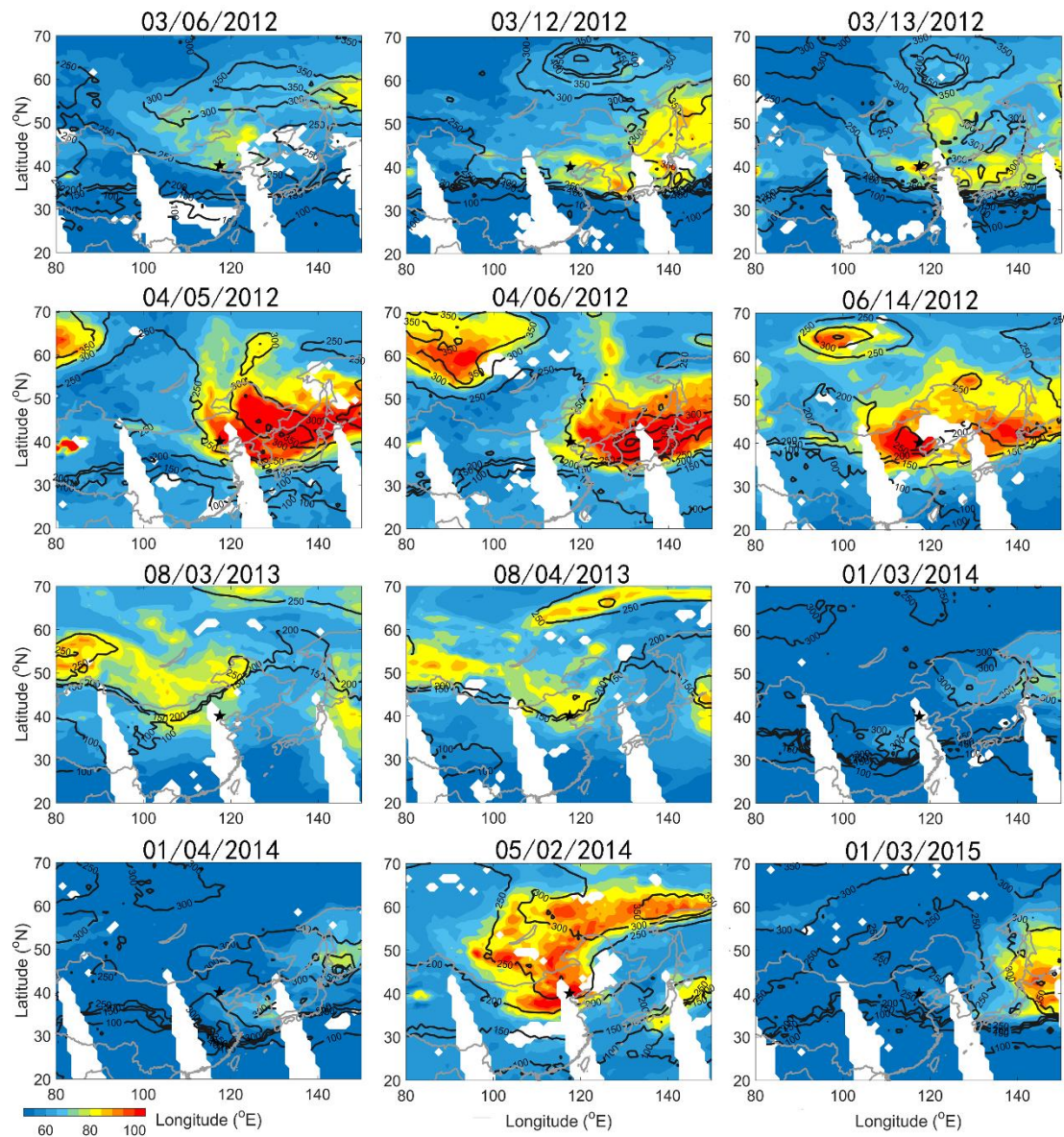


Supplementary material

It is well established that AIRS retrieved ozone provides strong information for identifying a stratospheric intrusion event. Supplementary figure S2 shows the AIRS derived daily 500 hPa ozone distribution corresponding to the cases shown in Figure 12a, to assist to support the evidence of possible stratospheric intrusions closely associated with the strong downdrafts preceding RT ascent. Due to some of the cases occur close together, as well as due to the limited resolution in AIRS retrieved data (daily in fact), not every individual case in Figure 12a can be clearly checked from AIRS observations. Almost every case (except for the cases labeled by A, B, C, and D) is associated with some form of significant 500 hPa ozone enhancement, indicating the intrusions of stratospheric origin.



Supplementary figure S1. AIRS retrieved daily 500 hPa ozone distribution along with the tropopause height contour corresponding to the cases identified in Figure 11a. The black star shows the location of the Beijing MST radar.