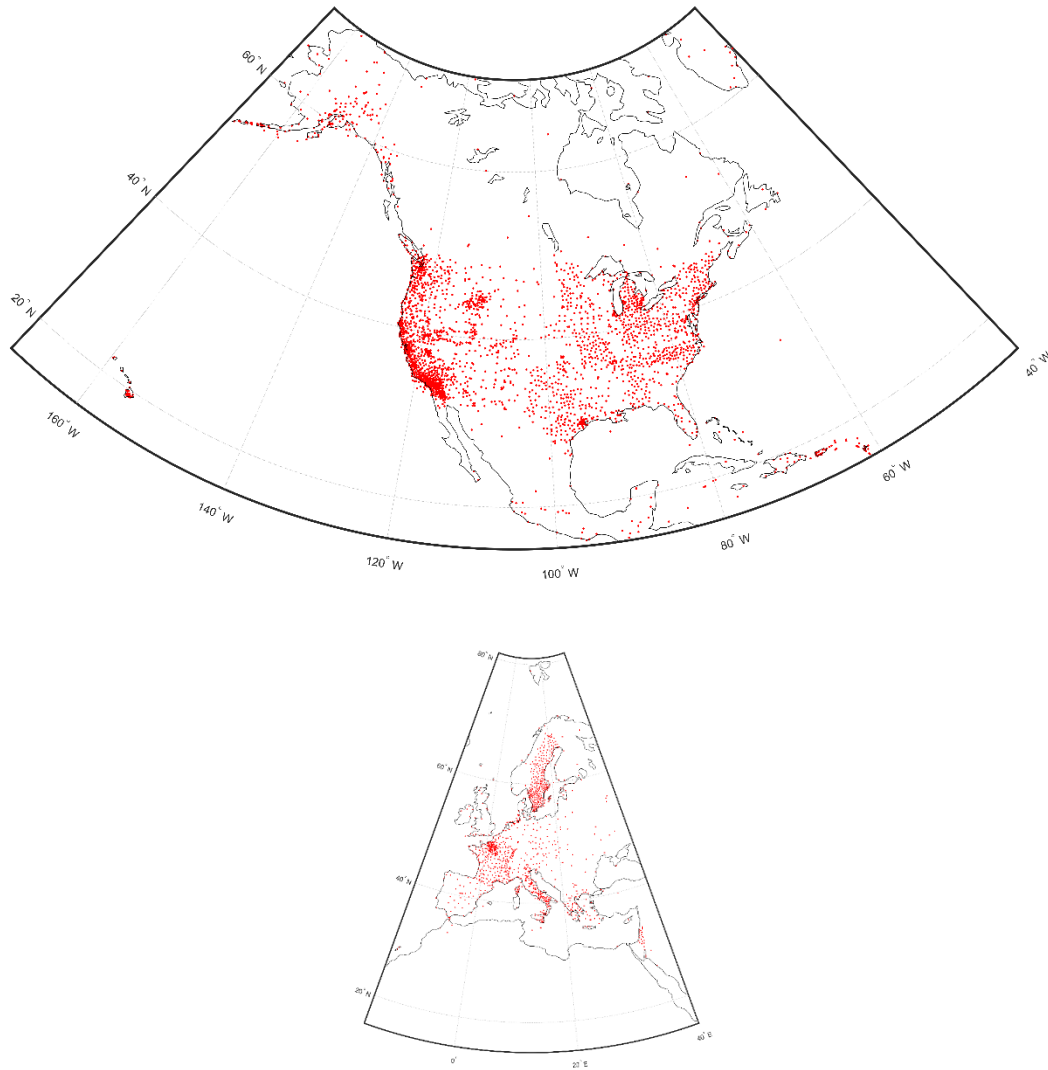


*Supplement of*

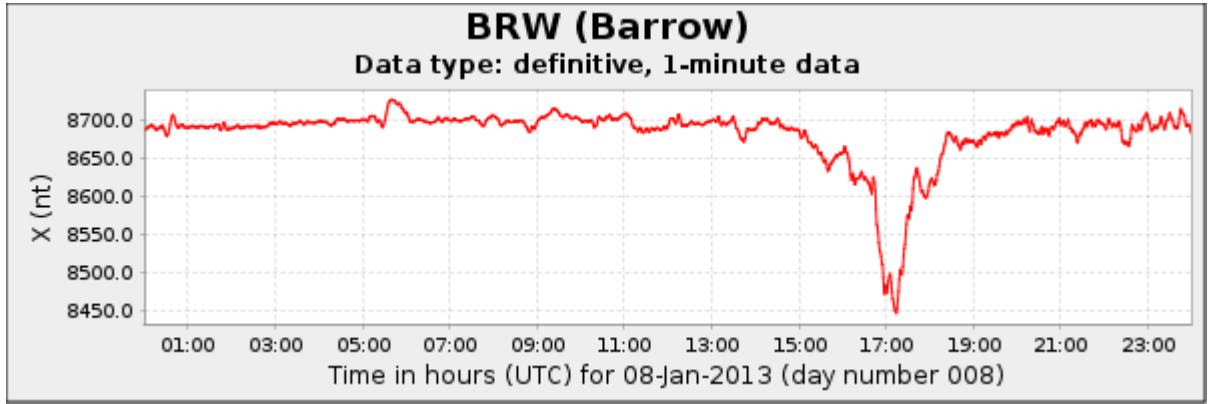
# **Observations of traveling ionospheric disturbances driven by gravity waves from sources in the upper and lower atmosphere**

**Paul Prikryl et al.**

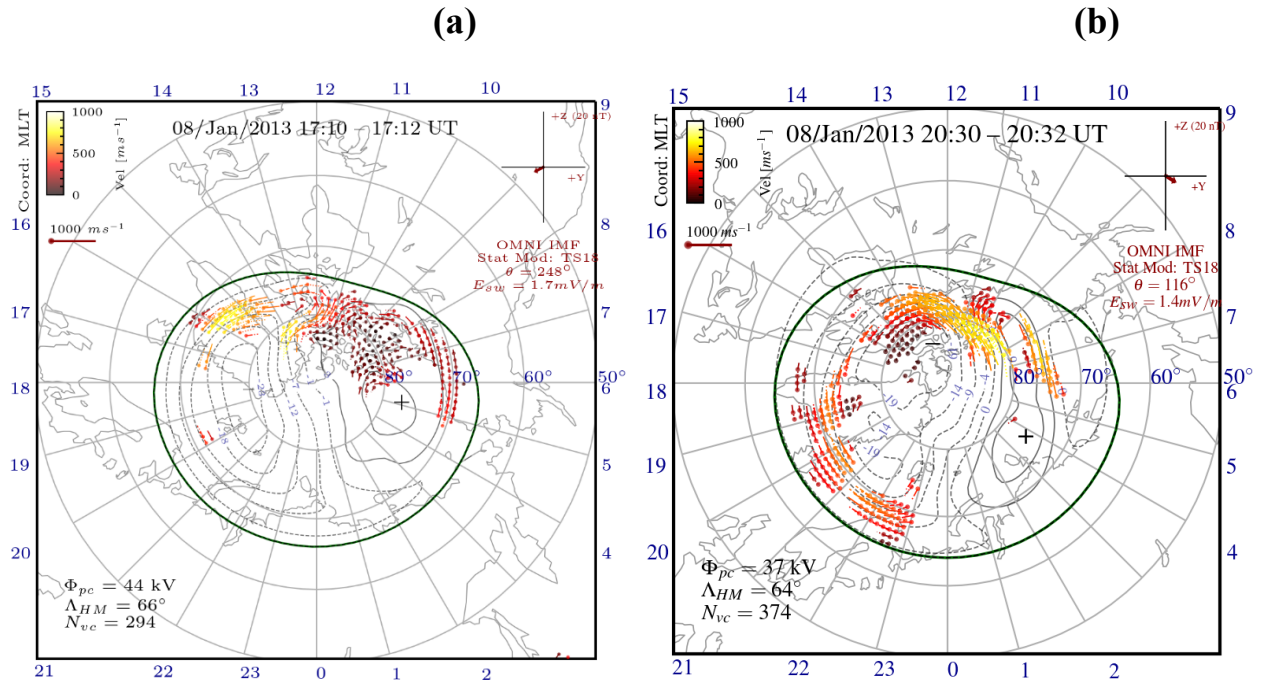
Correspondence to: Paul Prikryl (paul.prikryl@unb.ca)



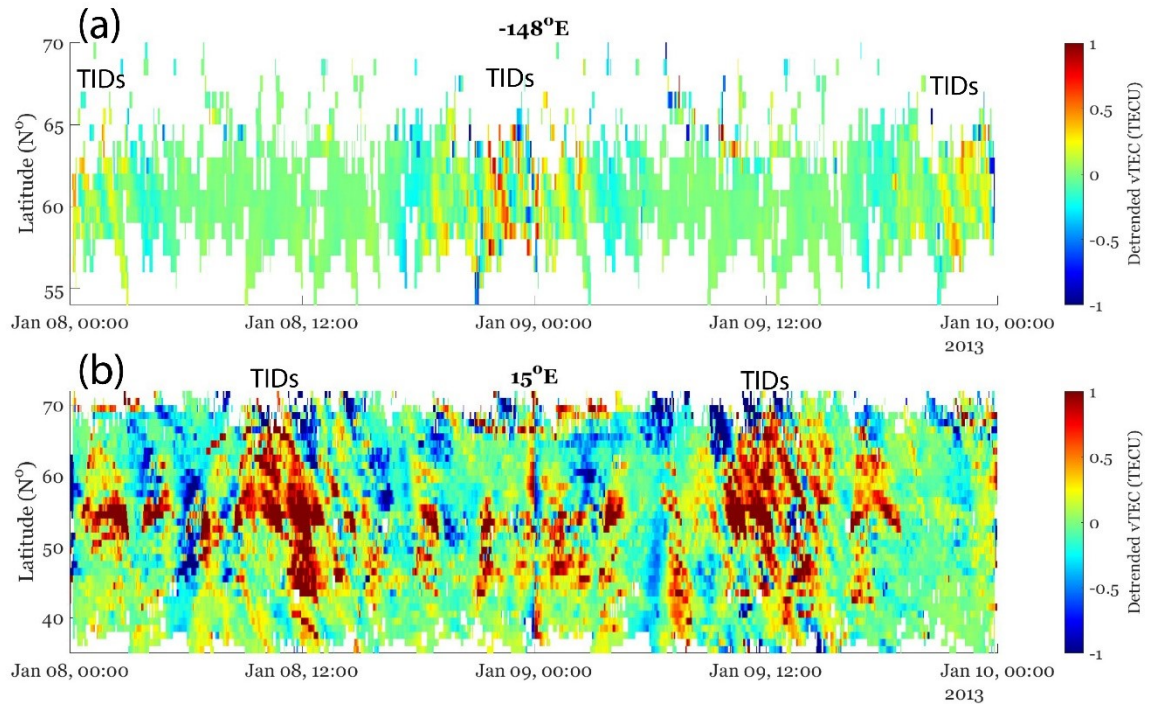
**Figure S1.** Examples of the GNSS station distribution in the two local domains of interest for November 4, 2014, when there were 5708 stations available globally.



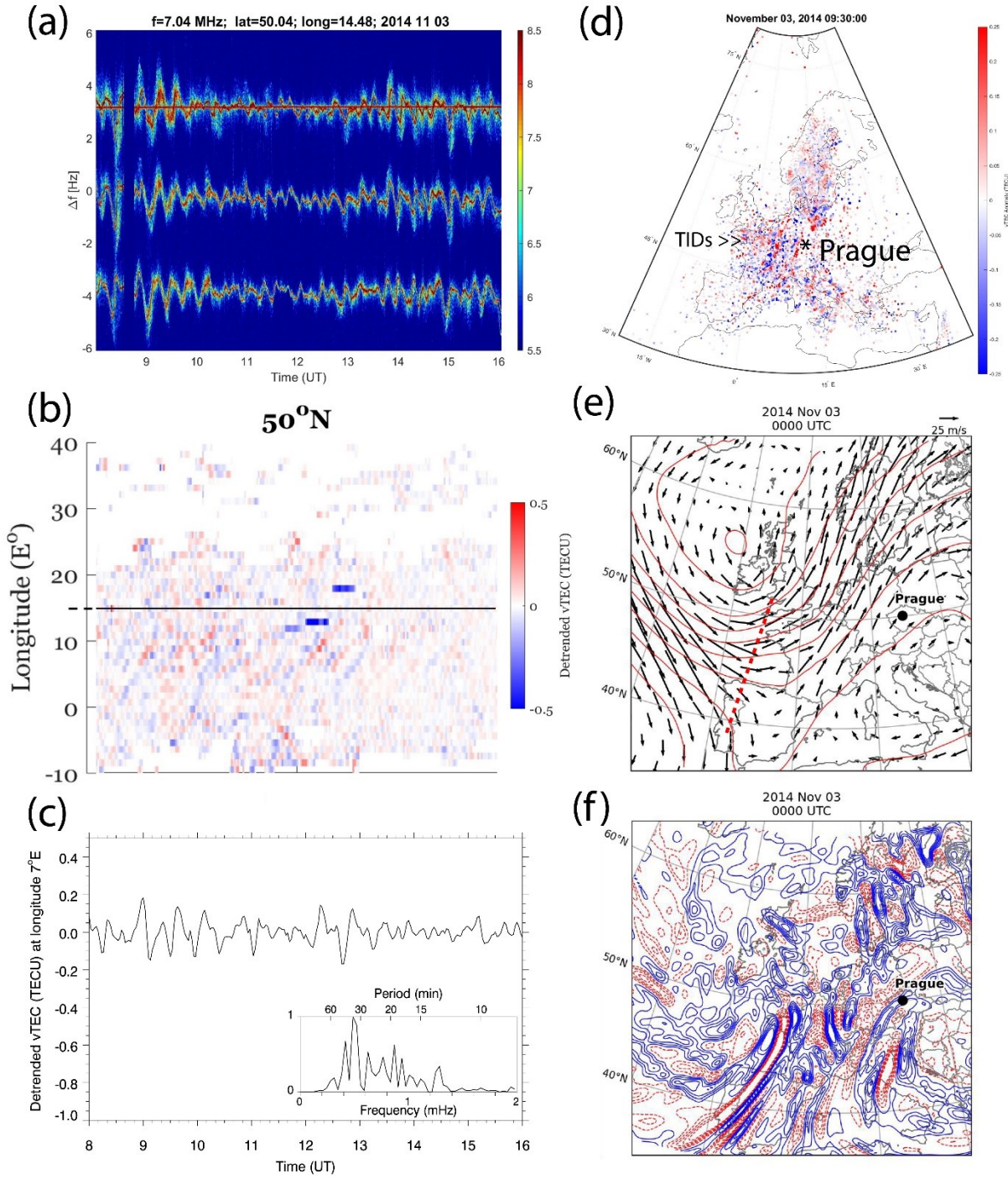
**Figure S2.** The north-south  $X$ -component observed by the magnetometer in Barrow (<https://imagedata.bgs.ac.uk/GIN/>) indicating westward electrojet.



**Figure S3.** The SuperDARN ionospheric convection maps for the IMF pointing (a) downward ( $B_y < 0$ ) and (b) duskward ( $B_y > 0$ ).

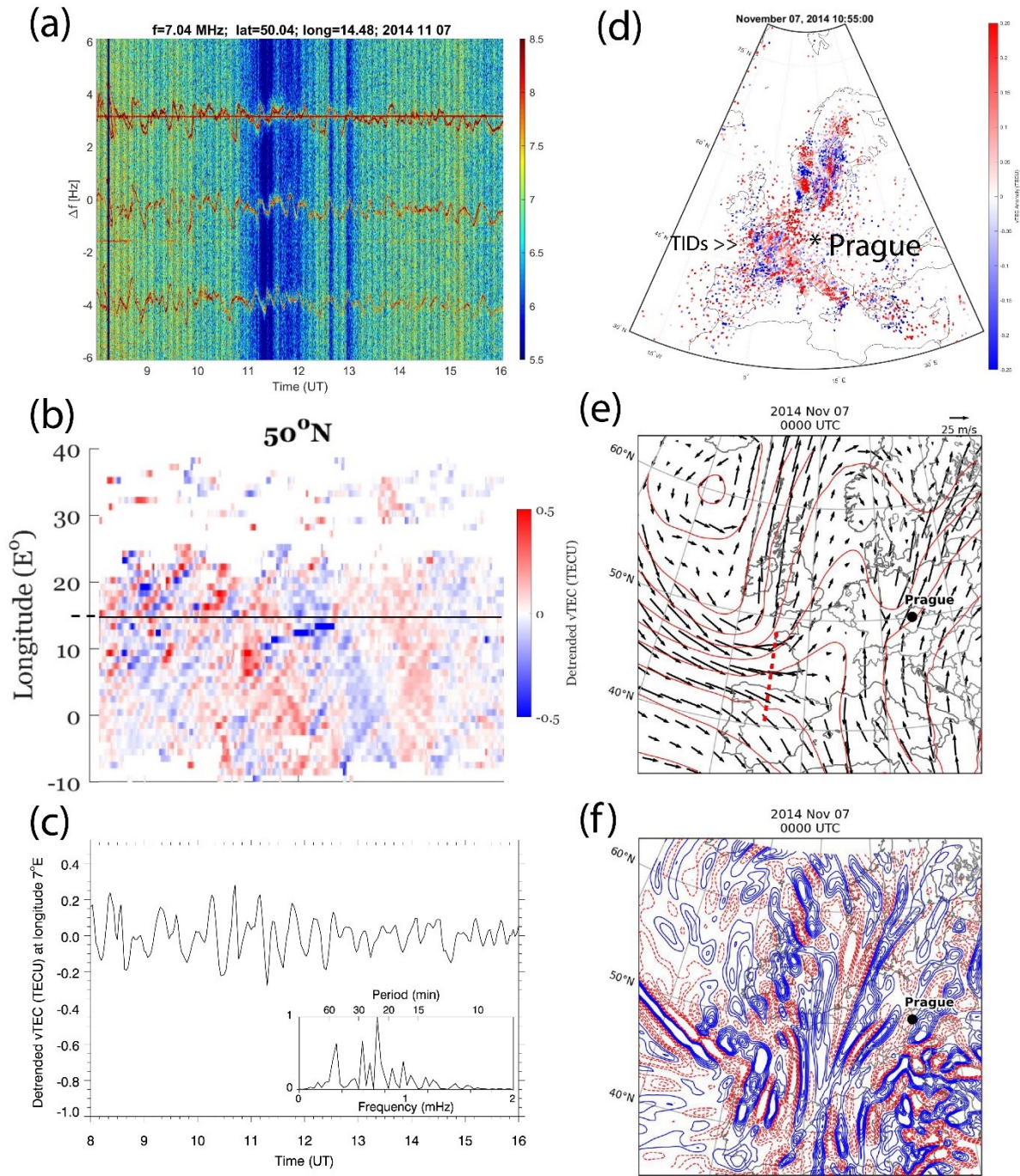


**Figure S4.** The detrended GNSS vTEC mapped at latitude bins along the longitudes **(a)**  $-148^{\circ}$  and **(b)**  $15^{\circ}$ .

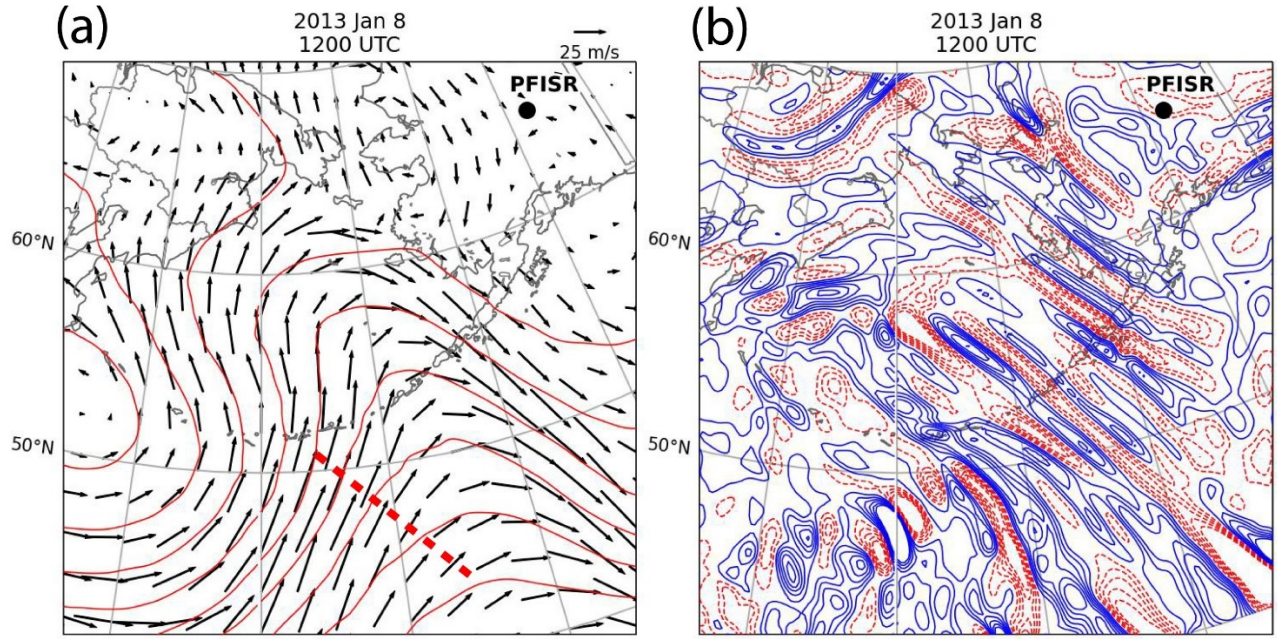


**Figure S5.** (a) The Doppler shift spectrogram recorded at frequency 7.04 MHz, (b) the detrended vTEC mapped along latitude of 50°N, (c) a time series of detrended vTEC at longitude of 7°E along with a normalized FFT spectrum, (d) a detrended vTEC map, and (e) the ERA5 300-hPa geopotential height (red contours at intervals of 100 m), approximate axis of inflection (red dashed line), and wind vectors (m/s) at 300-hPa level, and (f) the ERA5 divergence (positive in solid blue line) of the horizontal wind at 150-hPa level, on November 3, 2014.





**Figure S6.** The same as Figure SF4, but for November 7, 2014.



**Figure S7.** (a) The ERA5 300-hPa geopotential height (red contours at intervals of 100 m), approximate axis of inflection (red dashed line), and wind vectors (m/s) at 300-hPa level, and (b) the ERA5 divergence (positive in solid blue line) of the horizontal wind at 150-hPa level, on January 8, 2013.

**Table S1.** The 2-D and 3-D propagation analysis of the HF Doppler sounders data

Date and time	$v_{ha}$ (m/s)	Azimuth ( $^{\circ}$ )	$f_o$ (MHz)
2014/11/01 09:00-10:15 UT	$156 \pm 21$	$89 \pm 6$	4.65
2014/11/01 09:00-10:15 UT	$142 \pm 8$	$103 \pm 7$	7.04
2014/11/03 08:30-09:30 UT	$175 \pm 6$	$118 \pm 10$	7.04
2014/11/05 10:00-11:15 UT	$160 \pm 15$	$105 \pm 10$	3D analysis
2014/11/07 08:00-10:00 UT	$140 \pm 10$	$105 \pm 10$	7.04
2014/11/08 10:00-11:00 UT	$122 \pm 5$	$144 \pm 2$	4.65
2014/11/08 10:00-11:00 UT	$110 \pm 15$	$106 \pm 3$	7.04
2014/11/08 14:00-15:30 UT	$190 \pm 10$	$135 \pm 5$	3D analysis