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Supporting Information for

**Higher-order gravity waves and traveling ionospheric disturbances from the polar vortex jet on 11-15 January 2016: Modeling with HIAMCM-SAMI3 and comparison with observations in the thermosphere and ionosphere**

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**Movie S1.**

Movie S1: Simulated dTEC (colors, in TECU) from the SAMI3 using a 30-min detrend window on 11-14 January 2016. The maximum and minimum values are listed at the top of the panel. Green solid lines show the sunrise and sunset solar terminators.

**Movie S2.**

Movie S2: dTEC (colors, in TECU) from GNSS observations at 140°W to 50°E on 11-14 January 2016. The maximum and minimum values are listed at the top of the panel. We obtain the corrected sTEC from 6378 GNSS stations and 32 satellites worldwide (after first order receiver and satellite biases are removed). We then detrend the corrected sTEC with a 30-min running mean. We then convert the detrended sTEC to dTEC assuming an ionospheric Pierce Point altitude of 220 km for observations with elevations  $\geq 30^\circ$ . Maps are created by binning the dTEC into  $0.5^\circ \times 0.5^\circ \times 1$  min bins. These maps are smoothed with a  $1.5^\circ \times 1.5^\circ$  running mean horizontally and with a 5 min running mean in time. Green lines show the sunrise and sunset solar terminators.