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Analysis of gravity waves in the stratosphere after the 2011 Tohoku earthquake

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After the Tohoku earthquake on March 11, 2011, strong ionospheric disturbances and propagating concentric waves were detected. The slowest waves have been assigned to be the gravity modes of the coseismic atmospheric gravity waves and (Matsumura, 2011) has argued that most the ionospheric oscillations are mainly due to the motion of neutral atmosphere.
Using the spatially and temporally nearest GPS radio occultation data we have studied the possible influence of the earthquake situation on the internal gravity waves in the stratospheric region. From the comparison of the vertical wave number power spectral density before and after the earthquake remarkably different modes were selected. The altitude wavelength behavior of these modes was analyzed using the continuous wavelet transform and using the improved algorithm proposed by Gubenko et al. (2012) other parameters of these modes are determined. Finally, suitability of utilization of GPS RO density instead of temperature profiles for analyses of IGW is discussed.