

D-region ionospheric oscillations associated with eruptions of Sakurajima volcano, Japan, using LF transmitter signals

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Several studies for the F-region ionosphere associated with volcano eruptions based on GPS-TEC data have been reported so far (e.g., Heki, 2006; Dautermann et al., 2009; Heki et al., 2010). These studies reported that acoustic waves excited by volcano eruptions reach up to the F-region ionosphere, and caused F-region perturbations. After earthquakes, acoustic resonance (the period: 1-5 min.) between the Earth's surface and lower thermosphere was reported based on TEC data (e.g., Saito et al., 2011). However, little studies on the D-region ionosphere associated with volcano eruptions have been reported. In this study, we investigate the D-region variations related to eruptions of Sakurajima volcano (31.59N, 130.66E), Japan, at 04:11 UT on June 6, 2014, using intensity of LF transmitter signals. The LF propagation paths are JJY (JJY 60 kHz) - Tainan (TNN, Taiwan), and BPC (68.5 kHz) - TNN. Based on wavelet spectra, the both LF intensities had a period of 3-5 minutes during 04:12-04:20 UT after the eruptions (04:11 UT). On the JJY 60kHz-TNN path, the period became long to be about 6 min. gradually. We compared the LF intensities with atmospheric pressure data obtained by an infrasonic meter observed by Sakurajima Volcano Research Center, Kyoto University, and seismic waves in the NIED F-net data (FUK, STM, and SBR) located close to the Sakurajima volcano. The atmospheric pressure and vertical velocity of the seismic waves had the similar periods of 3-5 min. and 2-5 min. during 04:18-04:42 UT and 04:12-04:47 UT, respectively. In the presentation, we will discuss the possibility of acoustic resonance in more detail.

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