

Ionospheric disturbances associated with volcanic eruptions observed by GPS-TEC and HF Doppler sounding

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It is reported that ionospheric disturbances are caused not only by solar-terrestrial conditions but the phenomena below the ionosphere such as earthquakes, typhoons and volcanic eruptions. Compared with ionospheric disturbances caused by earthquakes, there are very few studies examining the ionospheric disturbances associated with volcanic eruptions.

In this study, we have examined ionospheric disturbances associated with volcanic eruptions using GPS-TEC and HF Doppler sounding. We detected ionospheric disturbances associated with Mt. Asama eruption at 11:02 UT on Sep., 1st, 2004. In HF Doppler sounding observation, the spiky disturbances whose frequency is about 7 - 16 mHz was observed firstly. Following this disturbances, longer-period disturbance was appeared, whose frequency is about 3 - 5 mHz. The former disturbance was also observed by GPS-TEC,

whose ionospheric pierce points were located near the Mt. Asama. From the propagation time of this disturbance, it is possible that the eruption generated shock waves which propagated to the higher ionosphere. In terms of the frequency, the latter disturbances observed by HFD sounding shows the resonance of the atmospheric wave between the lower ionosphere and the ground.

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