

Early warning system of tsunami by measuring tsunamigenic ionospheric hole

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Low frequency acoustic waves, termed infrasonic waves, are excited by the sudden displacement of ground and sea surface at large earthquake (EQ) and tsunami. When the acoustic waves propagate into the ionosphere, they disturb the ionospheric plasma. The plasma disturbance has been detected by the measurement of total electron contents (TEC) between a satellite of Global Positioning Systems (GPS) and its receivers on the ground. In addition to the acoustic waves, a TEC depression lasting for a few minutes to tens of minutes, termed tsunamigenic ionospheric hole (TIH), is formed by the large EQ with tsunami above the tsunami source area. The largest TEC depression appears 10 to 20 minutes after the main shock. In particular, it takes 20 minutes to identify the initial tsunami height for M9-class EQ only when we focus on the TEC depression to identify the height. In this paper, we propose alternative methodology to shorten 5 minutes to identify the initial tsunami height.

Keywords: Tsunami, Tsunamigenic ionospheric hole, Total electron content