

Excitation of four-minute periodic ionospheric variations by large earthquakes

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We report the excitation of the ionospheric variations by the large earthquakes. Two large earthquake, the one Mw 9.3 on December 26, 2004 off the west coast of northern Sumatra, and the one Mw 8.5 on September 11, 2007 southern Sumatra, induced the variations of ionosphere. They were detected in term of total electron content (TEC) variations that were measured by ground-based Global Positioning System (GPS) receivers. The observational results for these two earthquake events showed that the intense TEC variations occurs after the large earthquakes and the four-minute TEC variation follow them and continued for more than one hour. The four-minute TEC variation could be generated by the earthquake-induced acoustic waves that propagated upward to the ionosphere. The four-minutes periodic TEC variation was observed in a limited area whose size was less than 1,000 km around the epicenter. This is consistent with the limitation of acoustic wave propagates in the atmosphere. In addition, we propose that the aftershocks play an important role to continue the four-minute TEC variation for long time. The detail of mechanism of the earthquake generated the four-minutes periodic TEC variation will be discuss on the presentation.