

Modeling of periodic TEC perturbations excited by the Sumatra Earthquake

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After the 26 December 2004 Sumatra Earthquake, the periodic Total Electron Content (TEC) perturbations were observed. The observational data shows that the periodic TEC perturbations had clear four minutes period and oscillated for about two hours. We believed that acoustic waves generated by the earthquake played an important role to generate this kind of the periodic TEC perturbations in the ionosphere. In order to understand this phenomenon, a numerical model was used to simulate the periodic TEC perturbations. The simple sinusoidal waveform of acoustic wave in the ionosphere was applied to this model. The ionospheric structure was assumed to be at 300 km altitude with some kilometers of its thickness. The model shows good agreement to the observational data that the amplitudes of periodic TEC perturbations were dependent on the elevation angle of the GPS radio wave path. The maximum amplitudes of the periodic TEC perturbations were observed when the elevation angle of the radio wave path between a GPS satellite and a receiver at its maximum. The model also reproduced the temporal and special structures of the observational periodic TEC perturbations. The developing and detail descriptions of the model will be discussion in the presentation.