Possible Seismo-ionospheric Precursors of the 26 December 2006 M6.7 Ping-Tung Earthquake

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To investigate pre-earthquake signals in the lithosphere, atmosphere, and ionosphere, a project, called 'integrated Study for Taiwan Earthquake Precursors' (iSTEP, i=2, 2006/8-2011/7), has been undertaken (Figure 1). It consists of a main project and four inter-related sub-projects covering the following topics: Seismological variation, Radar interferometry for detection of surface deformation, Seismo electromagnetic signal (SES), and Statistical analysis of earthquake hazard. Eight networks of electrode, magnetometers, corona probes, FM tuner, all sky imager, Doppler sounder, ionosonde, and GPS receiver has been setup and continuously operated to monitor the SESs in Taiwan. In this paper, measurements of the ionosonde, Doppler sounder, and GPS receiver network during the 2006 M6.7 Ping-Tung Earthquake period are examined. It is found that the critical plasma frequency (Figure 2) and total electron content (Figure 3)) in the ionosphere abnormally decrease in the afternoon period of the 4th day before the earthquake, and quasi 3-minute periodical fluctuations were observed 1-3 days before the earthquake (Figure 4). Tow models are porosed to expaline the observed SES (Figure 5).

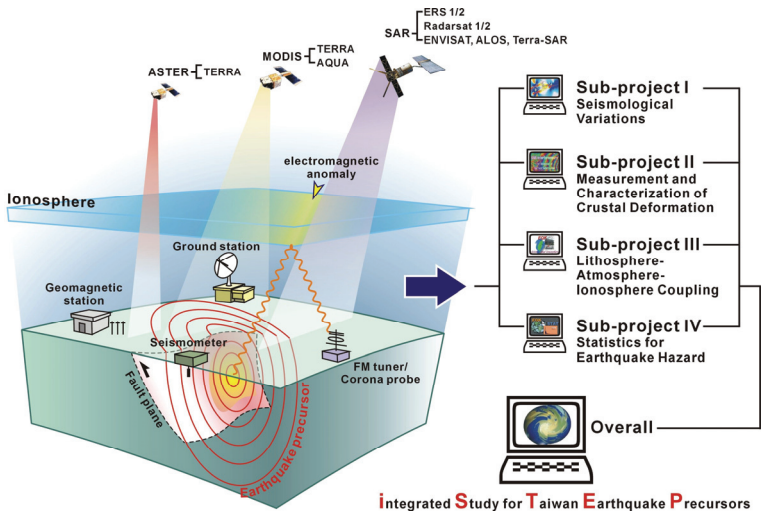

Figure 1. The iSPEP.

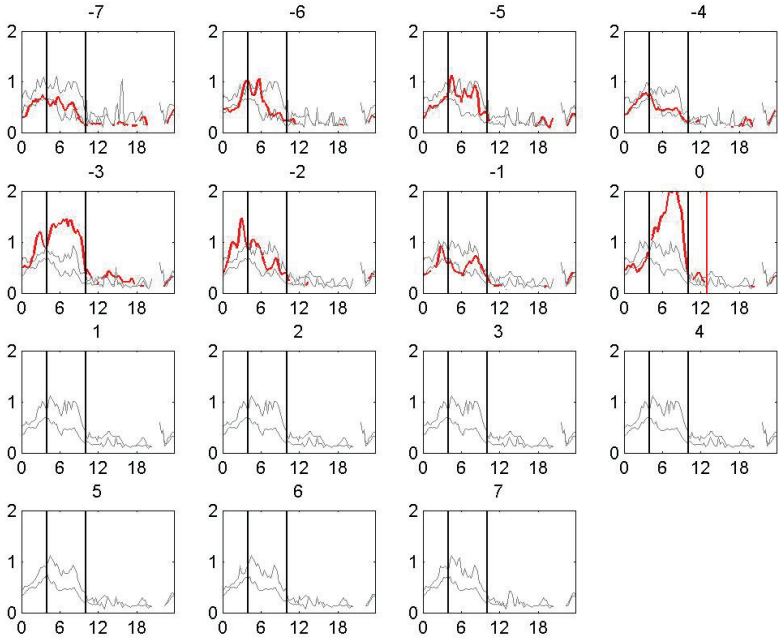

Figure 2. The critical frequency foF2 observed by the digital ionosode seven days before and after the earthquake.

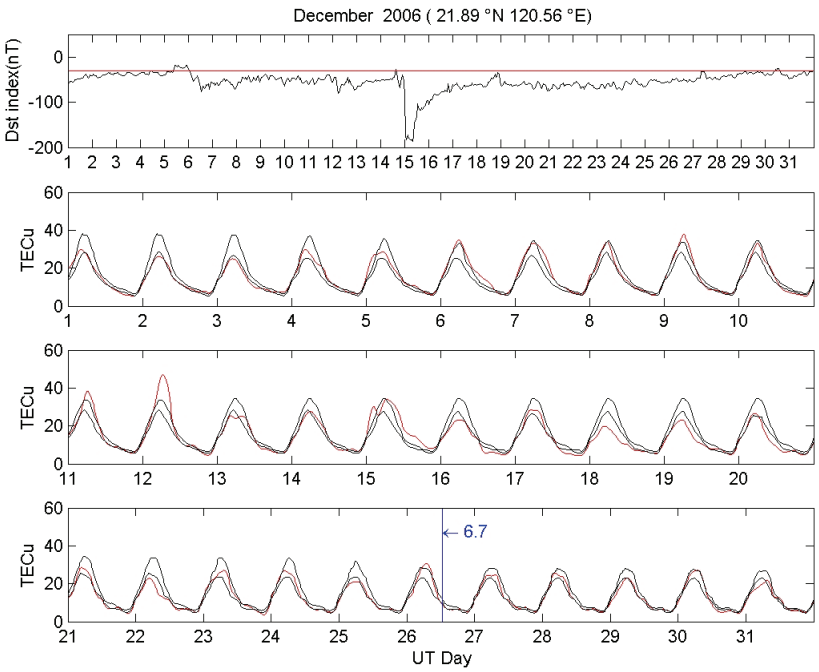

Figure 3. The Dst index and GPS TEC observed in December 2006.

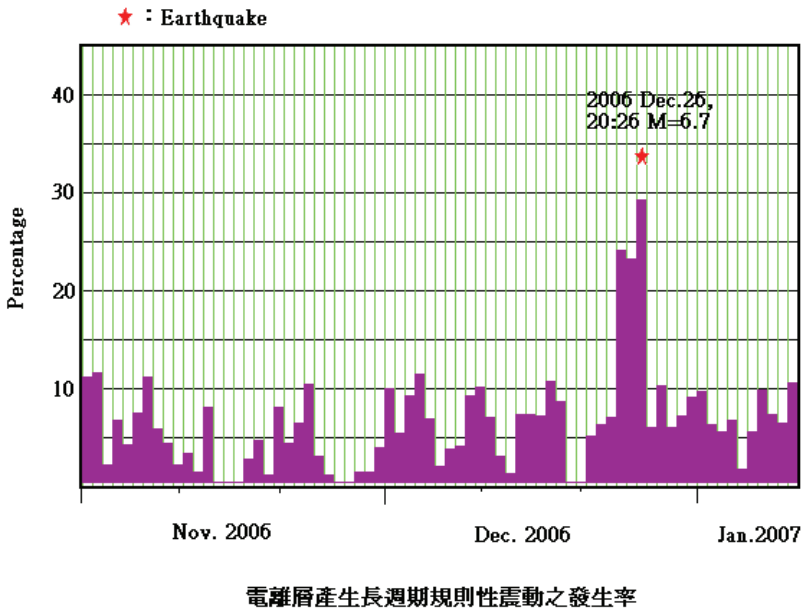

Figure 4. The percentage of 3-minute fluctuations observed by the Doppler sounding system during the earthquake period.

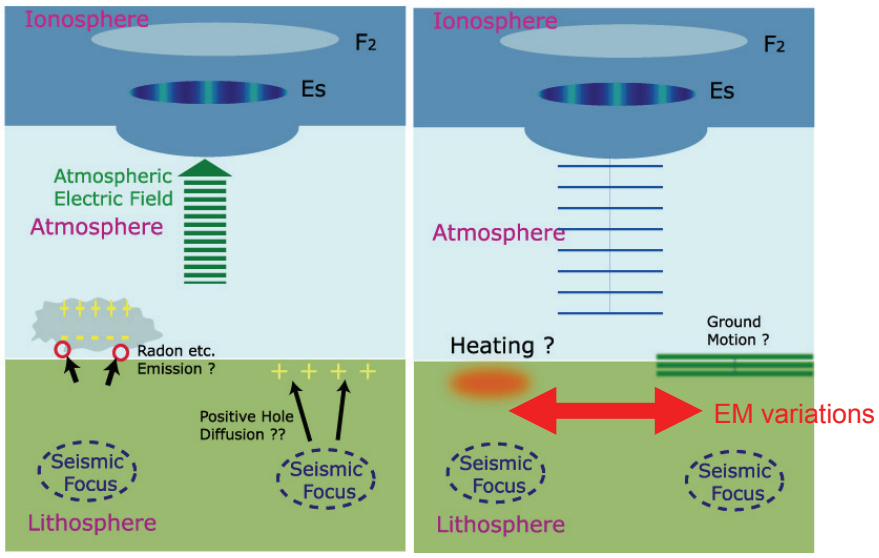

Figure 5. The electric filed and atmospheric gravity wave models.