

A proposal for mini/small satellite mission for earthquake study

K. -I. Oyama

Institute of Space Science, National Central University, Jongda Road, Jong-Li City, Taiwan 3200

Possible effect of the earthquake on the ionosphere has been reported many times in the past (Liu et al., 2001; Dvi et al, 2004). We tried to find the effect by using data, which was obtained by Japanese satellite. Electron temperature (T_e) at the height of 600km was studied in detail. We first examined three big earthquake occurred near Philippine in 1981 November and 1982 January. We found that T_e in the afternoon overshoot reduces or disappears about 5 days prior to and after the earthquakes and concluded that the westward electric field, which is generated associated with earthquake, modifies the behavior of T_e at the height of 600km. However there are cases where the effect of the earthquake on the ionosphere is not detectable. It appears that the degree of the effects on the ionosphere depends on the magnitude of the earthquake, the depth, the latitude, and the electrical features of the fault. Land /sea earthquake might give different effect on the ionosphere. As a first step toward earthquake prediction, we need to study more cases, at least for the earthquake of magnitude greater than 7. The earthquake of the magnitude >7 occurs about 10 times per year in the world. With this background, we propose mini satellites armada. Each satellite should have the same electron temperature probe and electron density probe as a common instrument. The probes should be an impedance probe and electron temperature probe which have been developed in Japan (Oyama 1970, 1999; Oya 1965). The weight of the satellite would be about 30kg-100kg. The height and inclination of the orbit are about 500-600km and less than 30 degrees respectively. Format of the data acquired from minisatellite armada should be the same in order to ease the data analysis and to save energy of software programming. Depending on the availability of the space in the satellite, several instruments can be added. Those are photometer (630nm), energetic particle detector, and VLF receiver. Together with the mini-satellite, which mentioned above, a small satellite (200kg), which accommodates more instruments, should be also proposed to study physics of the effect of the earthquake on the ionosphere. Possible candidate instruments are 1 Direction finding VLF receiver, 2. Energetic particle analyzer, 3 Photometer and/or. Camera with several wave lengths, 4. Topside sounder, 5. Ion mass spectrometer, 6. Plasma drift meter (which needs precise satellite attitude).