sprite-producing storms observed during the summer 2003 *EuroSprite* campaign. Here we test further this result by carefully analysing a much larger data set of simultaneous spite and VLF observations obtained from several *EuroSprite* campaigns. Our results suggest that the relationship between sprites and early VLF perturbations is less clear than that implied from the previous *EuroSprite* studies. In one storm that gave 20 sprites we found all to be accompanied with early VLF perturbations, whereas in a few other storms the number of the VLF events anticipated during the observed sprites, simply were not there. Here we present and discuss these findings, whereas we also provide some improved statistics on the early VLF event properties and discuss several correlative aspects by considering in addition to the VLF signatures the characteristics of the optical sprite images and those of the causative cloud to ground lightning discharges.

The Sumatra tsunami induced ionospheric signatures from the CHAMP satellite: a manifestation of atmosphere-ionosphere coupling via acoustic-gravity waves

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During the 24 December 2004 giant Sumatra tsunami, varieties of atmospheric and ionospheric signatures are detected. The low-orbiting CHAMP satellite has passed through this region many times in 2 hours interval and provided the electron density and magnetic variations at 400 km ionospheric heights. These data are very useful in understanding the tsunami induced fluctuations. They resides together with the fluctuations from other ionospheric sources and needs to be separated. Since the CHAMP satellite provides continuous observations (in 2 hours interval) of the Sumatra region before and after the event, it is possible to differentiate the tsunami induced fluctuations from others. The power spectrum distinctly shows the peak at certain frequencies during the event while these peaks remain absent on previous days. These frequencies are found below 10 mHz which indicates the possible involvement of Acoustic-gravity waves (AGWs) during the event.

To understand the possible cause of these fluctuations, we thus focus on the energy flow mechanism based on acoustic gravity waves. In this mechanism, AGWs are induced in the atmosphere by the sea surface displacement caused by the tsunami. These AGWs propagate to the ionosphere and gives rise to the current and subsequent fluctuations. The numerical simulation model is developed to deal with this process. In this model, the acoustic gravity wave equation and hydromagnetic equations are solved numerically. The results of this model is discussed in the context of observed fluctuations from the CHAMP satellite.