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Analysis of the DEMETER data related to seismic activity bringing Chile area into focus

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DEMETER is a low orbiting satellite (660 km) which was operating for more than six years to study ionospheric perturbations in relation with the seismic activity. It records wave and plasma parameters all around the Earth (except in the auroral zones) at two different local times (10.30 and 22.30 LT). This paper will present observations performed during large and recent seismic events. The presentation will show a more detailed analysis of the ionosphere at the time of the Chili earthquakes. As the ionosphere is highly variable, the paper will show a statistical analysis performed on the plasma parameters during night time. An algorithm has been implemented to detect crests and troughs in the data before world-wide earthquakes. The earthquakes have been classified depending on their magnitude, depth, and location (land, below the sea, close to a coast). Due to the orbit, DEMETER returns above the same area every day (once during day time, once during night time) but not at the same distance of a given epicentre. Then, for each earthquake, data have been checked until 15 days before the shock when the distance between the trace of the orbit and the epicentre is less than 1500 km. The results of the statistical analysis are presented as function of various parameters. A comparison is done with two other data bases where, on one hand, the location of the epicentres has been randomly modified, and on the other hand, the longitude of the epicentres has been shifted. At the end, the statistic is restricted to the Chile area.