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Automatic analysis of a temporal series to detect variations linked to seismic activity

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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 an attempt to automatically find variations in the ion density recorded by DEMETER which could be related to seismic activity. Only the night time data are used because in the past, for specific events, we have neither observed variations which could be related to seismic activity during day time. In a first step, variations of the ion density are searched in a data base which contains all the data ranked as function of the time. The search is done by a program which notices the amplitude of the variation, its time and its location. Data corresponding to high magnetic activities are not considered. In a second step another program check if each variation could be linked to an earthquake which will occur a few hours or a few days after in the same area. Results are shown as function of earthquake parameters (magnitude, depth, and location).