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Flux density variations of hiss and chorus ionospheric components observed before and after earthquake occurrences

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Several publications, in the year 2008, have reported a clear decrease of the flux density level associated to natural ionospheric emissions (like hiss and chorus) and also to transmitter signals. The decrease of flux density levels is observed over seismic zones, principally in Asiatic and Adriatic regions. Such investigations have been performed using VLF ground-based stations and electric and magnetic field experiments onboard DEMETER micro-satellite.

In the present study, we examine the ELF/VLF electromagnetic emissions recorded by ICE experiment on-board DEMETER. We quantify the hiss and chorus flux density levels before, during and after earthquake occurrences in the frequency range between 1 kHz and 7 kHz. These flux estimations are compared to the magnetospheric activity which is considered to be at the origin of natural ionospheric components, like hiss and chorus emissions. We show that the detection of pre-seismic electromagnetic ELF/VLF signals, using space observations, is crucially and significantly depending on the level of the geomagnetic activity which is a key parameter in such investigation. We finally attempt to propose different scenarios which can explain the flux decrease origin of hiss and chorus emissions over seismic regions.