HF and VLF electromagnetic waves recorded by DEMETER during thunderstorm activity

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[1] none

DEMETER is an ionospheric micro-satellite launched on a polar orbit in June 2004. Its main scientific objectives are to study the ionospheric perturbations in relation with seismic and anthropogenic activities. Therefore, its scientific payload allows to measure electromagnetic waves and plasma parameters all around the Earth except in the auroral zones. At its altitude (˜700 km), the phenomena observed on the E-field spectrograms recorded during night time by the satellite are mainly dominated by sferics and whistlers. The paper is related to HF emissions observed at the time of powerful thunderstorms by DEMETER during night time. Global maps of the Earth reveal a persistent wave activity at HF frequencies above the location of ground-based VLF transmitters. It is shown that it is due to the perturbation of the ionosphere by these transmitters which produce ionospheric irregularities. Whistler waves generated by lightning strokes can therefore penetrate trough the ionosphere at HF frequencies at the location of these VLF transmitters. In a second part, the paper will show electromagnetic waves recorded at the time of two sprites in Poland which are associated to two powerful lightning strokes (˜+100 kA).