



## **ULF waves observed by the low altitude satellite DEMETER during the geomagnetic super storm in November 2004**

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This study reports observations of ULF waves by the low altitude satellite DEMETER ( $\sim 700$  km) during the magnetic super storm in November 2004. This storm was the largest geomagnetic storm during the entire DEMETER mission (maximum Dst = - 373 nT and Kp = 9 on 8 November), and it was the opportunity to record many new phenomena in the equatorial region. The reported ULF emissions are observed both by electric and magnetic antennas and can be attributed to Schumann resonances and/or EMIC (Electro-Magnetic Ion Cyclotron) waves. It is not the first time that these emissions are observed in the low-altitude ionosphere. EMIC waves are very common whereas waves at Schumann resonances have been only recorded by a few satellites. But it is the first time that they are observed during an extended period of time. They extend continuously between the trough region in one hemisphere up to the other trough region in the other hemisphere. We explain our observation by a penetration of waves through these trough regions to the position at the satellite altitude. EMIC waves are generated in the equatorial region, but at much higher altitudes than the satellite orbit whereas waves linked to Schumann resonances must be coming from the Earth-ionosphere waveguide.