Geophysical Research Abstracts
Vol. 18, EGU2016-7461, 2016
EGU General Assembly 2016

Large-scale variation of electron parameters from Quasi−Thermal Noise during WIND perigees in the Earth's magnetosphere

Karine Issautier (1), Samuel Ongala-Edoumou (1,2), and Michel Moncuquet (1)

(1) LESIA, Observatoire de Paris, PSL Research University, CNRS, Sorbonne Universités, UPMC Univ. Paris 06, Univ. Paris Diderot, Sorbonne Paris Cité, 5 place Jules Janssen, 92195 Meudon, France, (2) PAPD, Atomic Physics in Dense Plasmas, University Pierre et Marie Curie, 4, Place Jussieu, 75252 Paris Cedex 05, France

The quasi-thermal noise (QTN) method consists in measuring the electrostatic fluctuations produced by the thermal motion of the ambient particles. This noise is detected with a sensitive wave receiver and measured at the terminal of a passive electric antenna, which is immersed in a stable plasma. The analysis of the so-called QTN provides in situ measurements, mainly the total electron density, with a good accuracy, and thermal temperature in a large number of space media.
We create a preliminary electron database to analyse the anti-correlation between electron density and temperature deduced from WIND perigees in the Earth's plasmasphere. We analyse the radio power spectra measured by the Thermal Noise Receiver (TNR), using the 100-m long dipole antenna, onboard WIND spacecraft. We develop a systematic routine to determine the electron density, core and halo temperature and the magnitude of the magnetic field based on QTN in Bernstein modes. Indeed, the spectra are weakly banded between gyroharmonics below the upper hybrid frequency, from which we derive the local electron density. From the gyrofrequency determination, we obtain an independent measure of the magnetic field magnitude, which is in close agreement with the onboard magnetometer.