Plasma boundaries in the Earth's space environment as seen by the Whisper relaxation sounder onboard Cluster

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The Waves of HIgh frequency and Sounder for Probing of Electron density by Relaxation (Whisper) aboard the four CLUSTER spacecraft aims at the thermal electron density evaluation and electric component of natural wave monitoring in the 2 to 80 kHz frequency range.

In its active working mode, the Whisper relaxation sounder behaves like a classical radar. Plasma parameters such as the electron density and magnetic field strength may thus be deduced from the actual frequency of the electric-field oscillations (resonances) that are excited in the surrounding medium. From both the nature of the natural waves that are detected whenever the whisper transmitter is switched off and the frequencies at which resonances are triggered (Whisper active mode), characteristics of the encountered plasma may be determined. Transition regions and main plasma boundaries are also most often clearly identified in the whisper data.

The objective of the presentation is to show how these Earth's plasma boundaries, in particular the bow shock, the magnetopause and the plasmapause are seen by Whisper. It is actually the first step in the automatic identification of these boundaries which is necessary for the total plasma density to be also automatically determined. The region being clearly identified, the appropriate algorithm may indeed be applied.