3rd VERSIM Workshop 2008 Tihany, Hungary 15th – 20th September 2008

Comparison of equatorial plasma mass density and electron density at L=1.85 inferred from ULF and VLF measurements

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ULF and VLF diagnosis of the magnetosphere plasma are both well established techniques that went through a great progress in the last decades. Ground-based magnetometer records have been used to monitor the geomagnetic field line resonance frequencies and hereby the plasma mass density in the magnetosphere since the early 1990's.

Combining ULF and VLF techniques would have several advantages. Since ULF field line resonances are typical daily phenomena, while whistlers occur mostly on the nightside, the two methods mutually complement each other. From simultaneous measurements of plasma mass density and electron density, the average ion mass and the plasma composition could be estimated.

There are some difficulties, however, need to be overcome. Both methods use several assumptions and models related to the investigated plasma environment which need to be tuned in order to get realistic results.

We present some examples based on ULF and VLF measurements at Tihany and along the MM100 magnetometer array to demonstrate these possibilities, and also discuss the existing difficulties.