



## **Upstream Proton Cyclotron Waves at Venus from the first year of Venus Express magnetometer observations**

**M. Delva** (1), M. Volwerk (1), T.L. Zhang (1), Z. Voeroes (1), S. Pope(2)

(1) Space Research Institute, Austrian Academy of Sciences, Graz, Austria  
(magda.delva@oeaw.ac.at / Fax: +43-316-4120-590)

(2) University of Sheffield, UK.

The magnetometer data from the first year of the Venus Express mission are investigated for the occurrence of proton cyclotron waves.

As a new feature at Venus, proton cyclotron waves (PCW) were detected in the upstream region, in and upstream of the foreshock region and over a large volume of space; they are a direct indication of pick up of planetary protons from the exosphere of Venus and loss of hydrogen to interplanetary space.

A detailed study of representative cases as well as an overview of the specific wave properties over the long time span of the first year of observations (May 2006 till May 2007) is presented, i.e. specific aspects of the spectra, analysis in the magnetic field principal axes system, direction of propagation etc.

The waves occur till large distances from the planet ( $\sim 8 R_V$ ) and for a large range of angles ( $V_{sw}$ ,  $B$ ). Therefore, the question of wave generation has to be addressed and different generation mechanisms are suggested.