Geophysical Research Abstracts
Vol. 12, EGU2010-6543-2, 2010
EGU General Assembly 2010

Observations and Numerical Modeling of IAR Eigenfrequency Shifts Response to Plasma Density Perturbations

Kai Yuan (1), Terry Robinson (1), Darren Wright (1), Tero Raita (2), Ye Pang (3), and Meng Zhou (3)

(1) (ky20@ion.le.ac.uk) Department of Physics and Astronomy, University of Leicester, UK, (2) Sodankylä Geophysical Observatory, University of Oulu, Finland, (3) School of Electronic Information, Wuhan University, China

On 9 November 2002 there was an Ionospheric Alfven Resonator(IAR) event was observed by 5 Finnish magnetometers simultaneously. A double running average smoothing and a sinusoidal curve fitting were used on the spectral data of the event to find the eigenfrequencies of the IAR. According to the analysis, the eigenfrequencies and eigenfrequency rates of change were found to differ between the different stations. Analysis shows that the eigenfrequency fluctuations were dominated by local plasma density perturbations. In order to study the relationship between plasma density perturbations and IAR eigenfrequency shifts, a model was developed. The numerical solution of the model agreed with observations quite well. Based on this model, the influence on IAR eigenfrequencies caused by plasma density perturbations above maximum F2 layer was investigated. The results shown that the eigenfrequency shifts were sensitive to height, width and intensity of plasma perturbations above F2 peak. Thus it is a possible way to estimate plasma density variation above F2 peak based on the shifts of IAR eigenfrequencies.