Geophysical Research Abstracts
Vol. 18, EGU2016-12582, 2016
EGU General Assembly 2016

Correlation scales of chorus emissions observed by THEMIS

Vitalii Shastun, Oleksiy Agapitov, and Vladimir Krasnoselskikh
France (vitalii.shastun@cnrs-orleans.com)

Chorus waves provide a possible mechanism for the local acceleration and scattering (causing precipitation loss) of electrons in the outer radiation belt and provide a strong source of electron pitch angle diffusion. The waves are often quite localized in time and in radial direction – thus the spatial extension of these waves can have a large effect on their overall scattering efficiency. Using measurements from THEMIS, we characterize the temporal extent of active chorus regions, and the dependence of these scales on local time, radial distance, and geomagnetic activity. The correlation time scales for chorus waves were estimated making use of THEMIS filter bank spectral data collected during 2008-2014. Two regimes can be statistically distinguished depending upon the spectral power. In the presence of chorus waves it is found that the correlation times vary between 200 and 300 s depending upon L-shell. In the absence of intense chorus waves the correlation time drops to around 50 s. The correlation time scales for intense chorus waves increase with increasing of L-shell from $\sim 200s$ at L = 4 to $\sim$ 300 s at L = 7. These characteristic scales play a crucial role in determining both the nature and extent of wave-particle interactions. The spatial and temporal scales of active region and source region for chorus wave modes impose limits for parameters used in the quasi-linear modelling of these waves as well as the possible biasing for statistical models, where all measurements are assumed to be statistically independent.