Project Details

ROSES ID: NRA-03-OSS-01
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Project Title:
A global model of the effects of ELF/VLF chorus emissions on energetic radation belt electrons

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Summary:
We propose to construct a global model of the distribution of ELF/VLF chorus emissions in space and time during and following periods of magnetic disturbance. This model will be used to determine if the energization of radiation belt electrons to MeV energies is a result of interactions between the chorus and the electrons. We will use a non-linear test particle resonant interaction model calculation to determine the change in energy and pitch angle of resonant energetic electrons due to typical ELF/VLF chorus elements, including nonlinear effects due to the high intensity of the wave, the coherent nature of the waves, their frequency-time variation, and wave normal changes due to propagation effects. The chorus element will be characterized at the generation region using already analyzed POLAR and CLUSTER data. The characteristics of the waves after they leave the source region will be determined using raytracing. Using these results in conjunction with new findings concerning chorus occurrence and distribution in space and time, the global chorus-driven energization rates and pitch angle scattering rates will be calculated and compared with measurements to determine whether chorus is the dominant mechanism in the rapid, storm-time energization of electrons in the Earth s outer radiation belt.

Publication References:

Summary: ''

Reference: Umran Inan / Stanford University - A Global Model of the Effects of ELF/VLF Chorus Emissions on Energetic Radiation Belt Electrons

Summary: no summary

Reference: Bell, T. F.; Inan, U. S.; Haque, N.; Pickett, J. S.; (2009), Source regions of banded chorus, Geophysical Research Letters, Volume 36, Issue 11, CiteID L11101, doi: 10.1029/2009GL037629