IN-SITU AND GROUND-BASED ILLUMINATION OF THE INNER RADIATION BELTS WITH WHISTLER-MODE WAVE ENERGY

Kulkarni, P., Inan, U.S., Bell, T.F.
STARLab, Stanford University, 350 Serra Mall

Bortnik et al. (JGR-Space Physics, 2005b.), introduced a novel method to construct, at any location in the inner magnetosphere, the frequency-time spectra that would be observed as a result of a single cloud-to-ground lightning strike. We adapt the procedure used by Bortnik et al. [2005b] to determine the distribution of wave energy that would be radiated into the inner radiation belts from a ground-based transmitter. Specifically, we use the Stanford 2D VLF raytracing program, coupled with an accurate estimation of the path-integrated Landau damping based on measured distributions of suprathermal electrons to simulate various transmitter locations and driving frequencies.

We compare the wave power distribution from a ground-based transmitter with the wave power distribution from a space-based transmitter. As indicated by Kulkarni et al. (talk presented at URSI Boulder, 2005), the data demonstrate that the majority of the radiated power is concentrated in waves whose wave normals are located near the resonance cone and wave frequencies no lower than 90

Based on the relative distribution of whistler-mode wave energy between ground-based and in-situ injection sites, we estimate the induced energetic electron precipitation that would result from different transmitter and satellite configurations.

Abstract Submission Form

2006 National Radio Science Meeting

Abstract: kulkarni848

Date Received: November 23, 2005

1. (a)
   P. Kulkarni
   STARLab, Stanford University,
   Stanford, CA
   94305 USA
   pxk161@stanford.edu
   (b)
   (c)
2. H - Waves in Plasma
3. (a)
4. P
5. No special instructions