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Parametric Model of Chorus Waves in the Outer Radiation Belt from Ten Years Cluster Measurements

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Modeling of wave-particle interactions requires the detailed information on wave amplitudes and wave-normal distribution over L-shells, magnetic latitudes, magnetic local times of different geomagnetic activity conditions. In this work, we develop a statistical parametrical model of VLF emission amplitudes, obliqueness, spectral power distribution using wave measurements in a chorus frequency range for ten years (2001-2010) aboard the Cluster spacecraft. We used data from the STAFF-SA experiment, which spans the frequency range from 8.8 Hz to 3.56 kHz. The proposed statistical model is presented in a form of the function of the normalized wave frequency f/fce, the magnetic local time, L-shell, magnetic latitude, and the Dst-index values. It can be directly applied for numerical calculations of the charged particles diffusion coefficients statistical properties in the radiation belts.