Investigation of the Chirikov resonance overlap criteria for equatorial magnetosonic waves

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Observations of Equatorial Magnetosonic Waves (EMW) show that emissions of this type consist of sets of discrete emissions centered around harmonics of the proton gyrofrequency. The interaction between these waves and the local electron population may result in the patchable scattering of particles into the loss cone and hence their removal from the radiation belts. This wave-particle interaction process is usually modeled using quasi-linear theory that assumes a gaussian type frequency spectrum, and the resulting diffusion coefficients used within physical models of the RB. In this paper we assess the applicability of quasi-linear theory to an instance of EMW observations from the Cluster Inner Magnetospheric Campaign using the Chirikov Resonance Overlap Criteria. The results show that for the period under consideration this criteria is not fulfilled, implying that diffusion coefficients based on the use of quasi-linear theory may lead to incorrect results.