

Van Allen Probe multipoint measurements of the spatial and coherence scales of EMIC waves

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Electromagnetic ion cyclotron (EMIC) waves are able to resonate with MeV electrons and cause precipitation loss of radiation belt electrons. EMIC waves can provide a strong source of electron pitch angle diffusion, but the waves are often quite localized – thus the spatial extents of these waves can have a large effect on their overall scattering efficiency. Using measurements from the dual Van Allen Probes, we characterize the spatial and temporal extents of EMIC wave active regions and how these depend on local time, radial distance, and wave properties (e.g. amplitude, frequency). During individual events at close approaches, analysis of the detailed wave properties and coherence is performed. These investigations give insight into the nature of EMIC wave generation and wave-particle interactions and support more accurate quantification of their effects on the outer radiation belt.