

Recent Results From The Electric and Magnetic Field Instrument Suite and Integrated Science (EMFISIS) on the Van Allen Probes

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Abstract

The physics of the creation, loss, and transport of radiation belt particles is intimately connected to the electric and magnetic fields which mediate these processes. A large range of field and particle interactions are involved in this physics from large-scale ring current ion and magnetic field dynamics to microscopic kinetic interactions of whistler-mode chorus waves with energetic electrons. To measure these kinds of radiation belt interactions, NASA implemented the two-satellite Van Allen Probes mission. As part of the mission, the Electric and Magnetic Field Instrument Suite and Integrated Science (EMFISIS) investigation is an integrated set of instruments consisting of a tri-axial fluxgate magnetometer (MAG) and a Waves instrument which includes a tri-axial search coil magnetometer (MSC). These wave measurements include AC electric and magnetic fields from 10Hz to 400 kHz. We show examples of density determination and plasmopause identification as determined by the upper hybrid resonance, low frequency ULF pulsations, EMIC waves, and whistler mode waves including upper and lower band chorus. These data are compared with particle measurements to show relationships between wave activity and particle energization.