



Initial GOES-16 Observations of Electromagnetic Ion Cyclotron Waves

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The GOES-16 spacecraft, launched in November 2016, is the first of the GOES-R series next generation NOAA weather satellites. The spacecraft has a similar suite of space weather instruments to previous GOES satellites. However, the MAG (magnetometers) sampling rate has improved to 10 Hz, which practically covers the full frequency range of electromagnetic ion cyclotron (EMIC) waves observable at geosynchronous orbit. Furthermore, the detection range of the GOES-16 particle suite called SEISS has improved compared to previous GOES satellites with SEISS able to observe the full range of keV EMIC wave-ion interaction energies. In addition, SEISS observes the radiation belt MeV electrons that can be scattered by EMIC waves. Hence, GOES-16 is well suited to observe EMIC wave spectral and wave-particle dynamics at GEO orbit. Here we present initial GOES-16 observations of EMIC waves and also discuss wave-particle dynamics using both MAG and SEISS data. Event case studies are presented including wave spectral properties, minimum interactions energies for wave growth/scattering due to keV ions and also minimum interactions energies for wave scattering due to MeV electrons. Energetic ion pitch-angles are presented and we discuss whether the distributions during events matches expected distributions for wave-particle interaction. We also present MeV electron fluxes during the EMIC wave events and discuss any losses that may be attributed to EMIC wave scattering of the MeV electrons.