Mary
Hudson
Dartmouth/NCAR
Scot R. Elkington,Laboratory for Atmospheric and Space Physics, University of Colorado
Zhao Li, Physics and Astronomy Dept. Dartmouth College, Hanover NH
Maulik Patel, NCAR High Altitude Observatory
Kevin Pham, NCAR High Altitude Observatory
Alex Boyd, Space Sciences Department, The Aerospace Corporation, Chantilly VA
Allison Jaynes, Department of Physics & Astronomy, University of Iowa, Iowa City IA
Oral
As part of the Whole Heliosphere and Planetary Interactions (WHPI) initiative, contrasting drivers of radiation belt electron response at solar minimum have been investigated with MHD-test particle simulations for the 13 –14 May 2019 CME-shock event and the 30 August – 3 September 2019 high speed solar wind interval. Both solar wind drivers produced moderate geomagnetic storms characterized by a minimum Dst = - 65 nT and - 52 nT, respectively, with the August - September event accompanied by prolonged substorm activity. The latter event, with characteristic features of a CIR-driven storm, produced the hardest relativistic electron spectrum observed by Van Allen Probes during the last two years of the mission, which ended in October 2019. MHD simulations were performed using both the Lyon-Fedder-Mobarry global MHD code and recently developed GAMERA model coupled to the Rice Convection Model, run with measured L1 solar wind input for both events studied, and coupled with test particle simulations, including both an initial trapped and injected population. Initial electron phase space density (PSD) profiles used measurements from the Relativistic Electron Proton Telescope (REPT) and MagEIS energetic particle instruments on Van Allen Probes for test particle weighting and updating of the injected population at apogee. Results were compared directly with measurements and found to reproduce magnetopause loss for the CME-shock event and increased PSD for the CIR event. The two classes of events, CIR-driven characteristic of solar minimum and CME-shock driven less common at solar minimum, are contrasted for their impact on outer zone relativistic electrons near the end of Solar Cycle 24.
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