Athanasios
Boudouridis
CU Boulder/NOAA
Juan Rodriguez, CU Boulder/NOAA
Brian Kress, CU Boulder/NOAA
Trevor Leonard, CU Boulder/NOAA
Poster
The Space Environment In-Situ Suite (SEISS) on NOAA's GOES-16/-17/-18 satellites includes the Magnetospheric Particle Sensor – High Energy (MPS-HI), an instrument designed for measuring radiation belt electrons and protons that have energies responsible for charging of internal spacecraft elements that can lead to disruptive or damaging electrostatic discharges. The four high energy electron channels, two differential channels with effective energies ~1970 keV (E9) and ~2900 keV (E10), and two integral channels with threshold energies ?2000 keV (E11) and ?4100 keV (E10A), require background removal due to penetrating high energy protons. This is conducted in real-time for the operational Level 1b (L1b) product. The operational L1b product for channel E11 is used for real time alerts of an enhanced radiation environment by the Space Weather Prediction Center (SWPC). The background removal is essential for accurate flux specification of the high energy electron channels. The first step in this process is the assumption that the high energy protons responsible for the elevated electron backgrounds are due to Galactic Cosmic Rays (GCRs). We use high energy GCR proton fluxes from the Solar and Galactic Proton Sensor (SGPS) instrument (also onboard the GOES satellites), to estimate the level of contamination of the MPS-HI E9-E11 channels. We show 7 years of MPS-HI E11 electron fluxes and SGPS P11 (>500 MeV) proton fluxes from the GOES-16 spacecraft (2017-2023), in order to evaluate the connection between the GCRs and the E11 backgrounds. We calculate the E11 background fluxes by modeling the peak of the electron distribution and the counts below the peak (the background counts) with a Gaussian distribution. We do the same for the SGPS P11 counts, and use the means of the two distributions to estimate the "background removal coefficients" that are used in real time to remove the GCR background counts from the MPS-HI E9-E11 electron channels. We perform this process periodically, every a few months, for the entire GOES-16 mission, to assess the stability of the resulting "background removal coefficients" over time, and thus evaluate the validity of our methodology in which the E9-E11 backgrounds, assumed to be due to the GCR fluxes, are accurately captured by the SGPS P11 (>500 MeV) fluxes.

Poster category:

Poster category
Geospace/Magnetosphere Research and Applications
Poster session day
Thursday, April 18, 2024
Poster location
6
Meeting homepage
Space Weather Workshop 2024
Download to PDF