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Poster
The Space Environment In-Situ Suite (SEISS) on GOES 16-19 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 2.0 MeV (E9) and 2.9 MeV (E10), and two integral channels with threshold energies ?2.0 MeV (E11, used by SWPC for its real-time alerts) and ?4.1 MeV (E10A), require background removal due to penetrating high energy protons. 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 examine nearly 8 years of MPS-HI E9-E11 electron fluxes and SGPS P9 (150-275 MeV), P10 (275-500 MeV) and P11 (>500 MeV) proton fluxes from GOES-16 (2017-2024). We calculate the electron channel backgrounds by modeling the peak of the electron distribution and the background counts below the peak as a Gaussian distribution. We do the same for the SGPS P9-P11 counts, and use the means of the distributions to estimate the “background removal coefficients” used in real time to remove the GCR background counts from the electron channels. We perform this process periodically, every few months, 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 P9-P11 fluxes.

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