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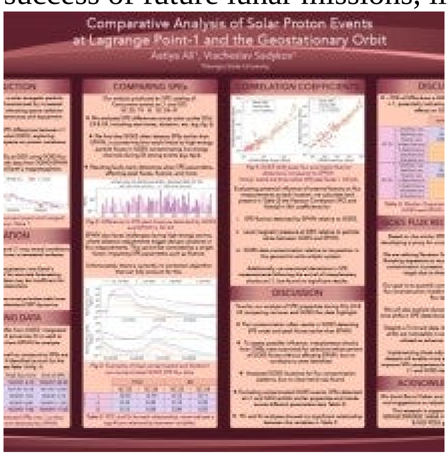
Solar energetic particles (SEPs) travel through the heliosphere and interact with Earth's environment, posing risks to astronaut health and satellite operations. Solar proton events (SPEs), a SEP subclass, consist of protons with energies ?10 MeVs exceeding 10 particle flux units. Accurate prediction of these events is essential to mitigate space weather impacts. Building on previous analyses of SPE flux data from the NOAA GOES series at geostationary orbit, this study compares event properties with those detected by SOHO-EPHIN at L1— beyond Earth's magnetosphere and representative of cislunar space. During Solar Cycles 23 and 24, we find that GOES often registers earlier event onsets, peak fluxes, and end times, primarily due to contamination from high-energy particles, whereas EPHIN typically records higher fluxes and longer durations. Despite these discrepancies, peak flux and fluence measurements between the instruments show a strong correlation, particularly during intense events. Further, environmental factors such as local magnetic pressure and interplanetary shock arrivals show minimal influence on flux discrepancies. However, GOES contamination affects 25 /115 concurrent SPEs, making event analysis less reliable. We are currently refining data correction techniques to address this and compare events more accurately. Our findings shed light on the complexities of SEP dynamics across space environments and highlight the need to account for location- and instrument-specific discrepancies in SPE detections. These insights are beneficial for advancing SPE forecasting models and ensuring the safety and success of future lunar missions, like Artemis, and other operations in near-Earth and cislunar regions.


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