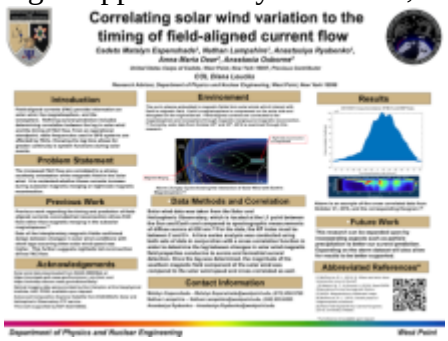
Matalyn
Espenshade
United States Military Academy
Nathan Lampshire- United States Military Academy
Anastasiya Ryabenko- United States Military Academy
Poster
The current state of research into field-aligned currents is primarily concerned with the causation of the increase in field-aligned current flows. Field-aligned currents, also known as Birkeland currents, flow along geomagnetic field lines and increase strength in response to changes in the interplanetary magnetic field (IMF). Researchers debate whether field-aligned currents are caused by magnetic merging or the convection of plasma in the magnetosphere following night-side reconnection. Currents are categorized by region: Region 1 at the magnetopause where currents are driven by charge separation, and Region 2 where currents are connected to the equatorial ring and originate from charge separation. Region 2 currents dominate in auroral electrojets that connect to the magnetosphere, drift eastward, and cause the diffuse aurora. Current systems are interconnected, and recent analysis focuses on the lag between solar wind conditions for the aurora and detection of the aurora. Both are used to determine whether reconnection is responsible for field-aligned current flow. The end state of this project is to determine the timing of either Region 1 or Region 2 currents with diffuse aurora. Initial analysis of non-geomagnetically active times with southward IMF polarity and the presence of diffuse aurora reveals a lag of approximately two hours, indicating Region 2 currents are responsible.



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