Jacob
Gruesbeck
NASA/Goddard Space Flight Center
Jared Espley, NASA/Goddard Space Flight Center
Oral
Since MAVEN's arrival at Mars in 2014, in-situ observations of the magnetic field have been made continually. During this time, the Martian magnetosphere has been disturbed by various solar transient events, such as stream interaction regions and interplanetary coronal mass ejections. A generalized magnetospheric index (MDI) has been developed to aid in the statistical study of large sets of disturbance events investigating the efficacy of solar transient events' ability to perturb the Martian magnetosphere. Computation of MDI requires identification of the magnetosheath about the planet. Manual identification of the magnetosheath over an entire mission's dataset can be prohibitively labor intensive, therefore we have begun development of an artificial neural network (ANN) to aid in the application of MDI over large sets of observations. Our ANN consists of two hidden layers to perform the identification: one Long Short-Term Memory layer to determine patterns in the time series data and one layer to determine if these patterns are expected in the magnetosheath. Spacecraft position, magnetic field observations and electron observations are used as inputs to our ANN. While enabling the extension of MDI calculation to large mission datasets, the development of the ANN will be useful to many other studies requiring knowledge of the plasma regime that the spacecraft is in.
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