Continuous Magnetic Reconnection at the Earth's Magnetopause

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Magnetic reconnection is a fundamental process that occurs in many regions of space. At the Earth's magnetosphere, the solar wind's interplanetary magnetic field (IMF) reconnects with Earth's magnetic field. This reconnection forms open field lines and allows for mass and energy exchange between the solar wind and the magnetosphere. Previous research of magnetic reconnection has led to the development of a model, the Maximum Magnetic Shear Model, which has a high degree of accuracy for modeling the reconnection line. However, under two conditions with a southward IMF, smooth single dispersion events and local noon events, the events are not represented by the model. Our research aims to understand more thoroughly the behavior of the reconnection line for these types of events. By analyzing these events, we hope to improve the reconnection line model. The data for our research is provided by the TIMAS instrument which was operated on NASA's Polar mission. TIMAS observed ion dispersions in the cusp, which allows us to study the ions from reconnection sites. We use the low-velocity cutoff method to fit the data to a field line model. We then apply our results to improve the existing model for these events. It is too soon in the analysis to make definite conclusions, but correlations can still be found within the data. With further analysis we plan to incorporate our results into the model, in order to increase its prediction efficiency in locating the dayside reconnection line.