Title: Magnetic Reconnection at Earth's Magnetopause

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Abstract: Reconnection at the Earth's magnetopause is the mechanism by which magnetic fields in different regions change topology to create open magnetic field lines. This allows energy, mass and momentum to flow from the solar wind into the Earth's magnetosphere, breaking the magnetic shield that is protecting Earth from the Sun's particle radiation.

Dr. Karlheinz Trattner has developed a model, known as the Maximum Magnetic Shear Model, that predicts where along the magnetopause this process occurs. The model is able to predict the location of reconnection correctly for 80% of the time. Studies have revealed that it fails however for a very specific parameter range during the equinoxes. This study investigated this parameter range, focusing on reconnection events occurring when the incident interplanetary magnetic field (IMF) has a clock angle alignment to Earth's dipole ranging from 200^0 to 260^0.

Data provided by the TIMAS instrument operated on the NASA Polar mission was analyzed using a low-velocity cutoff methodology to determine the location of the reconnection sites. The locations were compared to that predicted by the model. 58 events occurring within the clock angle range of 200°-260° were analyzed. 32.8% were on target with the model's prediction while the remainder of the events were not. The events were predominately above the predicted line in March, below the predicted line after April, and April's statistics were evenly distributed between above, below, and on target. This study has concluded that April is likely the turning point for this change in location of the x-line.