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Effects of Solar Wind Density on Geo-effectiveness of Storms¹ ELIZABETH MITCHELL, RAMON LOPEZ, UT Arlington — Geomagnetic storms are produced by solar wind disturbances causing large currents to flow throughout the magnetosphere. One current system observed to form during geomagnetic storms is the Ring Current. The rate of ring current injection is used to measure the geo-effectiveness of the solar wind electric field. Examining the relationship between the solar wind electric field and the ring current injection rate, we have found a dependence on the Alfvén Mach number during periods when the solar wind electric field has a non-linear relationship with the transpolar cap potential. During these periods, known as saturation, an increase in the Alfvén Mach number relates to a greater ring current injection rate for the same amount of solar wind electric field. Since the Alfvén Mach number depends on the solar wind density, this effect indicates that the geo-effectiveness of the solar wind electric field depends on the solar wind density as well as its electric field when the transpolar cap potential is saturated.

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