Title: Dst Profile Investigation with Gamma Distribution and Diffusion-Like Distribution

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Positive storms, also known as storm enhanced density (SED), have a wide range of characteristics that are not well understood, thus several mechanisms have been postulated to explain their existence. Detailed characteristics of long-lasting (i.e., more than 6-hours) SED events, such as solar wind structures, energy dissipation, physical and electrodynamic processes have rarely been investigated comprehensively. In this study, we focus on the Disturbance Storm Time (Dst) profile of long-lasting storms, which usually dips in a geomagnetic storm. The Dst profile was investigated with a phenomenological approach using the Gamma distribution, proportional to 1/(x^(k-1)) multiplied by exp(- theta*x). The energy dissipation was also modeled as a diffusion-like process where a 1-D diffusion profile would be equivalent to a Gamma distribution of k = 0.5. A 3-D diffusion profile of 1/(x^1.5) multiplied by exp(- theta*x) was also used in our investigation. Our 15-storm data analysis showed that the diffusion-like profile would offer a better fit as compared to the Gamma distribution, suggesting a diffusion-like process in the energy dissipation in the Ring Current.

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