# MODELING THE SELF-ORGANIZED CRITICAL BEHAVIOR OF EARTHS PLASMA SHEET RECONNECTION DYNAMICS

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Analyses of Polar UVI auroral image data (Uritsky et al. JGR, 2002; GRL, 2003, 2006) show that bright night-side high-latitude UV emissions exhibit so many of the key properties of systems in self-organized criticality that an alternate interpretation has become virtually impossible. It is now necessary to find and model the source of this behavior. We note that the most common models of self-organized criticality are numerical sandpiles. These are, at root, models that govern the transport of some quantity from a region where it is loaded to another where it is unloaded. Transport is enabled by the excitation of a local threshold instability; it is intermittent and bursty, and it exhibits a number of scale-free statistical properties. Searching for a system in the magnetosphere that is analogous and that, in addition, is known to produce auroral signatures, we focus on the reconnection dynamics of the plasma sheet. In our previous work, a driven reconnection model has been constructed and has been under study (Klimas et al. JGR, 2004; GRL 2005). The transport of electromagnetic (primarily magnetic) energy carried by the Poynting flux into the reconnection region of the model has been examined. All of the analysis techniques, and more, that have been applied to the auroral image data have also been applied to this Poynting flux. Here, we report new results showing that this model also exhibits so many of the key properties of systems in self-organized criticality that an alternate interpretation is implausible. Further, we find a strong correlation between these key properties of the model and those of the auroral UV emissions. We suggest that, in general, the driven reconnection model is an important step toward a realistic plasma physical model of self-organized criticality and we conclude, more specifically, that it is also a step in the right direction toward modeling the multiscale reconnection dynamics of the magnetotail.