

## OPENGGCM SIMULATIONS OF SUBSTORMS OBSERVED BY THEMIS

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THEMIS has now completed two tail seasons and thus has collected data on a substantial number of substorm events. In addition, THEMIS also observed substorms during the commissioning phase in February and March of 2007. Outstanding among these events were the March 23, 2007 "first light" substorm, and the February 26, 2008 event that was recently analyzed in a Science article. In this presentation we augment the data analysis with OpenGGCM global magnetosphere simulations. We show that the simulations reproduce the salient features of these substorms such as the westward traveling surge and dipolarization of the tail magnetic field. We conclude that the simulations are generally consistent with the Near-Earth Neutral Line substorm model; however, OpenGGCM simulations suggest that tail reconnection is much more fragmented and does not occur at a single x-line. Furthermore, we find in the simulations a breakdown of magnetic tension – pressure gradient force balance that precedes the onset of reconnection. This process possibly primes the tail current for reconnection by inducing a rapid thinning. The relationship of this process to substorm expansion phase onset will be discussed.

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