Abstract Submitted
for the DPP14 Meeting of
The American Physical Society

Investigation of Storm-Time Magnetotail and Ion Injection Using 3-D Global Hybrid Simulation YU LIN, XUEYI WANG, Auburn Univ, Auburn, AL, USA, SAN LU, USTC, China, JOE PEREZ, Auburn Univ, Auburn, AL, USA, QUANMING LU, USTC, China — Dynamics of the near-Earth magnetotail associated with substorms during a period of extended southward IMF is studied using a 3-D global hybrid simulation model that includes both the dayside and night side magnetosphere. Dayside reconnection leads to the penetration of the dawn-dusk electric field and thus a thinning of the plasma sheet, followed by the magnetotail reconnection with 3-D flux ropes. Hall electric fields in the thin current layer cause a systematic dawnward ion drift motion and thus a dawn-dusk asymmetry of the plasma sheet with a higher (lower) density on the dawn (dusk) side. Correspondingly, more reconnection and more earthward ion injections occur on the dusk side than the dawn side. Such finding is consistent with recent satellite observations. Ion particle distributions reveal multiple populations/beams. Oscillation of the dipolarization front is developed at the fast flow braking. Kinetic compressional wave turbulence is present around the dipolarization front. A shear-flow instability is found on the dusk side flank of the ring current plasma, whereas a kinetic ballooning instability appears on the dawn side. Shear Alfvén waves and compressional wave are generated, and they evolve into kinetic Alfvén waves (KAWs) in the dipole-like field region.

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Date submitted: 10 Jul 2014 Electronic form version 1.4