



Plasma Sheet Dynamics Imposed by Bursty Bulk Flows

E.V. Panov and the Themis BBF 20080317 Team

Space Research Institute, Austrian Academy of Sciences, Graz, Austria (evgeny_panov@mail.ru)

On 17 March 2008 around 9:12 UT the five Themis spacecraft were located in the plasma sheet no more than 1 hour MLT apart and covered radial distances from 15 Re (THB) to about 10 Re (THA). We found that all the spacecraft consecutively observed a bursty bulk flow traveling first earthward, slowing down between THB and THA from 400 km/s to 50 km/s, and then changing toward the opposite direction. We found that the most tailward located spacecraft, THB and THC, detected thinning and then thickening of the plasma sheet around the time of the flow direction change. The plasma sheet thinning propagated from THB to THC at about the Alfvén velocity in the plasma sheet boundary layer. Both spacecraft showed signatures of crossing the reconnection separatrix. On the other hand, we found that the THA, THD and THE spacecraft, which were located in a more dipolar region, indicated first plasma sheet thickening and then thinning. The five spacecraft observations can well be explained as the observation of the reconnected magnetic flux, which first moved toward a more dipolar field region close to the Earth, and then bounced tailward. Finally, we discuss the Pi2 pulsations observed by ground based magnetometers during these space observations, and also the non-adiabatic heating of particles inside the plasma sheet found after the sheet's thinning-thickening motion.