



THEMIS observations of the shock interaction with the magnetosphere

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Using THEMIS data we investigate the interaction of the solar wind dynamic pressure pulse with the magnetosphere. Vortices generated by the compression passing along the magnetopause are found and is compared with Sibeck [1990]'s predictions. Several events are found with ULF waves that are excited in the nightside plasma sheet after interplanetary shocks/dynamic pressure enhancements compress the magnetotail. The related ionospheric responses are also investigated. Earthward flow enhancements near the center ($y=0$) of the tail plasma sheet was also found, some of which cannot be simply explained by the enhanced reconnection. Global MHD simulations reproduced most features of the observations. Based on the observations and simulations, we proposed that the ULF can be generated by the vortex or maybe they at least are related closely to each other.