

Abstract Submitted  
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**A Case Study of Bow Shock Current Closure** PAULINE DREDGER, FATEME BAGHERI, RAMON LOPEZ, University of Texas at Arlington — As solar wind propagates away from the sun, it encounters Earth's magnetic field and slows rapidly to subsonic speeds, creating a bow shock. The compression of solar wind flow and interplanetary magnetic field (IMF) across the bow shock produces a current flowing along the shock. This current must close in part through the magnetospheric current system, either through Chapman-Ferraro current on the magnetopause, the boundary between the solar wind and Earth's magnetic field, or through Birkeland currents flowing on open field lines, depositing energy directly into the ionosphere. We present a case study demonstrating bow shock current closure through the ionosphere, the region of plasma within Earth's magnetic field. On August 2, 2016, IMF  $B_x$  was small,  $B_y$  was large and positive,  $B_z$  was strongly southward, and the magnetosonic Mach number was around three or less. AMPERE data show Birkeland currents in regions that appear to be open field lines with the current polarity consistent with closure of bow shock current. THEMIS spacecraft crossed both the bow shock and the magnetopause during this event, allowing a direct estimate of the current densities at those structures. The observed currents match the expected closure of bow shock current under the given solar wind conditions.

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