



The Ionospheric current response to an abrupt southward turning of the IMF

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In this large statistical study we answer the fundamental question: How does the ionospheric current system respond to abrupt changes in the solar wind driving? For the solar wind driver we use ACE data propagated to the front of the magnetosphere and for the ionospheric response we use SuperMAG SMU/SML indices (equivalent to AU/AL). To answer the science objective we have identified over 1000 events from the years 1998-2009. The events were selected as: 45 minutes continuous positive IMF Bz followed by 45 minutes continuous negative IMF Bz. Following the southward turning we identify two times: 1) the time before any response is seen in SMU/SML (response time), and 2) the time before the SMU/SML has found a new steady level (reconfiguration time). We find a surprisingly large spread in the response and reconfiguration times, and we attribute this to other controlling parameters. For example solar zenith angle, By and Bz strength, in addition to density, pressure and speed of the solar wind. Finally, non uniform ground station distribution also plays a role. We find a wide distribution with a maximum at 10 min and 30 min for response and reconfiguration times respectively.