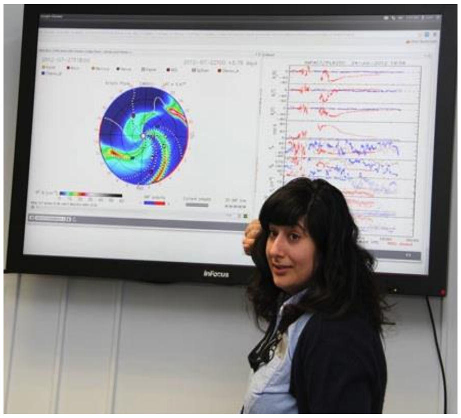
Metcalf Travel Award for M. Leila Mays, Research Scientist
LWS/SDO Science Workshop, March 3-8, 2013



Leila Mays is a research scientist at the Space Weather Laboratory in the Heliophysics Science Division at NASA Goddard Space Flight Center through CUA. She studies space weather events including CME kinematics and propagation, solar wind-magnetosphere coupling, and geomagnetic storms and substorms. She began at GSFC in August 2009 as a NASA Postdoctoral Program (NPP) Fellow working with Dr. Chris St. Cyr and Dr. David Sibeck. In 2004 she received a B.S. with high honors in physics and astronomy from the University of Maryland College Park. Leila graduated with a PhD in physics at the University of Texas at Austin with supervisor Professor Wendell Horton in August 2009.

Invited Talk: Tracking Solar Wind Input from the Sun to the Magnetosphere: 2007-2012
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Space weather is the science of how the Sun affects us on Earth, in the near space environment, and the space environment around other planets and spacecraft. The Sun and the solar magnetic field is the originator of space weather activity. Stream interaction regions (SIRs) form when fast solar wind streams overtake slower streamer belt streams. Coronal mass ejections (CMEs) are eruptions of plasma from the Sun which shoot out into space and some of them can affect us at Earth. They can interact with Earth's magnetic field to produce geomagnetic storms and sub-storms.

A statistical study of stream interaction regions and coronal mass ejection (CME events during solar minimum which result in storm and substorm activity has shown that combined CME and SIR events can be more geoeffective. Events are selected based on geomagnetic activity which is characterized by indices derived from ground based magnetometers and a minimum geomagnetic index threshold. For each geoeffective event, we identified CMEs in the STEREO/SECCHI coronagraphs, and SIRs in the STEREO/SECCHI Heliospheric Imagers and associated lower coronal signatures in STEREO/EUVI and SDO/AIA. Subsequent CME and/or SIR signatures were identified in ACE, WIND, THEMIS, and other in-situ data when available. CME evolution in the lower corona and properties such as acceleration, speed and width were determined along with the in-situ plasma data for interplanetary coronal mass ejections (ICMEs). The propagation of these structures were tracked in the STEREO Heliospheric Imagers and subsequently in-situ. Geoeffectiveness, the strength and duration of geomagnetic activity, is compared with upstream solar wind conditions.

In 2007 and 2008, SIRs produce most of the storms however the strongest storms are produced by combined ICME and SIR interactions in 2007 and SIRs in 2008. The number of SIR driven storms drops to just below half in 2009, and the remaining storms result from an ICME followed by an SIR and ICMEs. In 2011, half of the strongest storms are driven by ICMEs, one-third are hybrid events, and SIR driven storms fell to ten percent. For 2012, almost all of the strongest storms are driven by ICMEs: just over half of the storms are driven by ICMEs only, eighteen percent are from combined events, and SIR driven comprise a small fraction.