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RECENT ICME ANALYSIS USING SOLAR MASS EJECTION IMAGER DATA

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The Air Force/NASA Solar Mass Ejection Imager (SMEI) placed in orbit on 6 January 2003 records whole-sky images over each 102-minute orbit. Once a large background from zodiacal light, starlight, and aurora is removed, these precise photometric images allow a nearly continuous measurement of the electron Thomson-scattering density component of the inner heliosphere. A tomographic technique then yields a 3-D analysis of this brightness allowing the measurement of the solar wind bulk density. We have refined our tomography program to analyze both corotating heliospheric structures and more time-dependent phenomena such as Interplanetary Coronal Mass Ejections (ICMEs). A portion of these observations and data access to the volumetric-analysis results are available on the UCSD Website at <http://smei.ucsd.edu>, and also at the Community Coordinated Modeling Center (CCMC) at the NASA Goddard Spaceflight Center. Here we highlight a study of two recent events that were measured by this instrumentation. The first event arrived at the STEREO-B spacecraft late in 20 January, 2010. A flux rope present at STEREO-B has an associated increase in density at its center that is reproduced well by the SMEI analysis, which in turn allows its orientation to be determined. The second event began to arrive at Earth on 3 August 2010: here the SMEI analyses map various portions of this complex ICME structure produced by multiple CME eruptions from the solar surface a few days earlier.

Keywords: Coronal Mass Ejections (CMEs), Interplanetary CMEs, Magnetic Flux Ropes, The Solar Mass Ejection Imager - SMEI, Space Weather, Solar Wind