



Tracking and validating ICMEs propagating towards Mars using STEREO Heliospheric Imagers combined with Forbush decreases detected by MSL/RAD

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The enhancement of magnetic fields related to ICMEs and their shock fronts cause the so-called Forbush decrease, which can be detected as a reduction of galactic cosmic ray intensity (GCR) measured on-ground or on a spacecraft. Forbush decreases observed by the Radiation Assessment Detector (RAD) instrument onboard Mars Science Laboratory (MSL) on the surface of Mars as well as during its flight to Mars in 2011-2012 can be combined with observations at Earth and the two STEREO spacecraft to study the propagation of ICMEs up to Earth orbit and beyond to Mars.

Our previous work (Freiherr von Forstner et al. 2017, JGR: Space Physics) considered the case where Earth (or STEREO A or B) and Mars were nearly forming a straight line with the Sun so that ICMEs can be observed in situ at both locations. We now also study periods where one or both of the STEREO spacecraft are positioned suitably to remotely track ICMEs directed towards Mars continuously with their coronagraph and heliospheric imaging instruments and compare the arrival signatures with the in situ detection of the Forbush decrease by MSL/RAD. By studying additional events in periods with this constellation, we enhance our investigation of the evolution of ICME propagation speeds through the inner heliosphere up to Mars.