



Automated classification of solar wind disturbances

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Geomagnetic storms are known to be caused by solar wind disturbances associated with the passage of either interplanetary coronal mass ejections (ICMEs) or stream interaction regions (SIRs) associated with high-speed streams from coronal holes. We present and assess a new method for automated detection and subsequent classification of solar wind disturbances arriving at L1.

The method requires solar wind in situ plasma and magnetic field observations, currently provided in near real-time by NOAA/NASA from the ACE SWEPAM and MAG instruments. Periods of significantly enhanced magnetic field are identified and classified according to their most likely cause, being either ICMEs or high speed streams creating stream interaction regions SIRs. In the output the disturbed intervals are thus classified either as "ICME"-related, "SIR"-related or "NO ID".

We compare the results statistically with existing lists of ICMEs and SIRs derived manually, and assess the usefulness of the service for providing early warnings of upcoming geomagnetic storms.