



ID de Contribution: 30

Type: Oral presentation

20 years of ACE data: how superposed epoch analyses reveal generic features in interplanetary CME profile

jeudi 27 février 2020 13:30 (15 minutes)

Interplanetary Coronal Mass Ejections (ICMEs) result from solar eruptions occurring in our star's atmosphere. These large-scale magnetised structures propagate in the interplanetary medium where they can be probed by spacecraft. Depending on their speed, ICMEs may accumulate enough solar wind plasma to form a turbulent sheath ahead of them. They therefore consist of two main substructures, a sheath and a magnetic ejecta (ME), with the magnetic ejecta being the main body of an ICME where the magnetic field intensity is larger, and its variance smaller, than that of the ambient solar wind. We present a statistical study using the superposed epoch analysis technique, of 400 ICME parameter profiles (the magnetic field intensity, the speed, temperature, ...) seen at 1 AU by the ACE spacecraft. This study allow us to build the typical profile of ICME close to the earth. These profiles can then be compared to the future results of the simulation of an ICME propagation into the interplanetary medium from the Sun to the earth thanks to a 3D MHD code.

Field

Stellar physics (including solar physics)

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Classification de Session: Talk

Classification de thématique: Astrophysics