

# Different responses in the Galactic Cosmic Rays flux produced by ICMEs and SIRs

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**Abstract:** Interplanetary Coronal Mass Ejections (ICMEs) arise from instabilities in the solar corona producing ejection of magnetized mass toward the interplanetary medium. Their most common sub-structures are an interplanetary shock, a sheath, and a magnetic ejecta. Stream Interaction Regions (SIRs) consist of interplanetary plasma arising as a consequence of a process of interaction between fast solar wind stream, originated in the solar coronal holes, and slow solar wind stream, generally originated in the solar active regions.

It is well known that both, ICMEs and SIRs, are potential drivers of Forbush Decreases (FDs), which are abrupt decreases in the galactic cosmic rays (GCRs) flux observed on the Earth surface by different instruments like neutron monitors.

In this work, we study the consequences of ICMEs and SIRs on the GCR flux. We analyze all the ICMEs (457 events) that occurred during the period (1998-2016) according to the Regnault et al. (2020) catalog and all the SIRs (450 events) that occurred during the period (1995-2009) according to the Jian et al. (2006). We use data from MAG and SWEPAM instruments aboard the ACE spacecraft to study the interplanetary medium properties with time resolution of 16 and 64 seconds respectively. In the case of the analysis of the GCRs flux we use data from the McMurdo ( $R_c = 0,2$  GV) neutron monitor with time resolution of one minute. In the first part of the work, we make a statistical analysis of all the ICMEs/SIRs events. In the second part, we apply a Superposed Epoch Analysis to study typical structures for different categories of ICMEs/SIRs.

We conclude that FDs caused by ICMEs are more intense than those caused by SIRs, we also detected that ICMEs associated with interplanetary shocks produce greater decreases in the galactic cosmic rays.

**Acknowledgment:** We acknowledge support from the argentinean grants: PICT-2019-02754 (FONCyT-ANPCyT) and UBACyT-20020190100247BA (UBA).

**References:**

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**Session:** Solar Physics, heliosphere, cosmic rays

**Oral or Poster:** Oral