Geophysical Research Abstracts
Vol. 21, EGU2019-17038-1, 2019
EGU General Assembly 2019

Multipoint study of successive CMEs driving moderate disturbances at 1 AU

Erika Palmerio (1), Camilla Scolini (2,3), David Barnes (4), Jasmina Magdalenic (3), Matthew West (3), Andrei Zhukov (3,5), Luciano Rodriguez (3), Marilena Mierla (3,6), Simon Good (1), Diana Morosan (1), Emilia Kilpua (1), Jens Pomoell (1), and Stefaan Poedts (2)

(1) Department of Physics, University of Helsinki, P.O. Box 64, 00014 Helsinki, Finland, (2) Centre for mathematical Plasma Astrophysics (CmPA), KU Leuven, 3001 Leuven, Belgium, (3) Solar-Terrestrial Centre of Excellence – SIDC, Royal Observatory of Belgium, 1180 Brussels, Belgium, (4) STFC-RAL Space, Rutherford Appleton Laboratory, Harwell Campus, OX11 0QX, UK, (5) Skobeltsyn Institute of Nuclear Physics, Moscow State University, 119991 Moscow, Russia, (6) Institute of Geodynamics of the Romanian Academy, 020032 Bucharest-37, Romania

Coronal mass ejections (CMEs) are the major drivers of space weather effects at 1 AU. From a forecasting perspective, the most significant CMEs are those erupting from close to the disc centre (as seen from Earth or their target location) and fully encompassing the solar disc in coronagraph imagery. Such CMEs are known as front-sided full halos. However, geomagnetic activity can be driven also by CMEs erupting from closer to the solar limb and/or having a narrower width in coronagraph data. Multipoint analysis can give insights on the impact and geoeffectiveness of such CMEs.

In light of these aspects, we analyse the propagation of four successive coronal mass ejections (CMEs) that erupted in May 2013 and hit Earth, the STEREO-A spacecraft, or both. All the CMEs under study are "problematic" from a space weather forecasting perspective, since the first three CMEs erupted from the solar limb as seen from their corresponding target location, whilst the fourth one erupted from close to the disc centre, but was invisible to coronagraph images from Earth's viewpoint. Nevertheless, all the events drove moderate disturbances both at Earth and STEREO-A. We analyse the kinematics of the four CMEs using a combination of remote-sensing data from the solar disc, solar corona, and inner heliosphere. Moreover, we use input parameters from coronagraph reconstructions to forecast the arrival of the CMEs at 1 AU through the EUropean Heliospheric FORecasting Information Asset (EUHFORIA) model. Finally, we emphasise the difficulties in forecasting moderate space weather effects provoked by problematic and ambiguous events.