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A Statistical Study over the Nested CME Formations

Doga Can Su Ozturk (1) and Zerefsan Kaymaz (2)

(1) Faculty of Aeronautics and Astronautics, Istanbul Technical University, Istanbul, Turkey (ozturkdog@itu.edu.tr), (2) Faculty of Aeronautics and Astronautics, Istanbul Technical University, Istanbul, Turkey (zerefsan@itu.edu.tr)

Space Weather Forecasting have been greatly improved over the years as the number of spacecraft increases launched in space and the progressions in the Heliospheric modeling were recorded, however some challenges still remain when it comes to model the collective behavior of the various interacting Space Weather phenomena. The basic source of these problems stem from the fact the physical processes controlling the Space Weather phenomena on the Sun and their propagations in the interplanetary space are not very well understood owing to the complicated interactive structure. Coronal Mass Ejections (CME), occurring within the hot expanded corona, and which are the main drivers of Space Weather on the Near Earth Spacecraft Environment, are one of the most interesting and fascinating solar structures in terms of their formation and propagation mechanisms among other components of Space Weather. Despite significant developments and findings, the observations from SOHO-LASCO C2 /3 at Lagrangian Point-1 and STEREO-A/B at 1 AU distance from the Sun, continue to surprise the scientists. These observations indicate that there are still unresolved schemes on the geometry of the CMEs when being expelled out from the Sun due to their complicated formation and structure. As we approach the solar maximum, the CMEs tend to occur more frequently as a result of the increasing solar activity and more severe events can be observed. This study focuses on multiple CME formations detected in SOHO-LASCO C2-3 images in which CME bubbles occur within each other. The source region properties of the CMEs will be defined by using the Cone Model and Triangulation method based on the images gathered from coronagraphs based on SOHO and STEREO spacecraft. The statistics will be provided for latitude, longitude, cloud radius and velocity. The EIT and EUVI instruments on SOHO and STEREO will provide information about the active regions over the Sun. Our study aims to comprehend the physical environment in which nested CME formation tend to happen by focusing on the basic CME properties. We will present the results from our statistical work based on the nested CME observations in May 2012, their characteristics and categorization according to their source region characteristics.