



## **Large-scale Structures Caused by Interacting Coronal Mass Ejections: Their Formation and Detection as Revealed by MHD Simulations**

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The interaction of successive coronal mass ejections (CMEs) on their way to Earth (and other planets) has been a leading cause of large-scale and long-lived structures resulting in intense geo-magnetic storms during past solar cycles. Associated with the interaction, the merging of shock waves, which creates denser sheaths and the compression of the magnetic field in ejecta are expected to result in unusual responses of the magnetosphere. Here, we present results of magneto-hydrodynamic simulations of geo-effective events from the years 2000 and 2001 with the Space Weather Modeling Framework (SWMF). Our focus is on the propagation and interaction of successive CMEs from the Sun to the Earth and the understanding of the mechanisms which may result in larger and more geo-effective structures. We will also present simulations showing how the Heliospheric Imagers onboard STEREO will help predicting complex ejecta during solar cycle 24.