

Propagation of powerful CMEs occurred in early September 2017

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From September 4 to September 11 on 2017, a complex active region NOAA 12693 rapidly emerged and evolved occurring 52 major flares including 4 X-class flares. Associated with some of the major flares, 9 powerful CMEs occurred, three of which were front-side halo CMEs. The first halo CME were associated with M5.5 flare on September 4 and the second one were associated with X9.3 flare on September 6. These two CMEs interacted each other during their propagation to the Earth, and become a complex magnetic structure. The complex magnetic structure contained two strong southward magnetic field structure that may correspond to flux ropes of the two CMEs. The passage of the complex magnetic structure caused a two-peak magnetic storm started from 23UT September 7.

We investigated the propagation process of these CMEs using SUSANOO-CME, 3D MHD simulation of inner heliosphere (Shiota & Kataoka 2016). We chose 6 powerful CMEs including 3 halo CMEs and input these CMEs to the MHD simulation. We performed several cases of the MHD simulation changing the parameters of input CMEs and found that the shock of the second halo CME associated with the X9.3 flare compress and enhance the southward magnetic field in the ejecta of the first halo CME. The results also imply that the strong compression of the CME ejecta needed a strong shock propagating near the head-on direction and that the second CME experienced strong eastward deflection (toward to the Earth direction). We will present more detailed interaction processes these successive CMEs.

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