The relation between mixture CMEs and interplanetary disturbances:verification by the MHD simulation

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Coronal mass ejections (henceforth, CMEs) are the phenomena in which the solar corona blows off at the rate of 50-2000 km/s to the interplanetary space by the flare, the prominence eruption, etc. Since a shock wave and a high energy particle occur in the front, it is seriously taken also in the viewpoint of earth environment or a space weather prediction. However, since the observation data acquired is as fragmentary as near the earth or near the sun, most comparison and correspondences of the complicated structural change in CMEs and magnetic disturbances are not performed by the relevance or continuity between the solar and the earth. Moreover, as a result of two or more CMEs from which speed differs carrying out an interaction by the interplanetary space, it is reported that radio enhancements are observed in WIND satellite (Gopalswamy et al.2001). Thus, it is effective to compare the compounded magnetic disturbances of a unique CME and a unique interplanetary space as means which analyze both relevance more deeply.

In this research, the interplanetary magnetic disturbances by the phenomena and the data observed ACE in which two CMEs carried out the interaction generated on June 6, 2000 was compared. These CMEs contact near 20 solar radius, and the low speed CME is understood by high speed CME after that are observed by LASCO. On the other hand, the data of ACE corresponding to this showed that two or more structures with different density in one magnetic disturbances existed. Then, as for us, the collision of two or more CMEs near the sun verified how it would be observed by the interplanetary space using the 1.5-dimensional MHD simulation. Consequently, it turns out that the structure of the magnetic disturbance in the interplanetary obtained from the data of ACE is reproduced well by the model that two low speeds CME are understood by high speed CME (collision union is carried out).

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