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EXAMINATION OF THE INFLUENCE OF INTERNAL STRUCTURE OF CORONAL MASS EJECTIONS (CMES)

Abstract

The main purpose of this research is to determine the influence of internal structure of Coronal Mass Ejections (CMEs) on their propagation in the Heliosphere using the Wang-Sheeley-Arge (WSA)-ENLIL Cone Modeling. The Integrated Space Weather Analysis System (ISWA) and Stereo analysis tool were used to obtain several CME parameters. The ENLIL Cone Model was used to run 90 simulations for different cavity parameters of CME internal structures. The relationship between the cavity and CME propagation time and Kp index was studied for 15 CME events. As expected, when the velocity of CME is higher than the ambient solar wind speed, CME with smaller cavity (more heavy ones) propagates faster than the same size CME with larger cavity (lighter CMEs). Quite naturally the opposite behavior is observed when the velocity of CME is less than the solar ambient wind speed. For fast CME velocity the Kp index tends to decrease as the cavity increases while for slow CME velocity the Kp index remains constant. This research is very important for improving model capability to forecast space weather.