

[S06-5] **Coronal Waves Observed in Soft X-rays**

김연한, 문용재, 조경석, 박영득
한국천문연구원

Large scale disturbances originating from flares or coronal mass ejections (CMEs) can propagate through the corona, as demonstrated by global waves such as Moreton waves and EIT waves. Until now, only a few direct soft X-ray detections of such global coronal waves have been reported. In this study, we report on 8 coronal waves seen in Yohkoh/SXT images from all flare mode data from 1999 April to 2001 March : 5 waves from 279 limb flares and 3 waves from 159 disk flares. Major results are as follows. (1) Most of the X-ray waves (6/8) occurred during the rising time of the associated hard X-ray flare. (2) The speed of an X-ray wave ranges from 60 to 1500 km/s. (3) for 3 limb events, their wave speeds are comparable to those of X-ray plasma ejections. We are examining their detailed characteristics as well as the relationship with other phenomena, such as EIT waves, $H\alpha$ Moreton waves, and type II radio bursts.

[S06-6] **CME Earthward Direction as an Important Geoeffective Parameter**

김록순^{1,2}, 조경석², 문용재², 이유¹, 박영득², 김연한²
¹충남대학교, ²한국천문연구원

In the previous work, we had studied the forecast evaluation of geoeffective coronal mass ejections (CMEs) by using their speed and location parameters. Recently, it was suggested that the earthward direction of a CME is an important geoeffective parameter for fast halo CMEs. The earthward direction is defined as the ratio of the shorter axis and the longer axis on the extended line passing through solar center and the center of an ellipse characterized by the CME front. In this study, we have inspected the CME geoeffectiveness depending on the direction parameter and the CME speed. As a result, we found that (1) the direction parameter is more important for fast CMEs (≥ 800 km/s) than for slow CMEs (< 800 km/s); (2) all fast CMEs associated with strong geomagnetic storms ($Dst \leq -150$ nT) have large direction parameters (≥ 0.4); (3) the contingency table, which is made by a criterion determined by three parameters (speed, location, and direction), shows that the PODy, FAR and CSI are estimated to be 0.74, 0.39 and 0.50, respectively. For further work, we will consider other suggested parameters such as the field orientation of CME source regions and/or the orientation of ICME leading field.