

R010-23

Zoom meeting C : 11/4 PM1 (13:45-15:30)

13:45~14:00

Characteristics of dusk-side IHFAC polarity during storm and quiet times

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The Inter-Hemispheric Field-Aligned Current (IHFAC) is one of the major current systems causing changes in the geomagnetic field at low and middle latitudes. IHFACs flow from the summer hemisphere to the winter hemisphere in the dawn sector and from the winter hemisphere to the summer hemisphere in the noon and dusk sectors (Fukushima, 1994). The recent in-situ satellite and ground-based observations have reported the dusk-side current polarity of IHFACs are often inconsistent with the Fukushima's IHFACs model. We investigated whether the dusk-side IHFACs polarity is consistent or not with the current direction predicted by Fukushima's IHFACs model, by using long-term ground-based equatorial magnetometer data at Davao (Philippines) from 1998 to 2020. We found that there were seasonal dependences of the appearance of the dusk-side IHFAC of the Fukushima model type (the same IHFAC polarity between the noon and dusk sectors). The polarities of dawn-side and noontime IHFACs agreed with the Fukushima model irrespective of season: the IHFACs during solstices flow from the summer hemisphere to the winter hemisphere in the dawn sector and from the winter hemisphere to the summer hemisphere around the noon sector. The occurrence rate of the dusk-side IHFAC of the Fukushima model type was high around June and December solstices. In contrast, the dusk-side IHFACs, which are inconsistent with the Fukushima model type, dominated from the September to November months and occurred at slightly rates around the March equinox. The remarkable solar cycle dependence of IHFACs were exhibited in the dusk sector. Especially, large IHFACs flowed in the dusk sector during the declining phase of the solar cycle. It is also clear that the noontime and dusk-side IHFACs polarities reversed at the different intersection months. Seasonal variations of dD showed asymmetry in both dawn and noon sectors. In contrast, the seasonal dusk-side dD variations were symmetric. In this paper, we will demonstrate the polarity of IHFAC during storm time and quiet time.