[구SO-11] Multi-spacecraft Observations of Magnetic Clouds

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The solar wind observations by STEREO A and B, together with the ACE spacecraft provide an unprecedented opportunity toexamine structures of interplanetary magnetic clouds (MCs) in more detail. The purpose of this study is to get insight into MC structures, in particular, their spatial extent and deformation due to interactions with other solar wind structures by comparing the multi-spacecraft observations. For this purpose, we surveyed the STEREO and ACE data from January 2007 through Februray 2008. As a result, we found that each of the three spacecraft observed well-defined MCs during this period, when the separation of STEREO A (and B) from the Earth (or ACE) changed from 0 to 22 (-24). Interestingly, the probability for the same MCs to be observed by two spacecrafts is relatively low despite the small separation between them. This observational fact can be explained by the direction of MC axis obtained from model fittings. When the angle of MC axis from the ecliptic planeis large, it is reasonable that the MC is observed by only one spacecraft. This implies that we can obtain observational information about the spatial extent of MC only for those MCs with axes nearly parallel to the ecliptic plane. In spite of this possible limitation, we found one interesting case in which ACE observed a compound magnetic cloud consisting of two clouds, each of them being observed by STEREO A and B, respectively. This provide us with a data set by which we can examine cloud-cloud interactions with independent information about each element of the compound cloud.

[구SO-12] Analysis of wind vorticity and divergence in the high-latitude lower thermosphere: Dependence on the interplanetary magnetic field (IMF)

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To better understand the physical processes that control the high-latitude lower thermospheric dynamics, we analyze the divergence and vorticity of the high-latitude neutral wind field in the lower thermosphere during the southern summertime for different IMF conditions. For this study the National Center for Atmospheric Research Thermosphere-Ionosphere Electrodynamics General Circulation Model (NCAR-TIEGCM) is used. The analysis of the large-scale vorticity and divergence provides basic understanding flow configurations to help elucidate the momentum sources that ultimately determine the total wind field in the lower polar thermosphere and provides insight into the relative strengths of the different sources of momentum responsible for driving winds. The mean neutral wind pattern in the high-latitude lower thermosphere is dominated by rotational flow, imparted primarily through the ion drag force, rather than by divergent flow, imparted primarily through Joule and solar heating. The difference vorticity, obtained by subtracting values with zero IMF from those with non-zero IMF, in the high-latitude lower thermosphere is much larger than the difference divergence for all IMF conditions, indicating that a larger response of the thermospheric wind system to enhancement in the momentum input generating the rotational motion with elevated IMF than the corresponding energy input generating the divergent motion. the difference vorticity in the high-latitude lower thermosphere depends on the direction of the IMF. The difference vorticity for negative and positive By shows positive and negative, respectively, at higher magnetic latitudes than -70°. For negative Bz, the difference vorticities have positive in the dusk sector and negative in the dawn sector. The difference vorticities for positive Bz have opposite sign. Negative IMF Bz has a stronger effect on the vorticity than does positive Bz.