PEM27-03          Room:421                    Time:May 1 16:45-17:00

# Relationships among cosmic ray intensity, the photospheric magnetic field, and solar wind speed

HAKAMADA, Kazuyuki[1]* ; TOKUMARU, Munetoshi[2] ; FUJIKI, Ken'ichi[2] ; KOJIMA, Masayoshi[2]

[1]Chubu University, [2]Solar-Terrestrial Environment Laboratory

We visualize three-dimensional structure of the coronal magneic field by using the Radial-Field model for the coronal magnetic field devised by Hakamada with synoptic maps of photospheric magnetic field observed by the NSO/Kitt Peak, USA. As the rsults, we obtained the radial component of the photospheric magnetic field (Br_pho) and the one of the coronal magnetic field (Br_sou) on the source surface on the same field line in the coronal magnetic field. We estimate the solar wind speed (SWS) by using IPS technique divised by STE Lab, Nagoya Univiersity. According to our previous analysis on the Carrignton rotation bases, Log10|Br_pho|, Log10|Br_sou|show good correlations with the SWS for the data of [ -1.0 <= Log10|Br_pho|<= 1.5, (0.1 G <= |Br_pho|<= 31.6 G), -1.5 <= Log10|Br_sou|<= 0.0, (0.0316 G <= |Br_sou|<= 1.0 G) ]. In this study, we add the intensity of Oulu neutron monitor (NM), and study relations among rotation averages of these NM, SWS, and Log10|Br_pho|. We found good simple correrations coefficients between Log10|Br_pho|-NM (r=-0.773), and SWS-NM (r=0.703), as well as, a good multiple correlaion (r = 0.785) among them by using the regression equation in the form of NM = a + b *SWS + c *log10|Br_pho|with a = 6363, b = 1.186, and c = -1400.0. However, Log10|Br_pho|-SWS also shows good simple correlation (r=-0.802). We calculated partial correlation coefficients between (a) Log10|Br_pho|-NM, (b) SWS-NM, (c) Log10|Br_pho|-SWS and obtained (a) r=-0.294, (b) r=0.130, (c) r=-0.364. These results suggest that, althogh the cosmic ray intensities shown by NM is determined by the intensity of photospheric magnetic fields on the open field lines and the solar wind speed occupied by these field lines, the dpendence of magnetic field is stronger than the one of wind speed.

Keywords: cosmic ray intensity, photoshpheric magnetic field, solar wind speed