

Variability of High Energy particle Environment associated with Solar Activities

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It is thought that the longer-term variations of the solar activity may affect the Earth's climate. Therefore, predicting the next solar cycle is crucial for the forecast of the "solar-terrestrial environment". To build prediction schemes for the next solar cycle is a key for the long-term space weather study. Recently, the relationship between polar magnetic field at the solar minimum and next solar activity is intensively discussed. Because we can determine the polar magnetic field at the solar minimum roughly 3 years before the next solar maximum, we may discuss the next solar cycle 3 years before. Further, the longer term (~5 years) prediction might be achieved by estimating the polar magnetic field with the Surface Flux Transport (SFT) model. So far, we success to predict next solar cycle by using SFT model (see Iijima et al., 2017, for detail). Further, Flare/Coronal Mass Ejection (CME), solar wind prediction study has been also largely progressed (Kusano et al., 2012, Shiota et al. 2014, Iwai et al., 2019). We believe that it is good time to try to extend our models to predict future Flare/Coronal Mass Ejection (CME) and/or Solar Energetic Particles (SEP). In this talk we will introduce what we have achieved and what we will do in the future to understand the variability of high energy particle environment associated with solar activities.

Keywords: Sun, Space weather, High energy particle