Probabilistic space weather forecast of the relativistic electron flux enhancement at geosynchronous orbit

Ryuho Kataoka[1]; Yoshizumi Miyoshi[2]
[1] RIKEN; [2] STEL, Nagoya Univ.

http://hbksw1.stelab.nagoya-u.ac.jp/indexj.html

An operational technique is developed for a probabilistic space weather forecast of relativistic electrons at geosynchronous orbit, following a concept of a daily precipitation probabilistic weather forecast. In this paper, we use the arrival time of stream interfaces as a precursor of corotating interaction regions to make the probability diagram for flux enhancement of relativistic electrons at geosynchronous orbit, and the probability is defined by the number of events with daily maximum flux above the NOAA alert levels. The probability diagram associated with the stream interfaces is constructed to achieve an efficient probabilistic forecast, based on the two fundamental parameters of oncoming streams; whether the solar wind speed is higher than average (500 km/s) or not, and which sector polarities the interplanetary magnetic field belongs, according to so-called Spring Toward Fall Away (STFA) rule.

The original concept of the probabilistic forecast is published in Kataoka and Miyoshi (Space Weather, 2006) and Miyoshi and Kataoka (JASTP, 2007). The physical mechanism why and how the STFA rule controls the outer belt is reported in Miyoshi and Kataoka (JGR, 2007). Since May 2007, we have started a test operation of the probabilistic space weahter forecast servise on our Japanese website. In this presentation, we report how our forecast works and how effective it is, comparing to the former quantitative forecast services.