R010-03
Zoom meeting B ：11/3 AM2 (10:45-12:30)
11:15-11:30

Forecast of energetic electron flux variations at different L-shells using the machine learning

#SATOSHI FUKUOKA[1)], Yoshizumi Miyoshi[1)], Daikou Shiota[2)], Satoshi Kurita[3)], Inchun Park[4)], Tomoaki Hori[5)], Shun Imajo[1)], Takefumi Mitani[6)], Takeshi Takashima[7)], Iku Shinohara[8)], Ayako Matsuoka[9)]
[1)]ISEE, Nagoya Univ.,[2)]NICT,[3)]RISH, Kyoto Univ.,[4)]ISEE, Nagoya Univ.,[5)]ISEE, Nagoya Univ.,[6)]ISAS/JAXA,[7)]ISAS/JAXA,[8)]ISAS/JAXA,[9)]Kyoto University

The relativistic/sub-relativistic electron flux variations often cause serious damage on the satellite operations through the dielectric charging. In order to forecast flux variations of these electrons, various forecast methods based on the physical based simulation and empirical modeling have been developed. For the physics-based simulation, the SUSANOO that operates a code-coupling simulation of heliosphere and radiation belt provides MeV electron flux variations for the next couple of days. For the empirical modeling, the linear prediction filter and the auto-regressive moving average are popular methods, which have been used for the forecast of MeV electrons at geosynchronous Earth orbit (GEO). Recently, the machine learning techniques have widely been used for the space weather forecast, for example, ionospheric variations, the flare prediction, etc. In this study, we have developed the forecast system of relativistic/sub-relativistic electron flux variations based on long short-term memory recurrent neural network (LSTM-RNN). As the training data, we use the solar wind data and energetic electron data observed by Arase/HEP, XEP instruments at different L-shells of the outer belt. Our developed network provides time variations of the energetic electron flux around L=6 using the solar wind data as an input parameter. On the other hand, the network does not reproduce the observed flux variations at L=4, suggesting that other parameters are necessary as input parameters of the network. In this presentation, we will present the initial results of our developed network and discuss effective solar wind parameters to reproduce the observed flux variations at different L-shells.