

## Autoregressive model for time series prediction of the outer radiation belt electron flux variations observed by Van Allen Probes

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The outer radiation belt in the Earth's inner magnetosphere is consisted of relativistic energy electrons in MeV range. The electron flux is highly variable depending on both solar wind and magnetospheric conditions. Enhanced fluxes sometimes cause deep dielectric charging on spacecraft and in the worst case satellite anomaly will happen after discharge. Prediction of the electron flux is important for safety operation of the satellite in the near Earth's orbit, but the physical processes of relativistic electrons acceleration, loss, and transport are not fully understood, so far. Because first principal calculation is not available for prediction now, Japan space weather information center at NICT has developed a multivariate autoregressive (AR) model for the prediction of electron flux at geostationary orbit. The model is based on the statistical time series analysis method using Akaike Information Criterion (AIC), which can estimates future flux variations by a few days lagging response of solar wind parameter changes [Sakaguchi et al., 2013]. Recently, the Van Allen Probes have provided observation data throughout the radiation belts. We analyze the 2.3 MeV electron flux time series data obtained from Relativistic Electron Proton Telescope (REPT), which is sorted by L-star of 3, 4, and 5 in the outer radiation belt in a year of 2013. The AR analysis reveals the cross-correlation of fluxes between L-star, and their responses to solar wind parameters and geostationary flux. In the presentation, we show the AR analysis results and also validation results of 2.3 MeV electron flux prediction by using latest data in 2014.