畳み込みニューラルネットワークによる Arase/PWE の観測に基づいた自動電子密度推定

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Evaluation of Automatic Electron Density Determination by using a Convolutional Neural Network: Arase PWE measurement

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Electron number density is a key parameter for discussions of plasma wave generation/propagation, and wave-particle interaction in the inner magnetosphere. The High Frequency Analyzer (HFA) is a subsystem of Plasma Wave Experiment (PWE) aboard Arase. The HFA measures wide frequency range (0.1-10 MHz) electric power spectra with a time resolution of 8 or 60 s. This covers a typical frequency range of Upper Hybrid Resonance (UHR) frequency in the inner magnetosphere. We developed a technique for automatically determining UHR frequencies using a Convolutional Neural Network (CNN) to derive the electron density along the orbit of the Arase satellite. In this study, we evaluate the performance of electron density determination by using a CNN model from the point of view of science.