

東北大学における太陽電波観測とデータベース化の取組 Solar radio observation and the database project in Tohoku University

三澤 浩昭^{1*}, 岩井 一正¹, 土屋 史紀¹, 鍵谷 将人¹, 森岡 昭¹

Hiroaki Misawa^{1*}, Kazumasa Iwai¹, Fuminori Tsuchiya¹, Masato Kagitani¹, Akira Morioka¹

¹ 東北大学惑星プラズマ・大気研究センター

¹PPARC, Tohoku University

Planetary Plasma and Atmospheric Research Center of Tohoku University has started continuous observation of solar radio bursts. Non-thermal electrons accelerated in the solar corona emit radio waves in the meter wavelength range. Coronal radio emission phenomena are included in flares and coronal mass ejections, which have a large influence on planetary environments. In addition, coronal particle acceleration and radio emission mechanisms themselves have not been understood well. Therefore, the monitoring observation of solar radio bursts is important for both forecasting planetary environments and understanding solar plasma physics.

Iitate Planetary Radio Telescope (IPRT) is a ground based radio telescope of Tohoku University set at the Iitate observatory in Fukushima prefecture, Japan. A physical aperture of IPRT is 1023 square meter enabling high sensitivity observations. We have newly developed a radio observation system to observe solar radio bursts with high time and frequency resolutions. The developed system enables to observe solar radio bursts in the frequency range between 100 and 500MHz with the minimum detectable sensitivity of better than 0.7SFU under the integration time of 10 ms and the frequency bandwidth of 61KHz. This system also enables to observe left and right polarization components simultaneously. These specifications are suitable for observing metric solar radio bursts and the system is one of the world prominent equipments for solar radio bursts. We have started regular observations of the Sun since September 2009. Many solar radio burst events have been observed until now.

The observation data are disclosed as a part of the Inter-university Upper atmosphere Global Observation NETWORK (IUGONET) project. There are two formats in the providing database. One is low-resolution data consisted of standard FITS formatted 8 bits binary data files with 1 sec time resolution and 1 MHz frequency resolution. Users are able to download these data files from our web page. The other one is high-resolution data consisted of 8 or 16 bits binary data files with 10 ms time resolution and 61 kHz frequency resolution. These data files are too large to upload via network so users are asked to log in to the computers of Tohoku University for handling them. We also provide softwares to analyze and visualize the observation data. There are two types of analysis software written in IDL. One is based on TDAS (Themis Data Analysis Software suite) and the other one is based on SSW (SolarSoftWare). Thus, users are able to choose softwares they are more familiar with and start data analysis easily.

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