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Amateur data from Radio-Jove in the Virtual Observatory

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Abstract

The jovian radio emissions occurrence can be predicted in a statistical manner, but they are intrinsically sporadic. Enlarging the temporal coverage of the jovian radio emission is a key aspect of the understanding of this sporadicity. In addition to the temporal variability of the emission, a larger spatial and temporal coverage will provide informations on the temporal width of each sub-burst (radio arc), the short term variability of the arc shape... This will provide key information on the radio source properties, as well as on the radio source environment. This project also arrives at a time when the Planetary Science Virtual Observatory infrastructure is now existing (through SPASE or IVOA), so it is a good time to try to include this type of amateur community input.

1 Radio JOVE

The Radio JOVE project is a hands-on inquiry-based educational project that allows students, teachers and the general public to learn about radio astronomy by building their own radio telescope from an inexpensive kit and/or using remote radio telescopes through the internet. Participants also collaborate with each other through interactions and sharing of data on the network.

The Radio JOVE project began in 1998 by the NASA-GSFC team (http://radiojove.gsfc.nasa.gov). Since then, more than 1100 teams of students and interested individuals have purchased our non-profit radio telescope kits and are learning radio astronomy by building and operating a radio telescope. This self-supporting program continues to thrive and inspire new groups of students as well as individuals

An archive database is currently available and contains a variety of products: waveform data (.wav files); and time series, spectra or spectrograms as images (usually screenshots).

2 Scientific Observatories for Jovian Radio Monitoring

There are two main radio observatories dedicated to the survey of Jovian radio emissions: the Nançay Decameter Array, in France, and the Iitate Radio Observatory, in Japan. Both are operating in routine mode and are distributing their data to the scientific community. The Nançay data are available from the Observatory of Nançay web site (http://www.obs-nancay.fr) in a raw proprietary format accompanied with quicklooks. The data is also available on the Virtual Observatory using EPN-TAP [1]. The Iitate data are distributed as FITS files with quicklooks, and are available on IUGONET.

3 Proposed Standards and Descriptions for Radio JOVE data

The first step in the standardization is to select a standard file format for the shared data. There are several file formats that are currently under study (Wav, VOTable, FITS, CDF, NetCDF, HDF5) [2]. At the moment, Wav files are used, but it is not a metadata-rich file format. The discussion with the Radio JOVE software developers is ongoing to decide what can be set up.

Then, the global metadata standard shall be chosen. There are two possibilities (as studied during the Europlanet-IDIS project [3]): SPASE (Space Physics Archive Search and Extract) or IVOA (International Virtual Observatory Alliance). The former is a standard tailored for space plasma physics (Jovian radio emissions can be described with this standard) and the latter is a more generic set of standards for astronomy, but planetary sciences can also be described. It is possible to link between the two worlds. This has been done within the european IMPEx project [4, 5].

The VO-RadioJOVE service would include: SQL database with all observation records, access protocols

(e.g.: EPN-TAP), webservice (REST or SOAP) for data ingestion. We will set up a web-based interface for Radio JOVE participants to easily fill in events.

References

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