

火星web-GISのためのCRISMデータベース構築 Construction of CRISM Database for Mars web-GIS

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Many satellites have been launched to Mars and many observation data have been accumulated so far. We can study the surface condition, internal structure and mineral distribution of Mars by analyzing the observation data. Although the data are released online for free, the data web sites are not always well-organized. We need detailed search in those web sites to get the data we want. It takes time to find the data we need. The exact position where the spectral data are observed is often very hard to identify unless accompanying spontaneously observed image data. There is a Mars web site where the link to download each observation data appears on the corresponding location of a map layer. However, the web site does not provide any analysis function. Another web site, on which we can analyze observation data, is too heavy for practical use.

In this study, we build a database for Mars spectral observation data, which constitutes a very important part of the web geographic information system (web-GIS) of Mars which is under development. The efficient management of data becomes possible by introducing the database which is necessary for handling Mars observation data of large variety and amount. In the client side, the user can browse, download and analyze the data simply, easily and quickly.

We install Compact Reconnaissance Imaging Spectrometer for Mars (CRISM) data as source data for the database. CRISM data are 3D image cube data, which include spectral data in each image pixel. We can identify minerals by examining the absorption bands of the observed spectra. We choose key items from observation data to install in the database. Such key items would be useful for the user to search the data which he/she need for studying mineral compositions on Mars.

We use Post-GIS for developing the CRISM database. Post-GIS is an enhanced version database of PostgreSQL, which is a relational database. We can handle some datatypes including geometry and calculate coordinates by using Post-GIS. We use Python, a programming language to navigate Post-GIS and to install the contents of CRISM data or GIS objects to Post-GIS. The drivers to use Post-GIS on python are easy to handle. In addition, we use mapserver, which is also an open source software, where we can plot observation points and retrieves the information of the exact spots which the user selects.

We build a CRISM database which will improve the efficiency of browsing, downloading and analyzing the Mars spectral data. In the next step, we plan to develop other databases for other kinds of data useful for the 3D visualization in the Mars web-GIS.