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Analyzing CRISM hyperspectral imagery using PlanetServer.

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Mineral characterization of planetary surfaces bears great importance for space exploration. In order to perform it, orbital hyperspectral imagery is widely used. In our research we use Compact
Reconnaissance Imaging Spectrometer for Mars (CRISM) [1] TRDR L observations with a spectral range of 1 to 4 μm.

PlanetServer comprises a server, a web client and a Python client/API. The server side uses the Array DataBase Management System (DBMS) Raster Data Manager (Rasdaman) Community Edition [2]. OGC standards such as the Web Coverage Processing Service (WCPS) [3], an SQL-like language capable to query information along the image cube, are implemented in the PetaScope component [4]. The client side uses NASA's Web World Wind [5] allowing the user to access the data in an intuitive way. The client consists of a globe where all cubes are deployed, a main menu where projections, base maps and RGB combinations are provided, and a plot dock where the spectral information is shown. The RGB combinator tool allows to do band combination such as the CRISM products [6] using WCPS. The spectral information is retrieved using WCPS and shown in the plot dock/widget. The USGS splib06a library [7] is available to compare CRISM vs. laboratory spectra. The Python API provides an environment to create RGB combinations that can be embedded into existing pipelines. All employed libraries and tools are open source and can be easily adapted to other datasets. PlanetServer stands as a promising tool for spectral analysis on planetary bodies. M3/Moon and OMEGA datasets will be soon available.

[1] S. Murchie et al., "Compact Connaissance Imaging Spectrometer for Mars (CRISM) on Mars Reconnaissance Orbiter (MRO)," J. Geophys. Res. E Planets,2007.
[2] P. Baumann, A. Dehmel, P. Furtado, R. Ritsch, and N. Widmann, "The multidimensional database system RasDaMan," ACM SIGMOD Rec., vol. 27, no. 2, pp. 575–577, Jun. 1998.
[3] P. Baumann, "The OGC web coverage processing service (WCPS) standard," Geoinformatica, vol. 14, no. 4, Jul. 2010.
[4] A. Aiordăchioaie and P. Baumann, "PetaScope: An open-source implementation of the OGC WCS Geo service standards suite," Lect. Notes Comput. Sci. (including Subser. Lect. Notes Artif. Intell. Lect. Notes Bioinformatics), vol. 6187 LNCS, pp. 160–168, Jun. 2010.
[5] P. Hogan, C. Maxwell, R. Kim, and T. Gaskins, "World Wind 3D Earth Viewing," Apr. 2007.
[6] C. E. Viviano-Beck et al., "Revised CRISM spectral parameters and summary products based on the currently detected mineral diversity on Mars," J. Geophys. Res. E Planets, vol. 119, no. 6, pp. 1403–1431, Jun. 2014.
[7] R. N. Clark et al., "USGS digital spectral library splib06a: U.S. Geological Survey, Digital Data Series 231," 2007. [Online]. Available: http://speclab.cr.usgs.gov/spectral.lib06.