

PDS GEOSCIENCES NODE SUPPORT OF ASTROMATERIALS DATA ARCHIVING AND DISCOVERY.

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Introduction: The Planetary Data System (PDS) Geosciences Node [1] actively supports astromaterials archiving and data discovery tasks. We have developed an astromaterials-specific extension to PDS4 data dictionary as part of our work with providers archiving related datasets. The Spectral Library [2] has data from meteorite and lunar samples. The Analyst's Notebook (AN) [3] for Perseverance Rover will include initial reports and dossiers of collected samples and is positioned to support sample return data for future lunar missions.

Astromaterials Data Archiving: The Geosciences Node of the NASA Planetary Data System (pds-geosciences.wustl.edu) archives planetary science data from missions to Mercury, Venus, Mars, and the Earth's Moon, and from individual investigators funded by NASA data analysis programs.

The Astromaterials Local Data Dictionary (LDD) is an extension to the PDS4 information model, tailored specifically to enable comprehensive descriptions of astromaterials data and accompanying documents for long term archival. This data dictionary, created by the Geosciences Node, is designed with the needs of future missions and studies in mind, specifically enabling data relations and descriptions pertaining to astromaterials sample metadata such as collection/recovery year, origin, and relation to other relevant materials.

We currently are working with multiple data providers in support of astromaterials data archiving. The AstroMaterials PDS Archive, currently in peer review, contains data from the AstroMaterials Data System geochemistry database of laboratory data acquired from samples curated in the Astromaterials Collection at the Johnson Space Center (JSC) [4]. The database is accessible at www.astromat.org.

In addition, we are working with the Astromaterials 3D team at JSC to archive their collection of high resolution photographs, X-ray computed tomography (XCT) slices, and 3D models of Apollo samples [5] (ares.jsc.nasa.gov/astromaterials3d).

The Node archive contains bidirectional reflectance distribution function data for six Apollo soil samples measured at the Bloomsbury University Goniometer laboratory [6] (pds-geosciences.wustl.edu/missions/labdata/apollobug.htm).

Data Discovery with the Spectral Library: The Spectral Library (pds-specplib.rsl.wustl.edu) is a data discovery tool for Reflectance Experiment LABORatory (RELAB) data archived at the Geosciences Node archive, including visible and infrared spectra for 2075

meteorite and lunar samples.

Mars 2020 Sample Initial Reports and Dossiers in the Analyst's Notebook: Perseverance Rover has cached 4 of 43 potential sample tubes to date for return to Earth. As part of each sample collection, the mission science team prepares an initial report and a dossier containing a rich collection of key information needed to understand the rationale and immediate scientific context for that sample. Initial reports and dossiers will be captured in the PDS archive and incorporated in the Perseverance Rover Analyst's Notebook (an.rsl.wustl.edu) to be released this fall.

The Notebook for Perseverance also will contain daily documentarian and mission lead reports that provide a view into science operations—insight into why and how particular observations were acquired. Reports are edited only for grammar and spelling, and removal of spacecraft and instrument sensitive content. Additional Notebook components include the peer-reviewed, publicly available data delivered by the instrument teams; documentation describing context for the observations, processing methodology, and data formats; a surface operations historical overview; observation targets; and interactive rover traverse map.

Lunar Samples in the Apollo AN: Images of samples collected from Apollo missions 11, 12, 14, 15, 16, and 17 are available in the Apollo Notebook, along with annotated images, location maps, reference documents, and searchable traverse maps.

Conclusion: With a growing number of missions poised to perform in situ measurements and return samples for further analysis, the PDS Geosciences Node is committed to supporting astromaterials community data archive and discovery requirements. Future Notebooks are planned for the VIPER and Dragonfly missions, and the collection of spectral data will continue to grow with new archive submissions.

References:

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