

The Astromaterials Data System: Access and Preservation of Past, Present, and Future Data from Planetary Sample Analysis - New Developments

JENNIFER MAYS¹, SEAN CAO¹, ROBERT DOWNS²,
JUAN DAVID FIGUEROA¹, PENG JI¹, ANNIKA
JOHANSSON¹, SHAUNNA M MORRISON³, ALEXANDRA
OSTROVERKHOVA³, LUCY PROFETA¹, STEPHEN
RICHARD⁴ AND KERSTIN A LEHNERT¹

¹Lamont-Doherty Earth Observatory, Columbia University

²Center for International Earth Science Information Network (CIESIN), Columbia Climate School, Columbia University

³Carnegie Institution for Science

⁴US Geoscience Information Network (USGIN)

Presenting Author: jmays@ldeo.columbia.edu

The Astromaterials Data System provides a data infrastructure for analytical data of astromaterials samples collected by NASA missions and curated at NASA's Johnson Space Center in the Astromaterials Research & Exploration Science Division (ARES). AstroMat curates, preserves, and publishes these data; supports restoration of legacy data from publications and from researchers' contributions; and synthesizes historic and new data into a comprehensive, analysis-ready data store. Scientists can explore and mine astromaterials data in novel ways, using advanced search and data retrieval interfaces and APIs (Application Programming Interface) that support new data science methodologies such as Machine Learning and Artificial Intelligence. This presentation will provide an update on recently completed developments of AstroMat's human and machine-actionable interfaces for the AstroMat Synthesis, growth of data holdings, data rescue activities, and plans for new features.

We will also report on outcomes of the NASA Special Study on Astromaterials Data Archiving that AstroMat is currently conducting in response to new demands for the management of astromaterials data that recently emerged driven by a) new NASA data management strategies and policies for Open Science, and b) a new generation of astromaterials sample studies (OSIRIS-REx, ANGSA). The Special Study will investigate the current state and potential future states of the astromaterials data ecosystem by identifying standards, tools, and capabilities for managing and curating astromaterials data and for facilitating their discovery, reuse, analysis, and preservation for future use. The results of the study also will define the requirements for a potential expansion of AstroMat's infrastructure, workflows, and practices to function as NASA's Astromaterials Data Archive as a scalable and standards-compliant solution for archiving and disseminating astromaterials data as open data in compliance with the TRUST and FAIR principles for enabling the reuse of data. Recommendations will align with those provided by the report of the Planetary Data Ecosystem Independent Review Board (PDE-