Vision and Strategies for Astromaterials Data Management and Archiving

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The first Community Workshop on Astromaterials Data Management in the Era of Sample Return Missions was hosted at the University of Arizona (Tucson, AZ) on November 08–09, 2021. It brought together sample scientists, astromaterials collection curators as well as data scientists and software engineers working on past and current projects and initiatives for astromaterials sample tracking and data management. The workshop facilitated synergies and discussions on key topics related to data management: vision and concepts for data archiving (e.g., open data, FAIR principles), lessons learned from decades of sample-return missions and sample analysis, current data repositories, and planning for future data archiving. We also discussed the findings from the final report of the NASA Planetary Data Ecosystem Independent Review Board, as well as issues and shortcomings with the NASA's Science Mission Directorate information policy, SPD-41a.

We will report on the findings and recommendations for management and archiving of data resulting from the analysis of astromaterials. The workshop identified the need for detailed guidelines, work flows, and policies that help authors, editors, and data curators navigate FAIR data sharing and archiving procedures such as discussed by the Coalition for Publishing Data in the Earth and Space Sciences (COPDESS). Some of the key recommendations are: 1/ the implementation of common persistent identifiers, *e.g.* International Geo Sample Number (IGSN), Digital Object Identifiers (DOIs) and Open Researcher and Contributor ID (ORCID), for all astromaterials collections, data, and sample scientists that will ensure the findability, cross-referencing and interoperability of information between multiple repositories; 2/ the development of community agreed-upon archival standards and metadata dictionaries for all the data derived from the analysis of astromaterials; 3/ definition of well-established, machine-readable, and non-proprietary data formats that cover the sheer breadth, and ever-expanding data types and formats produced from the laboratory analyses of astromaterials; 4/ the development of consistent peer-review processes for metadata dictionaries and data submitted to repositories; 5/ provide training (online and at conferences) for investigators on how to archive their data to meet FAIR Guiding Principles and submit their data to compliant repositories; 6/ long-term support from funding-agencies for compliant data repositories.