The Planetary Materials Database

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NASA provides funds for a variety of research programs whose principal focus is to collect and analyze terrestrial analog materials. These data are used to (1) understand and interpret planetary geology; (2) identify and characterize habitable environments and pre-biotic/biotic processes; (3) interpret returned data from present and past missions; and (4) evaluate future mission and instrument concepts prior to selection for flight. Data management plans are now required for these programs, but the collected data are still not generally available to the community. There is also little possibility to re-analyze the collected materials by other techniques, since there is no requirement to archive collected samples.

The Planetary Materials Database (PMD) is a central, high-quality, long-term data repository, which aims to promote the field of astrobiology and increase scientific returns from NASA funded research by enabling data sharing, collaboration and exposure of non-NASA scientists to NASA research initiatives and missions. The PMD is a linked collection of databases developed using the Open Data Repository (ODR) system [1]. The PMD will include detailed descriptions of terrestrial analog planetary materials as well as data from the instruments used in their analysis. The goal is to provide example patterns/spectra/analyses, etc. and background information suitable for use by the Space Science community. An early example showing the utility of these databases (although not in the ODR format) is the RRUFF mineral database [2]. RRUFF, comprising 4,000+ pure mineral standards, is the most popular and widely used dataset of minerals and receives more than 180,000 queries per week from geologists and mineralogists worldwide. The PMD will be patterned after the CheMin database [3], a resource that contains all of the data collected by the MSL CheMin XRD instrument on Mars. Raw and processed CheMin data can be viewed, downloaded, reprocessed and reanalyzed using cloud-based “applications” linked to the data.

[1] Stone N. et al. (2017). AbSciCon 2017, abstract# 3545.

[2]. Lafuente B, Downs R T, Yang H, Stone N (2015). In: Highlights in Mineralogical Crystallography, T Armbruster and R M Danisi, eds. Berlin, Germany, W. De Gruyter, pp 1-30. (http://rruff.info/).

[3] https://odr.io/chemin