

DATA SHARING IN ASTROBIOLOGY: THE ASTROBIOLOGY HABITABLE ENVIRONMENTS DATABASE (AHED) AND THE CHEMIN DATABASE. B. Lafuente¹, T. Bristow¹, N. Stone², A. Pires³, R. M. Keller¹, R. T. Downs³, D. Blake¹, C. Dateo¹ and M. Fonda¹. ¹NASA Ames Research Center, Moffett Field, CA (thomas.f.bristow@nasa.gov), ²Open Data Repository, Gray, ME ³University of Arizona, Tucson, AZ.

Introduction: Astrobiology is a multidisciplinary area of scientific research focused on studying the origins of life on Earth and the conditions under which life might have emerged elsewhere in the universe. NASA uses the results of astrobiology research to (1) understand and interpret planetary geology; (2) identify and characterize habitable environments and prebiotic/biotic processes; (3) interpret returned data from present and past missions; (4) develop spacecraft instrument concepts and evaluate science value; (5) evaluate future mission and instrument concepts prior to selection for flight. The Astrobiology Habitable Environments Database (AHED) is a central, high-quality, long-term data repository that 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.

Objectives: The main goal of AHED is the creation of a single repository that has the flexibility to deal with the diversity of astrobiology datasets, while allowing a degree of standardization necessary for more rapid database creation, fulfillment of data archiving mandates, as well as facilitating data discovery and mining through efficient search.

Characteristics: AHED is a collection of databases storing information about samples, measurements, analyses and contextual information about field collection sites, the instruments or equipment used for analysis, and the people and institutions involved in their collection. To tie these databases together AHED will be structured based on framework of templates. A published AHED master template will sit at the highest level of this scheme, defining metadata requirements of AHED subscribing databases. Curation groups and users will contribute to a library of AHED database templates that allow other scientists and researchers to make compatible, but flexible, database designs tailored to their datasets (Fig. 1). By conforming to the AHED master template, databases will be visible for data mining and search through the AHED web portal.

Infrastructure: AHED will provide public and open access to astrobiology-related research data through a user-managed web portal implemented using open-source software created by the Open Data Repository (ODR) [1]. At the same time, publication of the metadata associated with the AHED master template will allow other platforms and software to create da-

taset in a way that makes them discoverable and searchable by the AHED web portal.

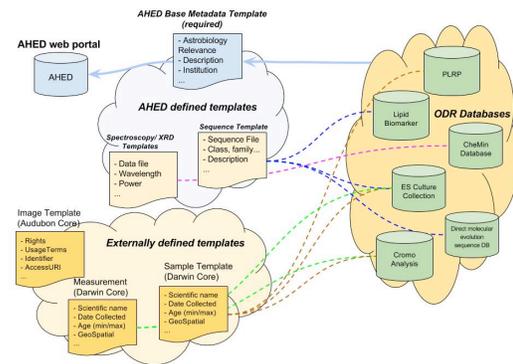


Figure 1. AHED framework of metadata templates.

AHED pilot - The CheMin Database: As a proof of concept, a database containing the raw and derived data products from the CheMin instrument [2] on the MSL rover *Curiosity* has been built (<http://odr.io/CheMin>). The database benefits from the capabilities of the ODR software to provide a very user-friendly interface (Fig. 2), where the data is easy to access using search tools, to visualize with a versatile graphing system, and to download in different formats. In the future, the database will also include online analytical tools to create high-level data products.

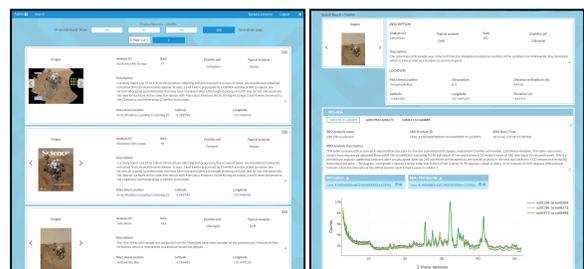


Figure 2. The CheMin database built in the ODR platform as part of AHED.

References: [1] Stone N. et al. (2017) Abscon 2017, submitted. [2] Blake D. et al. (2012) Space Sci Rev, 170, 341-399.

Acknowledgment: We gratefully acknowledge the support for this study by the Science-Enabling Research Activity (SERA) and NASA NNX11AP82A, Mars Science Laboratory Investigations.