Evolution of NASA’s Earth Science Digital Object Identifier Registration System

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Introduction

NASA’s Earth Science Data and Information System (ESDIS) Project has implemented a fully automated system for assigning Digital Object Identifiers (DOIs) to Earth Science data products being managed by its network of 12 distributed active archive centers (DAACs). A key factor in the successful evolution of the DOI registration system over last 7 years has been the incorporation of community input from three focus groups under the NASA’s Earth Science Data System Working Group (ESDSWG). These groups were largely composed of DOI submitters and data curators from the 12 data centers serving the user communities of various science disciplines. The suggestions from these groups were formulated into recommendations for ESDIS consideration and implementation.

The ESDIS DOI registration system has evolved to be fully functional with over 5,000 publicly accessible DOIs and over 200 DOIs being held in reserve status until the information required for registration is obtained. The goal is to assign DOIs to the entire 8000+ data collections under ESDIS management via its network of discipline-oriented data centers.

DOIs make it easier for researchers to discover and use earth science data and they enable users to provide valid citations for the data they use in research. Also for the researcher wishing to reproduce the results presented in science publications, the DOI can be used to locate the exact data or data products being cited.

Objective

ESDIS DOIs also provide data “Provenance” which is information about the creation and history of the data in question. This would include when the data was collected, which instrument was used to collect the data, and the version of the product at the time the DOI was assigned. Also, over the past few years, requests for DOIs have increased significantly as DAACs assign DOIs to both legacy data from earlier missions and new data products from in-orbit missions. Therefore, this study will evaluate the evolution of DOI registration and its usage over those years comparing data products as they are organized by mission, science discipline and data product level.

Discipline-based DAACs

The ESDIS Project since 1994 has been responsible for managing the 12 ESDIS DAACs and multiple Science Investigator-led Processing Systems (SIPS). SIPS are responsible for the generation, processing and transfer of science data products to the appropriate DAAC(s) for archiving and distribution. DAACs are responsible for performing all the various data management functions to include product ingest, archive, distribution, and documentation. Each of these facilities has a different discipline focus as shown in Figure 1 with details in Table 1. According to ESDIS policy, DOIs are assigned and managed by the DAAC responsible for the archiving and distribution of the science product requiring a DOI.

DOIs are also assigned to:

i) Near Real-time (NRT) data products generated under the LANCE (FIRMS, LANCE AMSR2, and LANCE MODIS)
ii) the documents that are related to the data products (LPVS).

DOIs Assignments by Product Level

ESDIS data products are processed at various levels ranging from Level 0 to Level 4. Level 0 products are raw data at full instrument resolution. At higher levels, the data are converted into more useful parameters and formats. Product level descriptions are given in Table 2.

DOI Assignments by Mission/Program

DOI names mapping to the science discipline, mission/program and product level were done based on the product identification provided by the DAACs during the submission of the DOI metadata. In addition, mapping was complemented by matching against the ESDIS Metrics System (EMS) metadata.

Conclusion

DOIs are also assigned to:

Table 1: Name and Science Discipline of Various Data Distributors

Table 2: Description of Science Discipline of the Data Products as of October 30, 2017

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