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Technical Report

Mines and Minerals Maps Metadata

Casey Brown
Metadata Librarian
Arizona Geological Survey
3550 N. Central Ave.
Phoenix, AZ 85012
602-771-1603

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Introduction

As part of the Energy Policy Act of 2005, the U.S. Geological Survey (USGS) was tasked with creating a National Geological and Geophysical Data Preservation Program (NGGDPP).

This Program is intended to work principally with the nation's geological surveys to: (1) archive geologic, geophysical, and engineering data, maps, well logs, and samples; (2) provide a national catalog of such archival material; and (3) provide technical and financial assistance related to the archival material.

The Program is envisioned as a national network of cooperating geoscience materials and data repositories that are operated independently yet guided by common standards, procedures, and protocols for metadata. The holdings of all collections will be widely accessible through a single, common, and mirrored Internet-based catalog, the National Digital Catalog (NDC), thus maximizing the availability of and interconnectedness of all the collections.

Scope and Implementation

In 2011 The Department of Mines and Mineral Resources (ADMMR) was merged with the AZGS in FY12. The Arizona Geological Survey (AZGS) rescued and stored the records when ADMMR was shut down. Since that time, the AZGS has inventoried the many collections of mining materials, typically mineral exploration reports, maps, and supporting documents. These collections contain mineral exploration information all over the world, but are largely focused on Arizona and the Southwest. As of October 2014, most of the documents related to Arizona have been geographically cataloged (where applicable), digitized, and are available online.

This year, AZGS item-level cataloged 4,358 maps from the ADMMR Map collection. These metadata records are stored as ISO 19139 records, XML encoding of ISO 19115, and published through the USGIN catalog at search.usgin.org. As these maps were all previously digitized, an electronic copy of the map, PDF, is linked via the metadata record. The AZGS created an interactive map for searching these records using the open source web framework, Drupal.

Metadata & Digital Infrastructure (Results)

Summary

The AZGS focused on creating metadata for the ADMMR map collection, oversized maps of Arizona's mines and geology. The USGIN metadata schema used in this project is related to the geographic metadata standard, ISO 19115, and is interoperable with that standard and the XML encoding for metadata exchange, ISO 19139. The USGIN metadata schema describes the fields necessary to catalog these resources. Required metadata includes a title, description, creator, publication date, distributor contact, metadata contact, metadata date, and a link to the item. Recommended metadata includes thematic keywords, spatial keywords, resource identifier, bibliographic citation, geographic coordinates, and starting and ending dates (USGIN, 2011). For maps, we also created metadata for the map dimensions and scale. Thematic keywords were used for maps to capture types: a claim map, geologic map, subsurface map and whether it included sample data or geophysical surveys. Spatial keywords are assigned by joining the map's mine ID to location information stored in the mines table, developed from the Arizona Mineral Industry Location System. Metallic mineral districts and physiographic areas are also based on coordinate locations and stored in another table created by the geoinformatics team.

Casey Brown and Becky Eden cataloged 4,358 maps with USGIN metadata using the Microsoft Access database developed previously for inventorying the collections. These records were exported from MS Access, converted to XML, and uploaded to USGIN. The geoinformatics team has collaborated with our colleagues at the USGS to harvest metadata from USGIN to the NDC.

Contrary to the plan to create an interactive map using ArcGIS, we have implemented a full search portal using Drupal, an open source web framework. This solution includes a searchable map. This map allows researchers to search either using coordinates or using a point and radius on a map.

The website was designed to address three common inquiries, resulting in three search pages to address each type of inquiry. Researchers either know the name of a property or its location. This led us to create a text-based search on mine names, including keyword filtering, and a map based search to allow discovery of the files by location. Lastly, some users are strictly interested

in finding photographs. Therefore, an image gallery option was created to facilitate searching and browsing images using thumbnails rather than text.

Metadata Created

Table 1. **Number of maps by county.**

County	Maps
Cochise	932
Mohave	780
Yavapai	711
Gila	582
Pima	359
Maricopa	301
Pinal	279
Santa Cruz	196
Graham	116
La Paz	114
Navajo	67
Greenlee	41
Coconino	34
Yuma	29
Apache	11

(Sum may exceed total due to overlap)

The AZGS has one map collection remaining to be digitized from its acquisition of ADMMR materials. The Walter Heinrichs and Grover Heinrichs collections included approximately 260 map tubes or about 2,000 maps. These maps will be processed in the coming year.

Availability

Records are available from USGIN, search.usgin.org, AZGS, <http://minedata.azgs.az.gov>, and the NDC, <https://www.sciencebase.gov/catalog/item/511ab167e4b084e2824d6a18>.

USGIN aggregates many diverse datasets, so we recommend prefacing search terms with the collection name, ADMMR, (e.g. Admmr Copperstone). Users may also define a search area on the map by drawing a bounding box.

<http://minedata.azgs.az.gov> currently only shows records acquired from the ADMMR. To find the ADMMR maps, use the filters from the Search Page to narrow results to Document: Image: Map.

Figure 1. Map Search results from <http://minedata.azgs.az.gov> for “Tungsten”

Title	Place Keywords	Commodities
<input type="text"/>	<input type="text"/>	tungsten
mine names	counties, quads, alternate names ...	copper, molybdenum, sand, stone...

Move marker and edit distance to search by proximity.



Latitude:

Longitude:

Distance:



Bibliography and Links

US Geoscience Information Network, (2011), “Metadata Recommendations for Geoscience Resources,” (accessed 2014-10-21, http://repository.usgin.org/uri_gin/usgin/dlio/335)