



Introduction

The Alaska Division of Geological and Geophysical Surveys (DGGS) produces and publishes numerous geologic maps each year. These maps and their associated databases are made available to the public as downloads and delivered to the USGS in their recently published database standard, GeMS (Geologic Mapping Schema). To produce standards-based, GeMS-compliant geologic maps we developed the AK DGGS Geologic Mapping System. The system controls the process of collecting, producing, converting, packaging, publishing, and sharing geologic map data. To ensure efficient processing we also developed the AK GeMS production workflow standard, which is a 16-phase process that takes a map and its data from planning though production, quality control, publication, and archiving.

Published Standards

The system is built upon published data and symbology standards. We published MP 169, AK GeMS Data Dictionary: A description of the AK GeMS Database Schema, which is an extension to the basic USGS published GeMS schema. In addition, we published a symbology standard, AK GeMS Symbology: A Description of the AK GeMS Style File. The system supports four major categories of geologic mapping production: new mapping, conversions, digitizations, and now more recently, compilations. During the mapping process, geologists heavily reference our published data dictionary and style file. In addition, we have built numerous tools and models to support mapping and improve quality assurance.

AK GeMS Data Dictionary



MP 170 AK GEMS DATA DICTIONARY: A DESCRIPTION OF THE AK GeMS DATABASE SCHEMA https://dggs.alaska.gov/pubs/id/30669

Includes a Report, Data Dictionary, Entity-Relationship Diagram, XML Workspace Document

Key Aspects of AK GeMS

- Increased focus on modeling geologic features (as opposed to graphic elements)
- Capable of exporting to National GeMS without signification loss of AK GeMS data extensions.
- Capable of supporting **both single-map** production geodatabases as well as the DGGS **multi-map** enterprise geodatabase (PostGreSQL).
- Support multiple geologic layers (i.e. bedrock, surficial, others).
- **Formalized pick lists** as attribute domains with definitions included in a glossary table.
- Well Documented



AK GeMS Symbology



MP 169

AK SYMBOLOGY: A DESCRIPTION OF THE AK GEMS STYLE FILE https://dggs.alaska.gov/pubs/id/30584

Alaska DGGS has developed and published a GeMS symbology standard and accompanying style file, AK GeMS symbology: A description of the AK GeMS style file. This publication describes the organization and content of the current style file used by DGGS for the Alaska GeMS map production system. In this standard, we have identified the primary and optional FGDC symbols for specific feature type values found within our established attribute domains. In addition, we have established procedures for requesting, creating, coding, and documenting custom symbols added to our style.

EUSSE AK_GeMS_symbology Appendix A: FGDC Symbols Appendix B: Compound FGDC Symbols Appendix C: Custom Symbs with FGDC Sections Appendix D: Custom Symbs NO FGDC Sections Appendix E: Symbols with alternate colors Appendix F: map_unit_points Symbols Appendix G: map_unit_lines Symbols Appendix G: map_unit_lines Symbols AK_GeMS_symbology_documentation_ver_1.dc						, ,	
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Alaska DGGS Geologic Mapping System

Mike Hendricks, Jen Athey, Amy Macpherson, Pedro Rivera, Chris Wyatt, Alec Wildland **Department of Natural Resources** Division of Geological & Geophysical Surveys (DGGS) 3354 College Road, Fairbanks, AK 99709 https://dggs.alaska.gov/

https://geoportal.dggs.dnr.alaska.gov/portal The Alaska DGGS employs a Geologic Mapping System to produce standards-based, GeMS-compliant geologic maps and data for publication. The system has been developed over the course of 6+ years and controls the process of collecting, producing, Department of Natural Resources GEOLOGICAL & GEOPHYSICAL SURVEYS converting, packaging, publishing, and sharing geologic map data. We designed the AK GeMS Geologic Mapping System as an extension to the GeMS schema to meet Alaska's specific requirements, but still ensure that we can deliver GeMS-compliant data. GEOPORTAL **AK GeMS Geologic Mapping Product Flow** Multimap Map Image Service **AK GeMS Multimap Explorer Web App** We are in final development of multi-map services **AK GeMS AK GeMS** and a Geologic Map Data Exploration web app. **Multimap Feature Service Data Dictionary** Symbology In Final Development **Scanned Geologic Map Image Service** Alaska DGGS Alaska DGGS Alaska DGGS Geologic This Image Service hosts raster map images of original Single Map AK GeMS Mapping Convert & Multi Map AK GeMS **Field Event** Feature cartographic products of geologic maps. Process Production Load Geodatabases Geodatabase Services Geodatabase ologic Scanned Maps age Service of Alaska Key Geologic Map Images **Cartographic Product** AK DGGS **Tools** GEOLOGIC Geologic Map 🖃 🌍 GeMS_production_tools_python_ArcMap. Change Source Value Disable Editor Tracking Enable Editor Tracking https://geoportal.dggs.dnr.alaska.gov/portal/home/item.html?id=3240b5b3f9d34d3582258b1ec684f1e7 Image 2 **Procedures &** Rasterize Services - ----🛯 🗞 Phase 5 Data Pub Prep 💐 Build Pub Prep Folder QC **Python Tools** Remove Empty Tables Remove Leading and Trailing Spaces from ALL string fields in Update Feature Extents **Data Reviewer &** Update geo_material_dict_id field in the DMU **Standard Cartographic Product** Update Location Confidence Fields **Product Citation Page** GEOLOGIC MAP UNITY Please as an anguing sparse for devices of the MERINATION FOR A STATE MERINATION OF A STATE OF A STATE MERINA OF A STATE OF A STATE VIELANCE BOYLES We develop Update map unit dmu_guid value Update map unit dmu_guid value for cross section **Python Tools** Update map_unit_assoc field value python tools to improve We create a standard high quality Update Product id productivity and quality Check orientation_confidence_meters field Value cartographic product from the AK GeMS Phase 9 Packaging Remove Editor Tracking Fields + assurance (QA) for map We use Save all layers in map Update Distribution Policy Alaska DGGS Geodatabase • CLOSE Data reviewer as our production primary quality control (QC) Export Single Map AK GeMS for map production When a map's database passes QC Geodatabase A Local Boolean State and metadata is complete, we Publication Product package the geologic map data for We have placed an emphasis in the past few years on developing Maps & Other Oversized Sheets publication, sharing, and delivery. robust and efficient quality control (QC) procedures. We have heavily Digital Geospatial Data
Tok River area geologic map Data File Format File Size Info Vector data 13.8 M Metada We the make following geologic map leveraged the ESRI Data Reviewer capability, as well as developed USGS products available for download: a python-based scripts and tools as part of our QC. Our efforts on report, the cartographic product as a Single Map GeMS improved QC procedures have dramatically increased the quality of Convert pdf, the geologic AK GeMS Geodatabase our published geologic map data. formatted Geodatabase, the basic 💲 Create New Database WITH CHANGES We provide a data package to the GeMS formatted Geodatabase. and Custom GeMS script to add additional elemen MISCELLANEOUS NAP STREET USGS for inclusion in their central GeMS shapefiles. In addition, we package We use USGS provided validation geodatabase and deliver the data to USGS. We Validation scripts to QC our database also populate web services with our data; we add the cartographic product as a TIF to our Geologic Map Image Service and convert and A load the single-map geodatabase **Organizational Procedures** into our multi-map PostgreSQL Anne Milli B, M. Milli J, Mann Andre Holloffe. Art KL. 1970. Recommension analysis and of the Transverse Quarkingle Almine T-S ing D-Computing Computing States and the Computing States and a 14th state in D-C. Million A. A. Weitersen, M.-S. Weitersen, H.-S. Konstapics G.J. Spacer, G.G. Billin, S.A. 1991. Montecipaning and an Administration of Computing States and the Computing States and Administration of Computing States and Administra-alis of States Intelligence and Administration of Computing States and States and Administration of Computing States and Computing States and States and Administration of Computing States and State Shakala dala basi nagi and sapagraphi linos mantal bian Li C dangan drawa (Williki lingu Towin Matri (Willi Raking Swar D dangan drawa drawa (Bathan (Bathan)) Matrix Matrix Base Kathanana (Bathan) dini Kathanana (Bathan) dini Kathanana (Bathan) dini geodatabase. To ensure that all parties involved with moving geologic maps and data through the system complete their assigned tasks requires well-defined organizational procedures. The backbone of our procedures is our AK GeMS production workflow graphic. This workflow is a 16-phase process that **AK GeMS Formatted Geodatabase Package** Data Packages contain: takes a map and its data from pre-publication though production, quality control, publication, and archiving. • File Geodatabase Map Document The workflow Identifies: Workflow, Responsibilities, Location of data, Production meetings, Products ArcMap now ArcPro in future • resources folder that includes: GeMS Formatted Geodatabase Package • fonts folder - Special FGDC fonts used for **AK GeMS Production Workflow** geologic labels and symbols • styles folder - ESRI Style file used for visualizing this data. Numerous symbols are dependent on the provided special GeMS Formatted Shapefiles Citation Page FGDC fonts. Map Pub Prep • layer files folder - ESRI layer files Data Pub Prep Prepub Load Into MM PG defining symbology and labeling for each Group Kristen Data Lead Kristen ieologist Simone GIS Simone GIS GIS MM feature class in the geodatabase. AK GeMS Generate Citation Pub record Feature Service **AK GeMS Production Status** template db db db e zipped Citation Web Page Begin AK GeMS Project Worksheet metadata Link Alaska DGGS Map Index Web App GeMS Database Package **zipped** FedGeMS Draft Link Submit to USGS report The Map Index Web App is an online web application **Available** AK GeMS Geodatabases designed to explore the geologic map holdings of the Variable GeMS Open Package **zipped** https://dggs.alaska.gov/pubs/keyword/gems Alaska Division of Geological & Geophysical Surveys Draft Delivery Package **zipped** Pdf Map (DGGS). This online exploration tool provides the Shape files We have **27 Geologic Maps** currently Link boundaries of most DGGS and U.S. Geological Basemap available Survey (USGS) geologic maps of Alaska in a single, db Data Reviewer interactive web application. changes validate GeMS nona/gis submission Package **zipped** supporting material validate report 13 **In Production** AK GeMS Geodatabases Load into Map Image Service Cartographic We have **29 Geologic Maps** currently in 15 Support Move folders to Cold storage archive report production Link 15 Map images Pdf Map Link Possibly publish **Planned** AK Geodatabases map and report early We have **25+ Geologic Maps** will go into tif Map production a: Pub Kick Off Meeting Include only GeMS : Pre Pub Meeting Pub Data Handoff Meeting **Production Workflow** I: Post Pub Meeting





Publishing Products

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