DIGITAL MAPPING TECHNIQUES 2024

The following was presented at DMT '24
May 13 - 16, 2024

The contents of this document are provisional

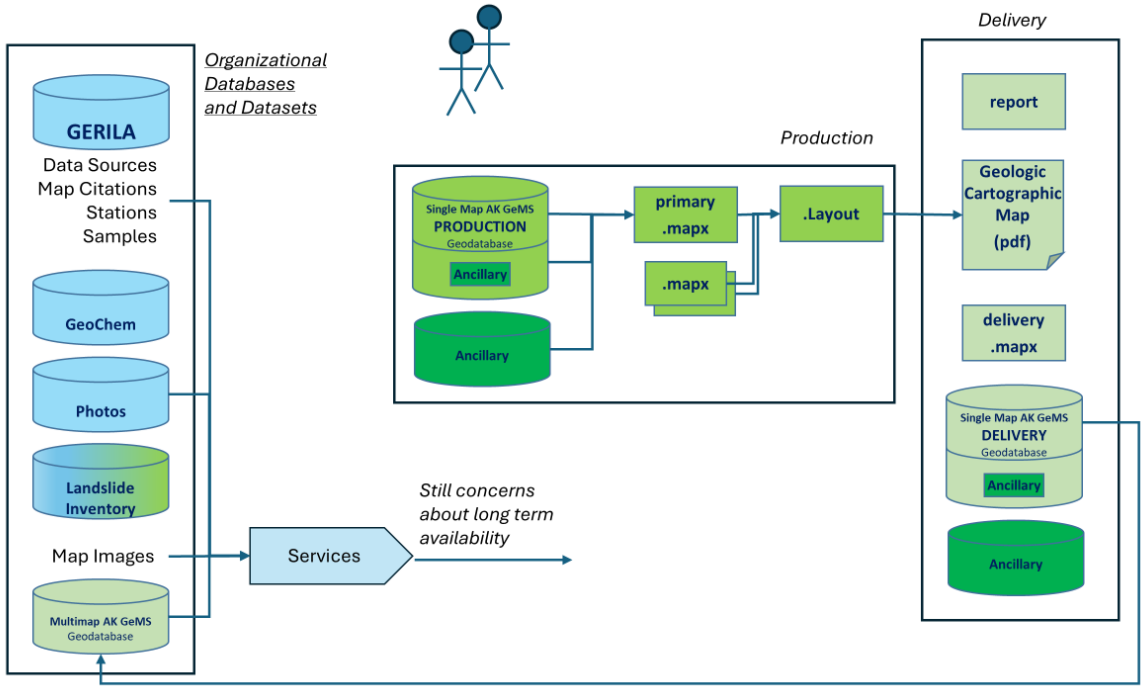
See Presentations and Proceedings
from the DMT Meetings (1997-2024)
http://ngmdb.usgs.gov/info/dmt/

Creating, managing, and using ancillary data within the Alaska GeMS geologic mapping system

By Mike Hendricks, Ally Steinleitner, M.S. Seitz, Simone Montayne, W.C. Wyatt, A.E. Macpherson, and Wes Buchanan (Alaska Division of Geological & Geophysical Surveys)

The Alaska DGGS works with numerous ancillary datasets during the production of geologic maps. This presentation will address the various ways we manage and use these datasets in support of GeMS based geologic mapping. We store all our field stations, samples, interval data, and map extents in our Geologic and Earth Resource Information Library of Alaska (GERILA) database. We also maintain a geochemistry and a photo database, as well as have a geochronology database in development. Our Geologic Materials Center maintains a database of their cores and other samples. These databases all link to each other and with GeMS content through field stations and sample ids. In addition, we have recently developed a landslide inventory database that uses the AK GeMS Schema as its starting point with the intent to allow easy insertion of features in this database into geologic maps.

Creating, Managing, and Using Ancillary Data within the AK GeMS Geologic Mapping System



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GIS Data and Symbology Standards

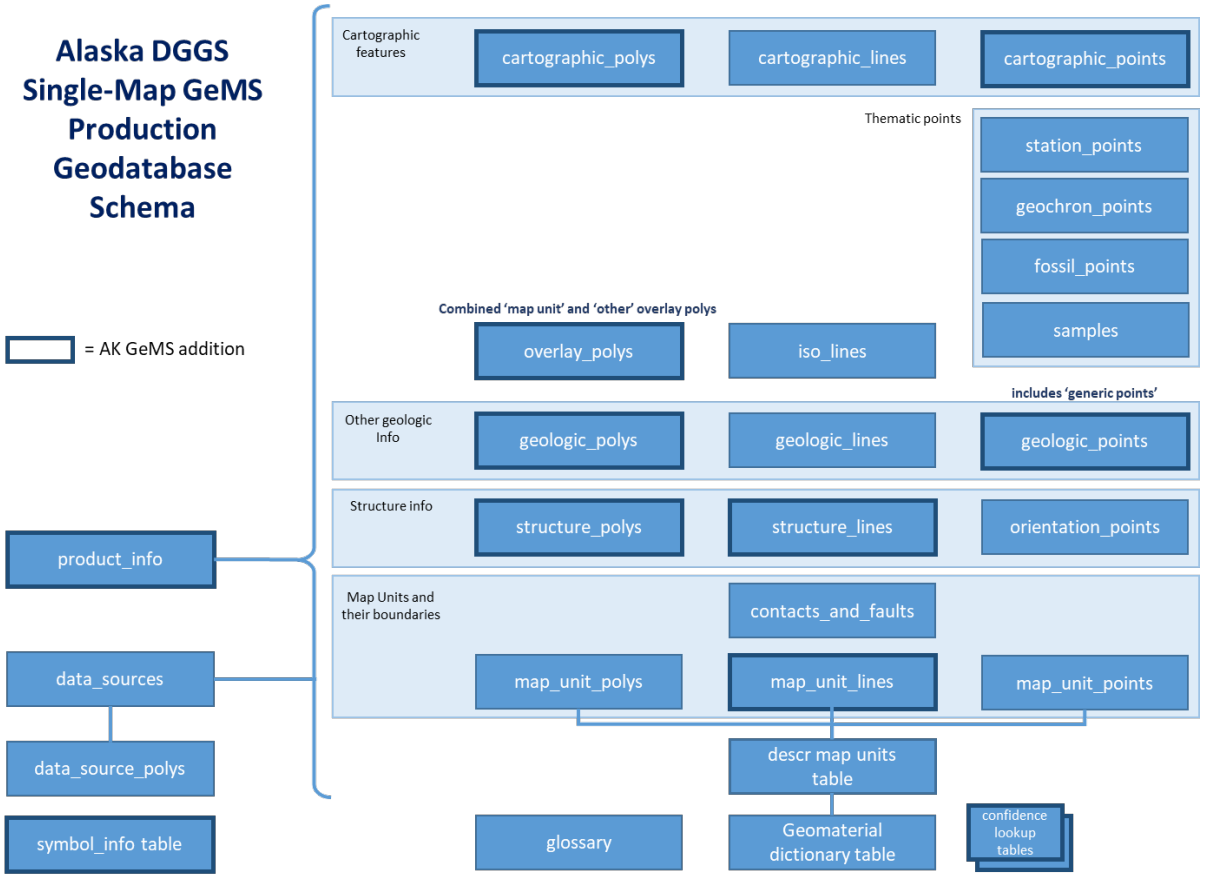
AK GeMS Data Dictionary

Key Aspects

- Increased focus on **modeling geologic features**
- Capable of **exporting to National GeMS**
- Capable of supporting **both single-map** 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.
  - Over 75 domains
  - Over 400 controlled & defined values
- **Well documented**

Version 2.0 scheduled for June 2024

AK GeMS Schema



AK GeMS Data Dictionary: A description of the AK GeMS database schema, MP 170
https://dggs.alaska.gov/pubs/id/30669

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  - Add a table as a new organizational standard

Adding “new” modeled phenomena into the GeMS schema

1. A lot of specialized tables

   versus
2. A few tables with attributes to define specialization (type/category)

AK GeMS trends towards option 2, *but is sliding slowly towards 1*

Example – Geologic (Points, Lines, Polygons)
category and type fields and domains

Note: AK GeMS frowns upon new custom tables within AK GeMS until new version published. One reason is custom tables make metadata generation, QC, and production in general less efficient.

AK GeMS Geologic (Points, Lines, Polygons) feature class category and type field domains

Geologic (Points, Line, Polygon) Domains	
Category	**Type**
key bed	key bed, generic
	key bed, clay
	key bed, clinkered coal
	key bed, coal
	key bed, economically important commodity
	key bed, traceable bed
	key bed, other
geomorphic feature	geomorphic feature, generic
	geomorphic feature, lineament
	geomorphic feature, form line
	geomorphic feature, other
glacial and periglacial	glacial and periglacial, generic
	glacial and periglacial, ice wedge polygon
	glacial and periglacial, pingo
	glacial and periglacial, other
lacustrine and marine	lacustrine and marine, generic
	lacustrine and marine, other
landslide and mass wasting	landslide and mass wasting, generic
	landslide and mass wasting, block-glide landslide
	landslide and mass wasting, debris slide
	landslide and mass wasting, displacement vector
	landslide and mass wasting, earth flow
	landslide and mass wasting, hummock
	landslide and mass wasting, rock slide
	landslide and mass wasting, rotational landslide
	landslide and mass wasting, slump
	landslide and mass wasting, soil creep or incipient sliding
	landslide and mass wasting, spring, seep, or drainage
	landslide and mass wasting, tilt direction
	landslide and mass wasting, Toreva block
	landslide and mass wasting, other
volcanic	volcanic, generic
	volcanic, fumarole or steam vent
	volcanic, hornito
	volcanic, thermal spring
	volcanic, geyser
	volcanic, cone, vent, cinder cone, or spatter cone
	volcanic, volcano
	volcanic, diatreme, breccia pipe, or collapse structure
	volcanic, other
natural resources	natural resources, generic
	natural resources, occurrence
	natural resources, prospect
	natural resources, mine
	natural resources, other
tectonic	tectonic, generic
	tectonic, other
unprovided	unprovided
unknown	unknown
other	other

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  - Files, enterprise database, service

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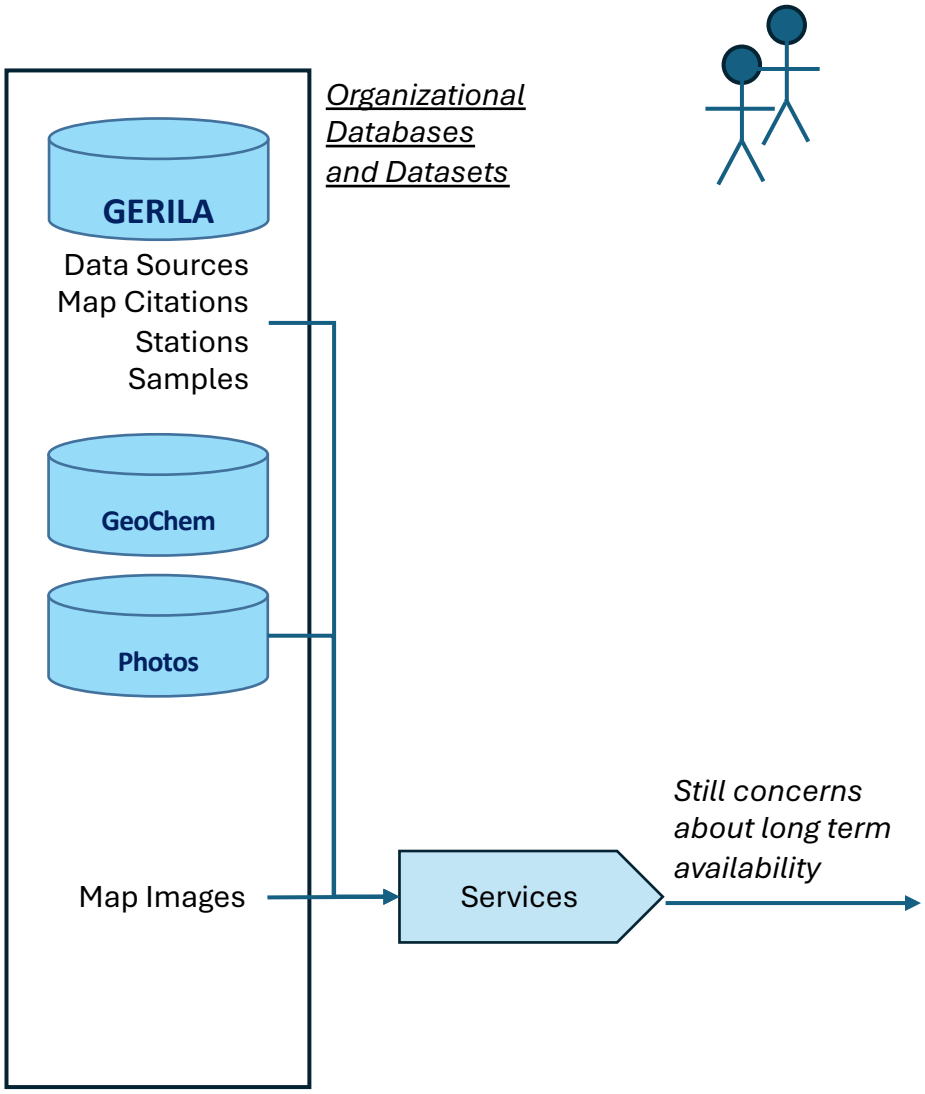
- Build other Databases/Datasets with GeMS in mind for future linkages

Some Ancillary Data in the process



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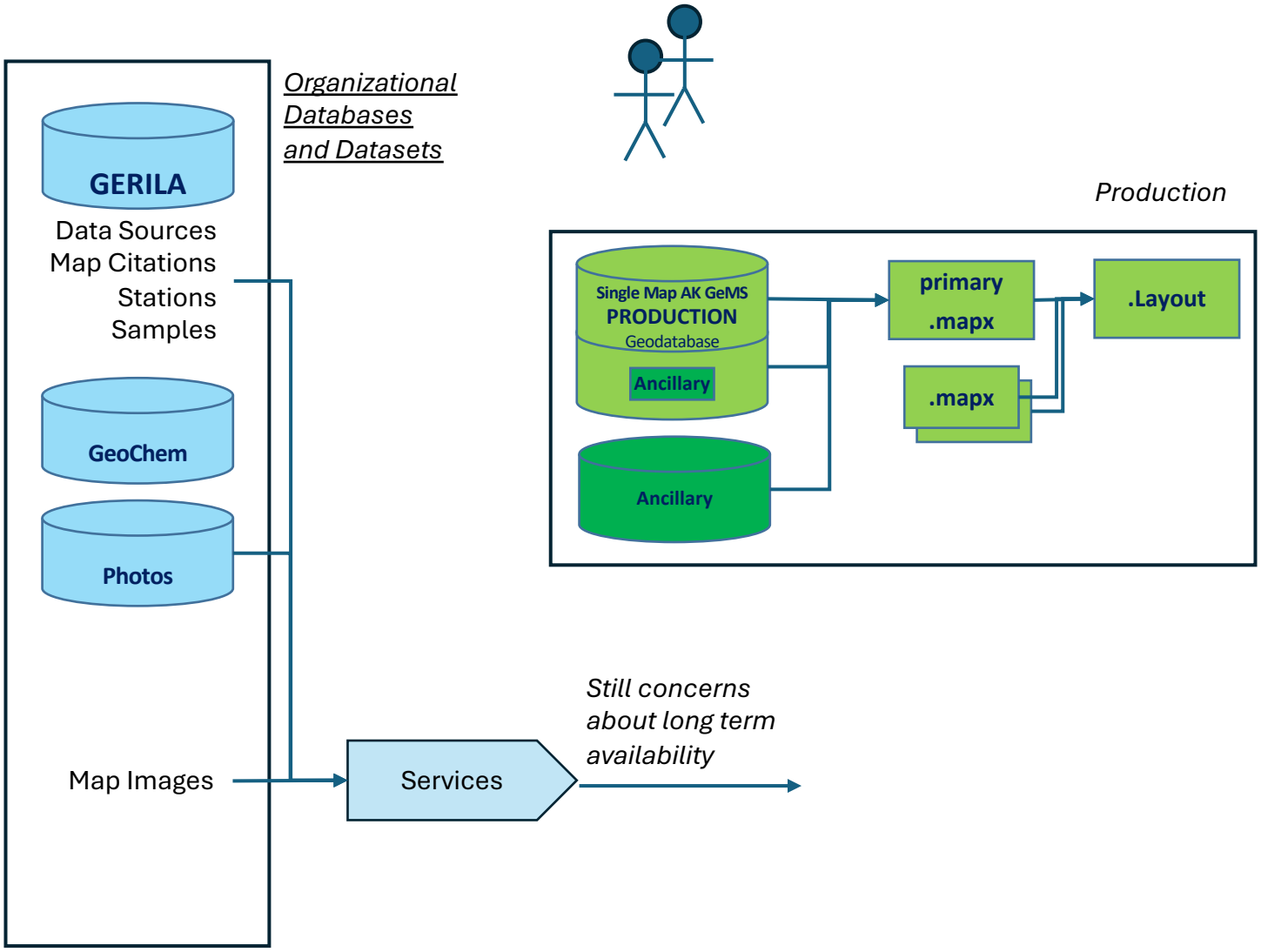

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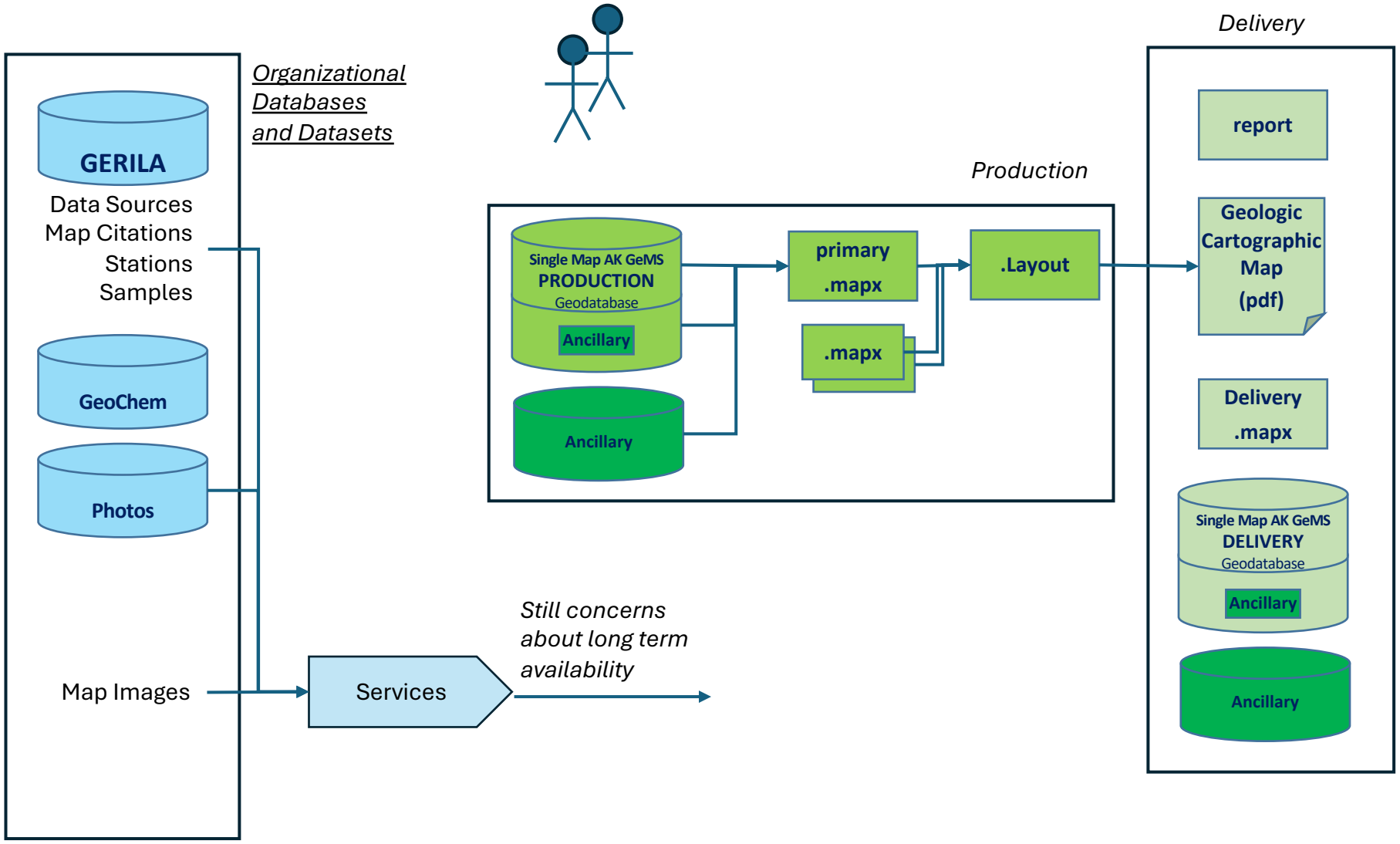

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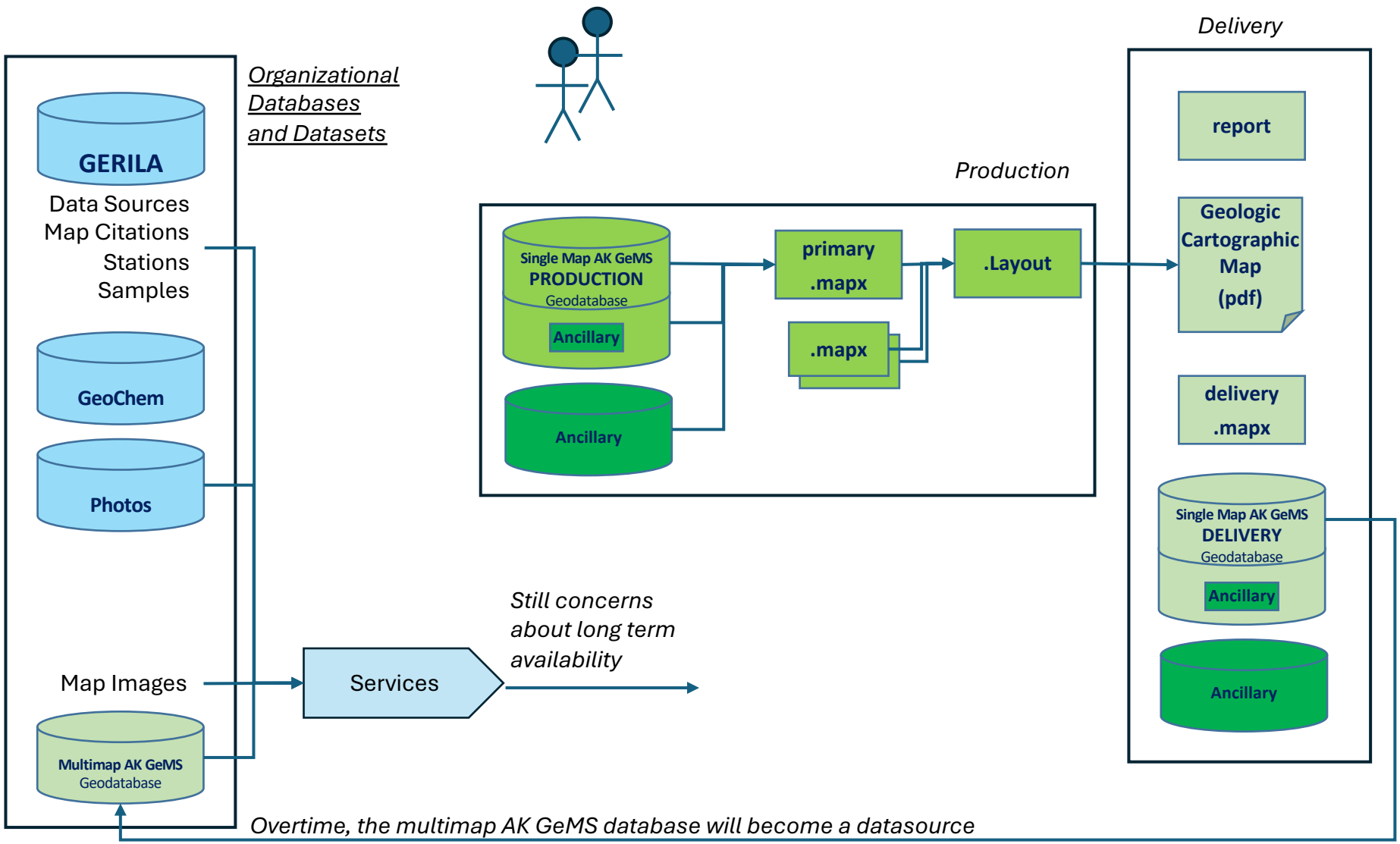

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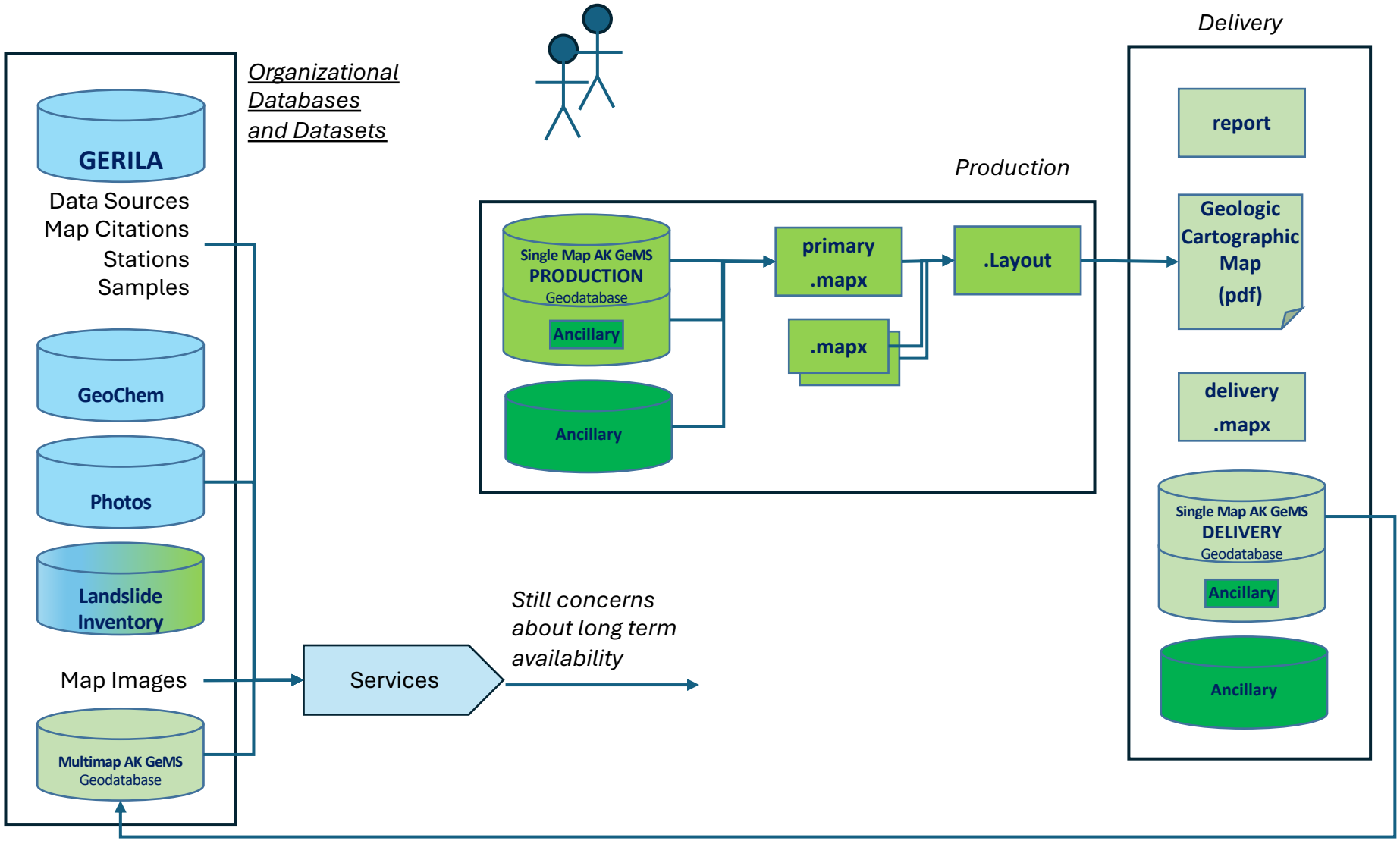
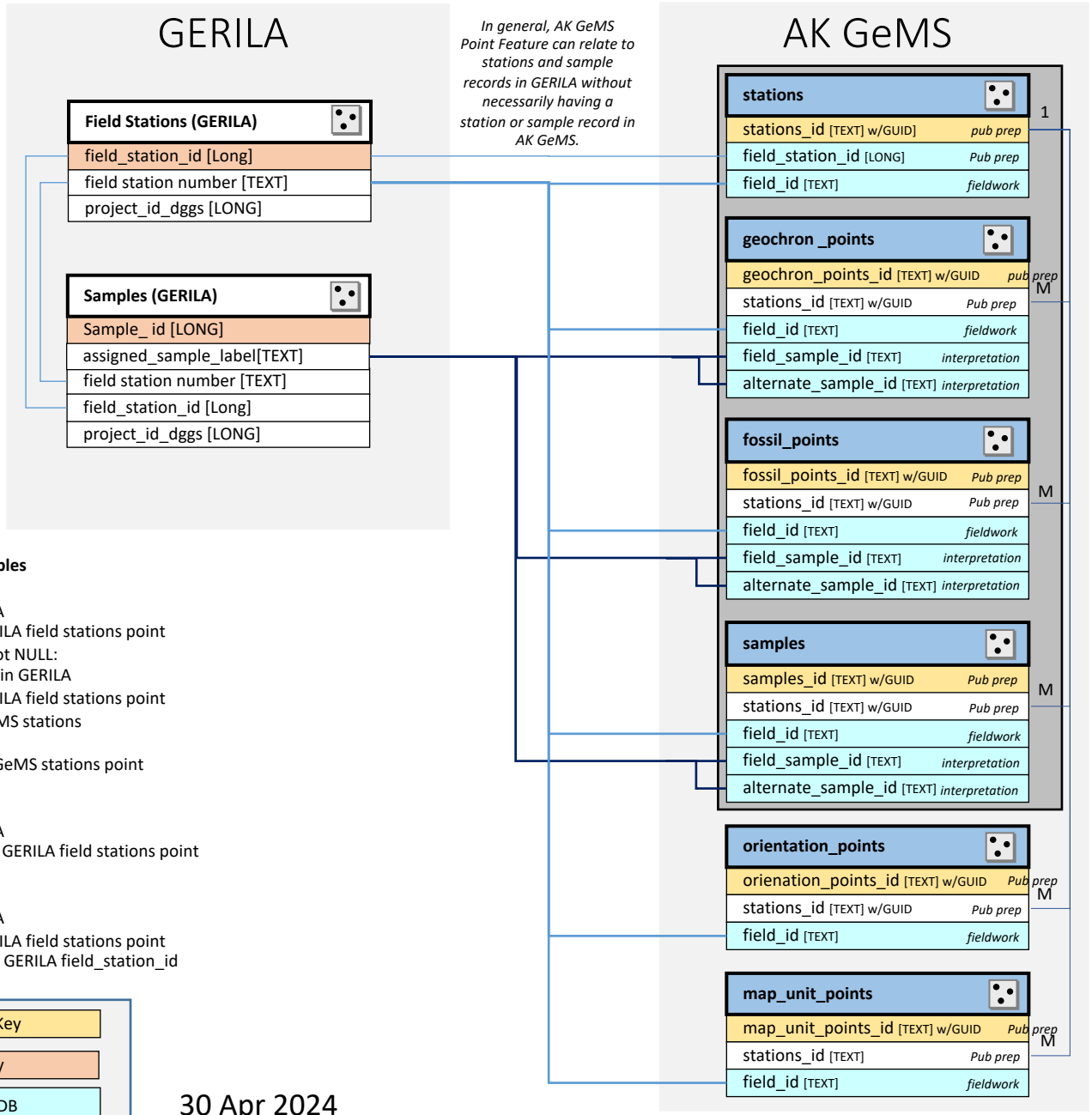


AK GeMS Key Relationships with Geo Analytic Data, Stations, Samples & GERILA



Station records in AK GeMS are optional. Typically used for inset map. All stations features must exist in GERILA and be collocated.

Records that relate to GERILA samples (field_sample_id) and/or field stations (field_id) must be collocated with GERILA's sample and station location.

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Version 2 only
Holds sample records that cannot be represented in geochron or fossils. Samples must exist in GERILA and be collocated.

Orientation points can optionally relate to a station in the AK GeMS Database. Note: They DO NOT necessarily have to be collocated with the station. Checked with 500m.

Map_unit_points can optionally relate to a station in the AK GeMS Database. Station must exist in GERILA and be collocated.

QC Checks:

For geochron, fossils, and samples

If point field_id is not NULL:
- field_id is found in GERILA
- point is collated with GERILA field stations point

If point field_sample_id is not NULL:
- field_sample_id is found in GERILA
- point is collated with GERILA field stations point

If field_id is found in AK_GeMS stations
- stations_id matches
- point is collated with AK GeMS stations point

For orientation_points

If point field_id is not NULL:
- field_id is found in GERILA
- point is within 500m with GERILA field stations point

For stations

for all points
- field_id is found in GERILA
- point is collated with GERILA field stations point
- field_station_id matched GERILA field_station_id

AK GeMS Table Primary Key

GERILA Table Primary Key

Relates to DGGS GERILA DB

30 Apr 2024

Collocation defined as <10m new mapping <100m for older map conversions