

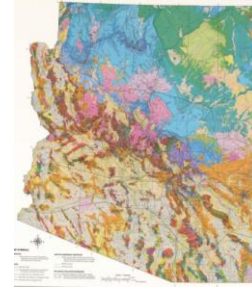


EARTHQUAKE

e-Newsletter about what's movin' and shakin' at the Earth Science Museum

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SPECIAL BULLETIN **Earth Science Week** **Friday, October 16, 2020** **Geologic Map Day**



Digital Geologic Maps - The future of geologic mapping

We believe that preserving and updating our digital geologic maps and map data is the highest priority issue for the AZGS and the geologic community in Arizona.

P.A. Pearthree, Arizona State Geologist

Digital geologic maps are the currency of 21st century geology. At the Arizona Geological Survey (AZGS), we are revisiting our geologic map products to add geodatabases and open-source data compatible with a variety of platforms. Adding these data increases the usefulness and value and versatility for our stakeholders in the mining industry, government, environmental and hydrologic consulting community, and academia.

Geologic maps - past and present - display the distribution of bedrock and alluvium, lithologic age relationships, and geologic structures - faults, folds and lineaments. Since 1915, the AZGS and its predecessor agencies made geologic mapping a priority. The resulting geologic maps and reports (e.g., bulletins, circular and open-file reports) inform mineral exploration, infrastructure planning and construction, and geologic hazard identification and mitigation.

In 2000, the AZGS migrated from hand-drafted maps to the digital maps comprising our Digital Geologic Map (DGM) series; now at more than 130 maps and counting. We employ ESRI's ArcGIS software application to build our digital maps. Our earliest digital products were solely high-resolution PDF map images available \$25 to \$35 on compact disks. Those same maps, and all new geologic maps, are now available free-of-charge through the [AZGS Online Document Repository](#).

The PDF format lacks the underlying database with limited digital inquiry or modification features. In 2017, AZGS procured funds from the US Geological Survey's (USGS) National Geological and Geophysical Data Preservation Program (NGGDPP) to revisit and upgrade map products of our DGM series. The overarching goal: make geologic map data available in digital formats to better serve Arizona's geosciences community.

The Next Generation of Digital Map Products. With funds from the NCGDPP, we revisited our early digital map products to bring them into congruence with the ‘National Cooperative Geologic Map Program 09’ (NCGMP09) standards; now referred to as GeMS - Geologic Map Schema.

(Source: <https://ngmdb.usgs.gov/Info/standards/GeMS/#bk>)

Since 2018, we have added digital databases to more than 60 of our DGM maps (Table 1). All new DGMs are accompanied by this suite of digital products. Lists and URL links to all 60+ data-enhanced AZGS DGMs appear in the following AZGS blog posts.

Table 1. *Digital map products released as part of AZGS Data Preservation project and now available for all newly published DGMs.*

- PDF (map sheets and, if available, reports)
 - Open Source version of GIS data (geopackage .gpkg extension)
 - Google Earth KMZ
 - Simplified version of the geodatabase
 - GeMS V1.1 Geodatabase
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- ✓ [‘Fresh Digital Data Packages for 22 extant Digital Geologic Maps’](#) (Sept. 2020)
 - ✓ [‘Enhancing AZGS Digital Geologic Maps with GIS Data Formats’](#) (Dec. 2019)
 - ✓ [‘The Next Generation of Digital Geologic Map Products’](#) (Mar. 2019)

Migrating from hand-drafted to digital maps was fraught with difficulty. It required geologists to enter the labyrinth of GIS software. And as GIS products evolve, AZGS staff data management skills had to keep pace with technological enhancements to migrate digital databases across GIS platforms and to manage, curate, and archive-swelling terabytes of data.

For the foreseeable future, the AZGS will continue to serve map products and geologic reports from the [AZGS Document Repository](#). To ensure long-term preservation, the University of Arizona Library Services established the [Arizona Geological Survey Collection](#) at the University of Arizona Campus Repository. This new repository mirrors the existing AZGS repository; all new geologic map and reports will be hosted at both repositories.

The US Geological Survey’s [National Geologic Map Database](#) (https://ngmdb.usgs.gov/ngmdb/ngmdb_home.html) is the single largest U.S. digital geologic map repository with more than 90,000 geologic maps from all 50 states.

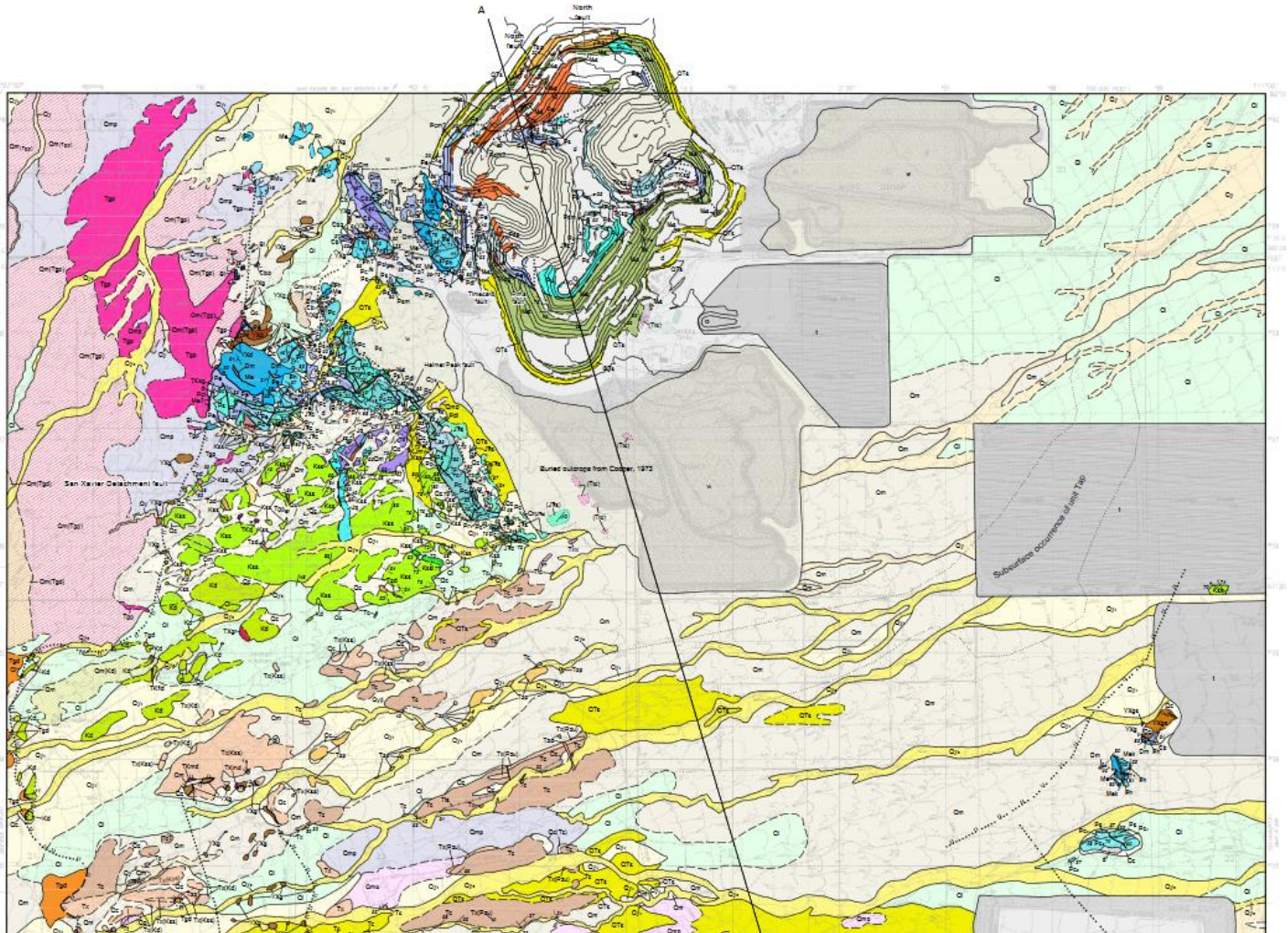


Figure DGM of Twin Buttes 7.5' quadrangle south of Tucson, AZ.

For a high quality and scalable version with map key:

<http://repository.azgs.az.gov/sites/default/files/dlio/files/nid562/dgm-31twinbuttes.jpg>

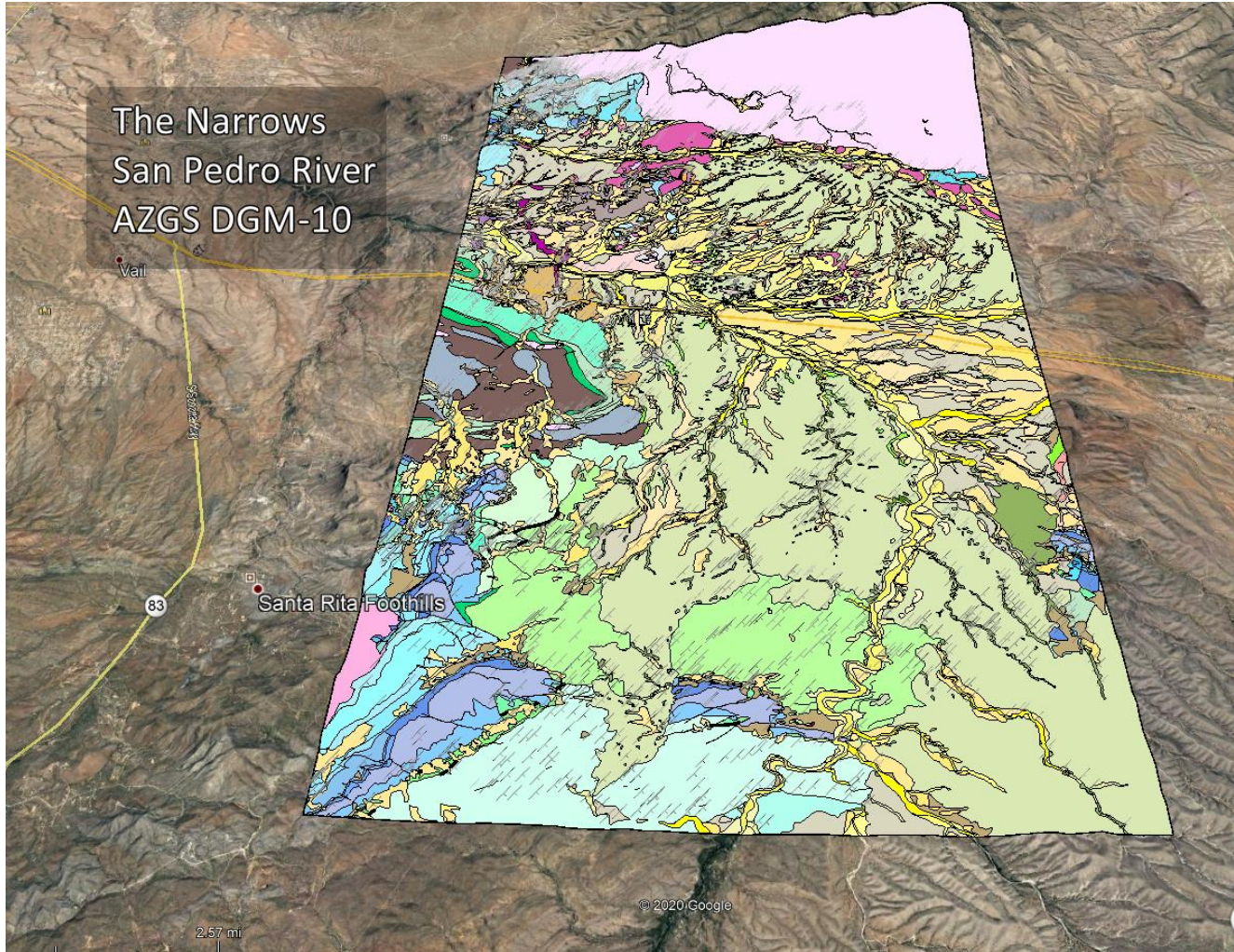


Figure Google Earth KMZ display of The Narrows geologic map. (The Narrows are located in the San Pedro River Valley south of Benson, AZ.



The Narrows
Google