

DMT 2022

DIGITAL MAPPING TECHNIQUES 2022

The following was presented at DMT'22 May 22 - 25, 2022

The contents of this document are provisional

See Presentations and Proceedings from the DMT Meetings (1997-2022)

http://ngmdb.usgs.gov/info/dmt/

GeMS Implementation in Large Scale Geologic Compilations

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Talk Outline:

What are large scale compilations in VA? What do the GeMS products look like?

•Virginia's approach to large compilations: Our Criteria

•FY20 and FY21 project examples

•GeMS Compilation topics for the future

1:250K Geologic Bedrock Map Compilation in VA:



> Delivered as a FY20 GeMS level 2 compliant geodatabase

1:250K Geologic Surficial Map Compilation in VA:



> Delivered as a FY20 GeMS level 2 compliant geodatabase

100k Scale Compilation Workflow and Criteria:

•Use the 5m Lidar base to draw surficial deposits

- •Compile bedrock mapping from 1:24K, 1:100K, 1:250K
- •Main new mapping component: surficial geology!
 - Developed a workflow for checking surficial units w/ Strabospot
- GeMS attribution & validation
- Geologic interpretation review
- GeMS database review
- Metadata review

Digitization Guides in VA:

If Mapping at this scale:	1: 24k Maps	1:100K Maps	1:250K Maps (Statewide Compilation)				
Map features that are clearly visible at this scale	10K-12K	50K	100-125K				
Digitize features while zoomed to this scale	4K-6K	10K-15K	24K				
Minimum fault and dike length	500 ft	2000 ft	5000 ft				
Minimum fold axis length	2000 ft	8000 ft	Only major fold axes				
Minimum map thickness for polygon map unit	150 ft	600 ft	1200 ft				
Minimum polygon size for overlay polys	200 x 200 ft	400 x 400 ft	1000 x 1000 ft				
Show the following mineral resource sites	All known sites	All sites visible on basemap at 24K	All sites visible on basemap at 100K				
Show the following karst features	>100ft2 as points >30,000 ft2 as lines	>400ft2 as points >120,000 ft2 as lines	Not shown				
Show the following coal beds	All coal beds	Major coal beds	Not shown				

Master DAS ID list in VA:

DAS ID	Source/ Citation							
DAS009	Andrews, L.E., Jr., 1952, Structure of the area north of Roanoke, Virginia [Ph.D. dissertation]: Johns Hopkins University, Baltimore, Maryland, 126 p.							
DAS010	Averitt, P., 1941, The Early Grove gas field, Scott and Washington counties, Virginia: Virginia Geological Survey Bulletin 56, 50 p.							
DAS011	Badger, R.L. and Sinha, A.K., 1988, Age and Sr isotopic signature of the Catoctin volcanic province: Implications for subcrustal mantle evolution: Geology, v. 16, p. 692-695.							
DAS012	Bailey, C.M. and Simpson, C., 1993, Extensional and contractional deformation in the Blue Ridge Province, Virginia: Geological Society of America Bulletin, v. 105, n. 4, p. 411-422.							

> Master DASID list for all GeMS deliverables in VA (800+ sources and counting)

- > This list was a by product of our Statewide compilation
- > Have a similar list for all glossary terms

100K Scale Quadrangles in Virginia FY20:



GEOLOGIC MAP DATABASE OF THE ROANOKE 30 X 60 MINUTE QUADRANGLE



- Mini-map collar
- 2 layer GeMS map
- Draft until published, coming soon!



Bedrock Geology by William S. Henika Surficial Geology by Holly E. Mangum and Jeffrey B. Stewart Digital compilation by Holly E. Mangum and Matt J. Heller



GEOLOGIC MAP DATABASE OF THE WILLIAMSBURG 30 X 60 MINUTE QUADRANGLE



Geology by C.R. Berquist Digital compilation by Holly E. Mangum



Williamsburg 100K Compilation:

- Mini-map collar
- 1 layer GeMS map
- Draft until published, coming soon!

100K Scale Quadrangles in Virginia FY 21:



Fredericksburg 100K Compilation:



Should there be a standard approach to the Fall Zone units in GeMS? (MUP vs MUOPs)

Danville 100K Compilation:

- FY21 2 layer map
- GeMS Level 3 compliant geodatabase
- Interstate project with North Carolina!
 - VA: surficial mapping
 - NC: bedrock mapping
- In progress, to be delivered this fall



GEOLOGIC MAP OF THE VIRGINIA PORTION OF THE DANVILLE 30 X 60 MINUTE QUADRANGLE

Geology compiled by William S. Henika 2002



2002 Danville 30 x 60 minute map

Digitization Guides in VA:

If Mapping at this scale:	1: 24k Maps	1:100K Maps	1:250K Maps (Statewide Compilation)				
Map features that are clearly visible at this scale	10K-12K	50K	100-125K				
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Show the following karst features	>100ft2 as points >30,000 ft2 as lines	>400ft2 as points >120,000 ft2 as lines	Not shown				
Show the following coal beds	All coal beds	Major coal beds	Not shown				

Grid tiles for Surficial fieldwork:

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Grid tiles for Surficial fieldwork:









Danville Interstate Collaboration w/ VA and NC



Danville Edgematching:



Note: Images on this slide provided from ongoing communications and mapping with North Carolina Geological Survey, and are still in draft stages.



Edgematching 100K maps:

South Boston	Hibbard	Henika
Omm [Biotite gneiss and schist of Cedar Grove of the Cunningham Complex]; Omc [Biotite gneiss of Halifax]	Omcc [Cunningham Complex]	COmg [Chopawomsic upper unit]

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Summary and Conclusions:

- •GeMS is more applicable to 7.5 min quads
- •Try figuring out frameworks for scale, Data Sources, and Glossary terms early
- •Implement geodatabase reviews at different points along the project cycle
- •States facing similar compilation projects at this scale – let's work together!
- •These large compilation maps begin stratigraphic reconciliation between states and the Geolex nomenclature & bedrock edge-matching



The Danville Team: Holly Mangum, Catherine Brown, Phil Bradley, Emily Michael, and Katie Lang

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•Thank you to the incredible staff at the Virginia Geological Survey (VA Dept. of Energy, Geology and Mineral Resources Program) on these large compilations: Holly Mangum, Catherine Brown, Lauren Williams, Anne Witt, Matt Heller, Marcie Occhi, David Spears, Bill Swanger

•Past geologists (VA, NC, USGS, & Universities) who have created our primary sources and geologic maps

- •Phil Bradly and Emily Michael at the North Carolina Geological survey
- •USGS for the STATEMAP funding
- •The creators and editors of the GeMS code and tools we appreciate all of the updates, office hours, and other help as we learn this new framework



The Danville Team at the VA – NC state line! VA and the VA geologists to the left, NC and the NC geologists on the right.

Questions?

Contact me: Katie E. Lang katie.lang@energy.virginia.gov Virginia Department of Energy, Geology and Mineral Resources Program (Virginia Geological Survey)

