

Using python to automate AK GeMS geologic map legends

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The construction of geologic map legends, involving manually manipulating the individual graphics that make up a legend in an ArcGIS Pro layout, has been a time-consuming and sometimes frustrating task for the cartographers and geologists at DGGS. Fortunately, we discovered that the Alaska Geologic Mapping Schema (AKGeMS) database holds the key to automating the formatting and layout of the legend with the use of Python scripting. This presentation will provide a short history and overview of geologic mapping at the Alaska Division of Geological & Geophysical Surveys and the AKGeMS schema. We will discuss in detail the issues and hurdles surrounding the creation of the Description of Map Units portion of a geologic map legend and investigate the feature classes and tables that eventually enabled the automation of the legend creation. Lastly, the presentation will provide a short introduction to the arcpy.mp Python module, a description of the new Legend Builder toolbox and its functionality followed by a live demonstration.

# Using Python to Automate AKGeMS Geologic Map Legends

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### Quick outline

- Geologic mapping at DGGS
  - AK GeMS
  - Inefficient and frustrating cartographic workflow
  - Demo "the before"
- Esri to the rescue!
  - Demo "the now"
  - Closer look at arcpy

## Geologic Mapping at DGGS



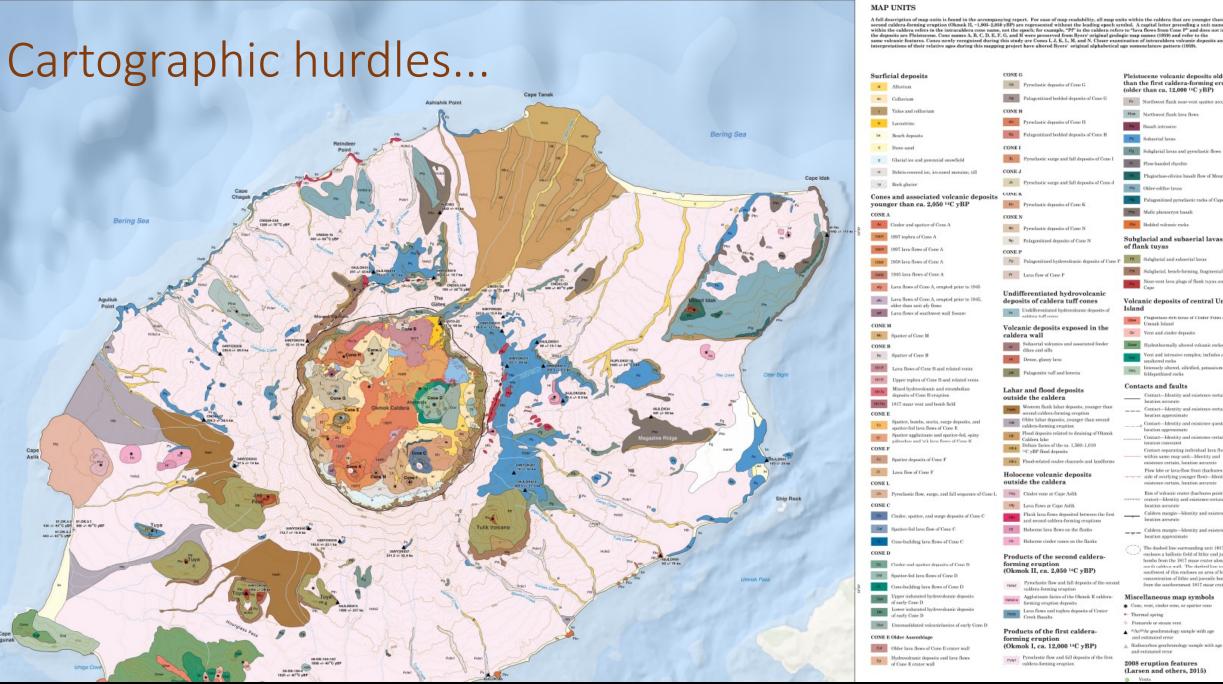
We have many groups inside of DGGS and they are all collecting data and making new maps with their own specific focus: Minerals, Energy, Hydro & Surficial, Geologic Hazards, Volcanology

But when we make a new\* geologic map, we all use the same standard – AK GeMS

\* we also work to update pre-AKGeMS maps to this new standard!

#### The standard — AK GeMS

- Based on USGS GeMS
- MP 170 AK GeMS data dictionary: A description of the Alaska geologic mapping schema
- MP 169 v. 2 AK GeMS Symbology: A description of the AK GeMS Style File (alaska.gov)



#### Pleistocene volcanie deposits older than the first caldera-forming eruption (older than ca. 12,000 14C yBP) Pr Northwest flank near-vent spatter accumulation Piw Northwest florik lova flows Pa Basalt intrusive Ps Subarrial locas Pg Subglarial laws and pyroclastic flows Plow-banded rhyolite Plagioclaso-olivine basalt flow of Mount Idak Older-edifice lavas Palagonitized pyroclastic rocks of Cape Idak Mafie phenoryst basalt Pow Bodded volcanie rocks Subglacial and subaerial lavas of flank tuyas FT Subglacial and subsecial lawas Subglacial, bench-forming, fragmental deposits car-vent lava plugs of flank tuyas and Kettle Volcanic deposits of central Umnak Qr Vent and einder deposits Quee Hydrothermally altered volcanic rocks Vent and intrusive complex: includes a few Intensely altered, silicified, potassium Gsq Intensery areas feldspathized rocks Contacts and faults Contact-Identity and existence cortain, \_\_\_\_ Contact—Identity and existence certain, location approximate Contact-Identity and existence questionable Contact-Identity and existence certain, Contact separating individual lava flows within same map unit-Identity and existence certain, location accurate Flow lobe or lava-flow front (bachures on side of overlying younger flow)-Identity and Rim of volcanic erater (hachures point into crater)-Identity and existence certain, location accurate Caldera morgin-Identity and existence certain Caldera margin-Identity and existence certain location approximate The dashed line surrounding unit 1817s encloses a ballistic field of lithic and juvenile bombs from the 1817 moor croter along the math caldera wall. The dashed line southwest of this encloses an area of high ncentration of lithic and juvenile bomb from the southernmost 1817 mour crater

#### Esri to the rescue!

Attended the Esri UC last summer, question in hand – is it possible to automate this?

Met Jeff and his team

Few months later we are scoping out the early stages of the script!

#### The "Now"

- New toolbox
- Uses the Description of Map Units (dmu) table to populate the legend
- Flexibility
  - Can adjust spacing between elements
  - Can append information like unit age and full description