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OREGON STATEWIDE GEOLOGIC MAP DATA: A PILOT PROJECT WHERE DIGITAL TECHNIQUES CHANGED THE GEOLOGIC MAP COMPILATION PROCESS AND PRODUCT

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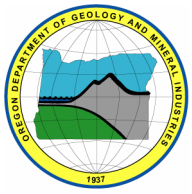

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Oregon Statewide Geologic Map Data:
A pilot project where digital techniques changed the geologic map compilation process and product

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The Oregon Department of Geology and Mineral Industries (DOGAMI) has begun a six-year project to digitally compile geologic data for the entire state. This effort brings together the best available geologic mapping from state and federal sources, student thesis work, and consultants. To accomplish this project, DOGAMI is working in partnership with the U.S. Geological Survey (USGS STATEMAP) and the Oregon Geographic Information Council (OGIC). This partnership shares the funding burden of this ambitious effort, and provides a review process to ensure the resulting data is consistent in structure, fully documented, and serves the greatest number of potential users.

Project: Create a new statewide digitally-compiled geologic map coverage that will become an Oregon Geoscience Framework Layer. Replaces the present 1:500,000-scale state geologic map.

Two different approaches to the process of making compiled geologic maps:

1) Conventional method:
- Give the best available geologic maps to a geologist or team of geologists.
- Draw new coverage at a particular scale that assigns new compilation units.
- Digitize the new unit linework.
- Enter into a database the data about each unit, based on a newly written explanation of units for the compiled units.

2) Oregon Pilot method:
- Digitize the polygons/units for each of the best available geologic maps.
- Enter the information from the original author's explanation of units into a relational database.
- Rank the maps and decide on their order of supersedence.
- Put the best available information together into a single coverage, primarily using the more detailed or better quality maps but retaining the less detailed or poorer quality maps in areas where no other coverage is available. This process creates an "appended" map that contains all of the best geologic coverage.
- Create new compilation merge labels for all of the unit polygons in the appended map, including different labels for geologic units, for lithologic units, and for general lithology type units.

Advantages and Disadvantages

CONVENTIONAL METHOD

Advantages:

- Seamless coverage without "map faults" between the various geologic interpretations and scales of maps.
- Coverage at a uniform scale.
- Simple to use because it contains only a single set of descriptive data for every compiled map unit.
- Easier to construct the digital compilation because it contains only a single set of polygons to vectorize.

Disadvantages:

- Not updateable. It is a snapshot of the geologic information available at a particular time. New mapping cannot be added to it. Every new compilation must start from scratch with the original maps.
- Not transparent. It does not necessarily retain the original author's polygons or unit descriptions.
- Not flexible. Only a single derivative geologic map can be made from the data and the map unit labels.
- Not scaleable. The coverage is at a single scale and does not retain larger scale detailed information.
- Not revealing. The seamless coverage at a single scale masks the areas of poor quality mapping.

OREGON PILOT METHOD

Advantages:

- Updateable. New mapping can be added as soon as it is completed, and the compilation merge units can be changed to reflect the new information. To make a new compilation map, the process never has to start again with the original maps; the process is always modifying/updating the compiled dataset.
- Transparent. The author's original polygons and descriptive explanation are always available in the database. Digital versions of the original geologic maps, both as scanned images and converted vectors are part of the compiled map package.
- Flexible. Derivative geologic/lithologic maps can be made for any purpose. The compilation merge units that are assigned by DOGAMI can be modified to fit other author's interpretations.
- Scaleable. Because it retains the original information, those areas that contain the most detailed information can be used at the original larger scale; while the compilation merge units are appropriate for intermediate and small scale usage.

- Revealing. The compiled map clearly conveys the areas of poorest quality mapping. This serves as a tool to focus future mapping efforts to continually improve the compilation product.

Disadvantages:

- A seamed coverage with obvious "map faults", or seams, between areas of differing original geologic interpretations and/or map scales. Edgematching between the original reference maps is only partially addressed.
- Not a static product, so at any point in time there is no official "Geologic Map of the State of Oregon".
- More difficult to use, because it requires the user to choose the type of geologic derivative map product, as well as the map scale to be displayed.
- Not easily printable in its entirety. It is not meant to be printed at a single scale and the labels for the merged map units are longer than standard geologic map unit labels.
- Varied in quality. Older geologic maps and explanations of map units are entered into the database, and may contain information that is from previous, now discarded, generations of geologic interpretation.
- A large volume of information needs loading--many geologic maps instead of a single coverage; many sets of unit descriptions instead of a single set of unit descriptions,

Digital concepts that were the impetus behind the Oregon Pilot method:

1) Digital maps do not have to be made at a particular scale and do not have to be printable on standard paper sheet sizes.
2) Digital techniques make it easy to convert maps individually into digital products and then later splice or append them together to make the final compilation product.
3) Compact digital storage media has grown large enough to allow for the inclusion of scanned and digitized original maps as well as the final single appended statewide geologic map.
4) Most federal, state, and local governments have GIS systems that they use for land-use decision-making. These entities need a digital geologic coverage that is as detailed as possible and that is understandable by non-geologists. The appended original maps can provide the most detailed available information at the largest possible scale
5) Digital geologic data can be layered with many other themes of digital information, to provide a more complete understanding of a project or a planning dilemma.

GOALS OF THE OREGON PILOT METHOD:

- Break free of the need every few years to recompile the state's geologic information from scratch because new geologic information has become available.
- Create a product that can be used by a wide range of disciplines, not just geologists.
- Constantly provide the most current geologic information possible to the Oregon Framework Themes process, which serves all state, federal, and local decision makers.
- Keep the amount of non-mnemonic database information to a minimum. Geology as a science has enough difficult-to-understand vocabulary without adding layers of database classification.
- Refrain from re-interpreting the original authors' work.
- Take advantage of relational database efficiencies, i.e. enter descriptive geologic information only once for each unit.

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