

# THE DEVELOPMENT OF STANDARDS FOR 3D GEOSCIENCE MAP INFORMATION – WHAT’S NECESSARY?

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“...the [geologic] maps are designed not so much for the specialist as for the people, who justly look to the official geologist for a classification, nomenclature, and system of convention so simple and expressive as to render his work immediately [understandable]...” (Powell, 1888).

These words eloquently expressed the purpose of geologic mapping and the need to clearly communicate to the public, and they are at least as true today as when they were written. They serve as the guiding philosophy for the National Geologic Map Database project (NGMDB; <http://ngmdb.usgs.gov>), a Congressionally-mandated collaboration between the USGS and Association of American State Geologists (AASG).

For the past decade, the NGMDB’s goal has been to help users find the information they need to address a variety of societal and research applications. Society, businesses, and private citizens are not faced with simple, one-dimensional issues; in order for geologic information to be used, it must be presented in a readily comprehensible form that can be integrated with other types of information. In other words, the presentation of geologic information must, to some extent, be standardized. Geological surveys produce individual maps, reports, and datasets in a wide variety of formats and layouts, each containing specialized scientific terminology. Without a doubt, these have proven immensely valuable to our users. With this in mind, the NGMDB project has been a leader in geologic map standards-development efforts that include: 1) the FGDC Geologic Map Symbolization Standard, 2) the North American Data Model’s (NADM) Science Language, 3) the NADM Conceptual Data Model, and 4) the IUGS-sponsored data-interchange format “GeoSciML”. These standards are being developed through the efforts of many hundreds of geologists across the world, which helps to ensure their adoption. A debt of thanks is owed to these individuals and agencies, who contributed so significantly to these activities.

Historically, geologic map standards have addressed the portrayal of two-dimensional information, and the management of that information in databases. Can these standards be applied to 3D geologic map information? Is that necessary? In my opinion, the answers are:

these standards can be extended to address the demands of 3D information; this work is underway now, and is briefly outlined in a previous Workshop in this series (Soller, 2004), and, to echo Powell’s quote, it is indeed necessary to strive for a standardization of 3D information, especially given its clear and immediate relevance to a broad range of societal issues.

Without question, standards are most effectively developed through consensus among scientific and technical experts, as opposed to a “top-down”, directive-based approach. For the past 12 years, the AASG/USGS-sponsored National Geologic Map Database project has used a consensus-based approach to standards development (see <http://ngmdb.usgs.gov/Info/standards/> for a partial list of the standards-development activities that the NGMDB has led or been involved in). The technical discussions held during the 11 annual Digital Mapping Techniques Workshops (see <http://ngmdb.usgs.gov/Info/dmt/>) have been an invaluable aspect of this effort; those workshops have served to expose to public debate numerous ideas for technical and science standards, and have resulted in significant convergence in techniques, guidelines, and standards among the Nation’s geological surveys.

This Workshop on 3D geologic mapping offers the NGMDB project an excellent opportunity to extend those discussions, and to identify prospective standards and guidelines that are most relevant to the collection, management, visualization, and dissemination of 3D map information. Specifically, can we identify standards or guidelines that would improve your ability to create 3D geologic maps and related products, and improve your user’s ability to understand and use these products?

## REFERENCES

- Soller, D.R., 2004. Facilitating 3-D Analysis with Standardized Information – The Role of the National Geologic Map Database, in R.C. Berg, Hazen Russell, and L.H. Thorleifson, conveners, Three-dimensional Geologic Mapping for Groundwater Applications: Illinois State Geological Survey Open-file Series 2004-8, p.85-88.