Digital Mapping Techniques '03

Association of American State Geologists | **United States Geological Survey**

Digital Mapping Techniques '03—Workshop Proceedings

June 1-4, 2003
Millersville, Pennsylvania

Convened by the
Association of American State Geologists
and the
United States Geological Survey

Hosted by the
Pennsylvania Geological Survey

U.S. GEOLOGICAL SURVEY OPEN-FILE REPORT 03-471

U.S. Department of the Interior
U.S. Geological Survey

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Edited by David R. Soller

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FOREWORD

When one looks at the history of science, the notion of a geologic map is a comparatively new scientific concept. The first geologic map of a large area was produced in England by William Smith, a mere 200 years ago. During a recent visit to the British Geological Survey (BGS), I had the opportunity to learn of their advances in geologic mapping during the last 2 centuries. I was amazed at the current effort to catalog and make all of their mapping holdings digital and more accessible to their various users. The British Isles are perhaps the most geologically mapped part of the planet. However, I was shown the results of an effort to develop a seamless geologic map of Great Britain from their mapped quadrangles. As you would expect, the map looked more like a quilt than a seamless representation of the geology.

The reasons for this problem are many, including varying interpretations of field observations. However, many problems are related to the lack of mapping standards. To me, that fact highlights the importance of this conference and the several that have proceeded it. Clearly, the development of digital mapping standards will serve us well in the future. Consensus and well considered standards will focus our attention on the major scientific issues and differences in interpretation, and will minimize our difficulties in separating legitimate scientific issues from those caused by differences in the standards or methods used to describe geologic features and compile maps. These standards should lead to products that will be far more understandable to the public. William Smith's geologic map was born from very practical needs. I think that even after 200 years, he would be among the first to applaud these efforts and the progress that has been made to date.

The First Digital Mapping Techniques Workshop was held in 1997 in Lawrence, Kansas, with the goal of "developing more cost-effective, flexible, and useful systems for digital mapping and GIS analysis". This joint effort of the Association of American State Geologists (AASG) and the U.S. Geological Survey (USGS) has been a great success, and instrumental in the sharing of ideas, technologies, and methods that will truly contribute to the development of digital geologic map products and standards designed to better serve society's needs in the future. It was a great pleasure to welcome the participants of the sixth annual workshop in Millersville, Pennsylvania. Enormous progress has been made since the first workshop, but much work remains. This volume, like those from previous workshops that document the 'state of the science' in digital mapping techniques, is an important legacy of the outstanding progress being made.

P. Patrick Leahy
U.S. Geological Survey
Associate Director for Geology

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Introduction

By David R. Soller

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The Digital Mapping Techniques '03 (DMT'03) workshop was attended by nearly 90 technical experts from 36 agencies, universities, and private companies, including representatives from 22 state geological surveys (see Appendix A). Although the meeting was slightly smaller than DMT'02 it was, considering the budget deficits in nearly all 50 states, very well attended. This workshop was similar in nature to the previous six meetings, held in Lawrence, Kansas (Soller, 1997), in Champaign, Illinois (Soller, 1998), in Madison, Wisconsin (Soller, 1999), in Lexington, Kentucky (Soller, 2000), in Tuscaloosa, Alabama (Soller, 2001), and in Salt Lake City, Utah (Soller, 2002). This year's meeting was hosted by the Pennsylvania Geological Survey, from June 1-4, 2003, on the Millersville University campus in Millersville, Pennsylvania. As in the previous meetings, the objective was to foster informal discussion and exchange of technical information. This objective was well met, as attendees continued to share and exchange knowledge and information, and to renew friendships and collegial work begun at past DMT workshops.

All the DMT workshops have been coordinated by the Association of American State Geologists (AASG) and U.S. Geological Survey (USGS) Data Capture Working Group, which was formed in August 1996, to support the AASG and the USGS in their effort to build a National Geologic Map Database (see Soller and Berg, this volume, and <http://ncgmp.usgs.gov/ngmdbproject/standards/datacapt/>). The Working Group was formed because increased production efficiencies, standardization, and quality of digital map products were needed for the database—and the State and Federal geological surveys—to provide more high-quality digital maps to the public.

At the 2003 meeting, oral and poster presentations and special discussion sessions emphasized 1) methods for creating and publishing map products (here, "publishing" includes Web-based release); 2) digital cartographic techniques, 3) analytical GIS techniques; 4) continued development of the National Geologic Map Database; 5) progress toward building and implementing a standard geologic map data model and standard science language, and 6) the need to archive both the published products and the data and observational data that support it.

ACKNOWLEDGMENTS

I thank the Pennsylvania Geological Survey (PGS) and their Director and State Geologist, Jay Parrish, for hosting this meeting and for his enthusiastic participation. In the tradition of past DMT meetings, the attendees were given a very informative, productive, and enjoyable experience. I especially thank Tom Whitfield (PGS), who coordinated the events, provided excellent support for the attendees, and offered an entertaining range of technical and social activities, including a medieval-themed dinner. Thanks also to Lynn M. Goodling (PGS) for skillfully managing the registration and logistics, Stuart O. Reese (PGS) for managing the meeting's website, and Gary M. Fleeger (PGS and secretary of the Field Conference of Pennsylvania Geologists) for hosting the meeting's Web site and finances. I also warmly thank Millersville University for providing an excellent venue and support for our meeting; in particular, Dr. Richard D. Clark, Dr. Lynn Marquez, and Dr. Alex DeCaria (Department of Earth Sciences), and John M. Roscoe (Director of University Dining and Conference Services).

I also, with gratitude, acknowledge Tom Berg (Chair, AASG Digital Geologic Mapping Committee) for his friendship and his help in conducting the meeting, and for his continued support of AASG/USGS efforts to collaborate on the National Geologic Map Database. Thanks of course also are extended to the members of the Data Capture Working Group (Warren Anderson, Kentucky Geological Survey; Rick Berquist and Elizabeth Campbell, Virginia Division of Mines and Geology; Rob Krumm and Barb Stiff, Illinois State Geological Survey; Scott McColloch, West Virginia Geological and Economic Survey; Gina Ross, Kansas Geological Survey; George Saucedo, California Geological Survey; and Tom Whitfield, Pennsylvania Geological Survey) for advice in planning the workshop's content.

I warmly thank Kit Richter (Geological Survey of Alabama) for technical editing of each manuscript, and Lisa Van Doren (Ohio Geological Survey) for typesetting the Proceedings. Finally, I thank all attendees for their participation; their enthusiasm and expertise were the primary reasons for the meeting's success.

PRESENTATIONS

The workshop included 29 oral presentations. Nearly all are supported by a short paper contained in these Proceedings. The papers describe technical and procedural approaches that currently meet some or all needs for digital mapping at the respective agency. There is not, of course, a single “solution” or approach to digital mapping that will work for each agency or for each program or group within an agency; personnel and funding levels, and the schedule, data format, and manner in which we must deliver our information to the public require that each agency design their own approach. However, the value of this workshop and other forums like it is through their roles in helping to design or refine these agency-specific approaches to digital mapping, and to find applicable approaches used by other agencies. In other words, communication helps us to avoid “reinventing the wheel.”

POSTERS AND COMPUTER DEMOS

More than 20 posters were exhibited and several computer demonstrations were provided throughout the workshop. These provided an excellent focus for technical discussions and support for oral presentations. Many are documented with a paper in these Proceedings, following those for the oral presentations; the other posters generally provided material in support of oral presentations, and so are not documented here.

DISCUSSION SESSIONS

To provide the opportunity to consider a topic in some detail, special discussion sessions are held at the DMT workshops. This year there were two: 1) how we can share information about digital cartographic techniques, and 2) how we should try to archive the basic data and observations that form the basis for all published databases, maps and summaries. Discussion on these topics was concentrated on the final day of the meeting, and produced many good ideas and recommendations that will be discussed by the Data Capture Working Group and DMT’03 attendees via the DMTListserve. These sessions highlight an important aspect of the DMT workshop series—it provides a unique venue for sharing technical information and experience for those in the geologic and GIS disciplines.

THE NEXT DMT WORKSHOP

The eighth annual DMT meeting will be held in mid-May, 2004, in Portland, Oregon. Please consult the Web site <http://ncgmp.usgs.gov/ngmdbproject/standards/datacapt/> for updated information. While planning for that event, the Data Capture Working Group will carefully consider the recommendations offered by DMT'03 attendees.

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