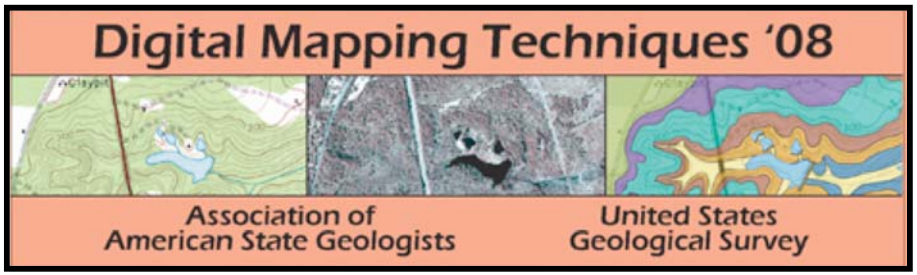


The following was presented at DMT'08 (May 18-21, 2008).

The contents are provisional and will be superseded by a paper in the DMT'08 Proceedings.

See also earlier Proceedings (1997-2007)
http://ngmdb.usgs.gov/info/dmt/

Sharing Technical Information With Non-Technical Users—
An Example From the Monterey Bay Area Quaternary Fault Atlas

Lewis I. Rosenberg, Tierra Geoscience, P.O. Box 1693, Tijeras, NM 87059, tierrageoscience@gmail.com
Collaborative Research with the U.S. Geological Survey, Northern California Quaternary Fault Map Database Task

ABSTRACT

This study was funded by the U.S. Geological Survey's National Earthquake Hazard Reduction Program (NEHRP). An important goal of NEHRP is to provide information that non-technical users can understand to help them reduce the hazards from earthquakes.

Although much of the NEHRP-funded research is extremely useful to geologists and seismologists, the findings are commonly written in language that is opaque to the layperson. One of the goals of this study was to provide a way that the information was accessible to scientists as well as to laypeople.

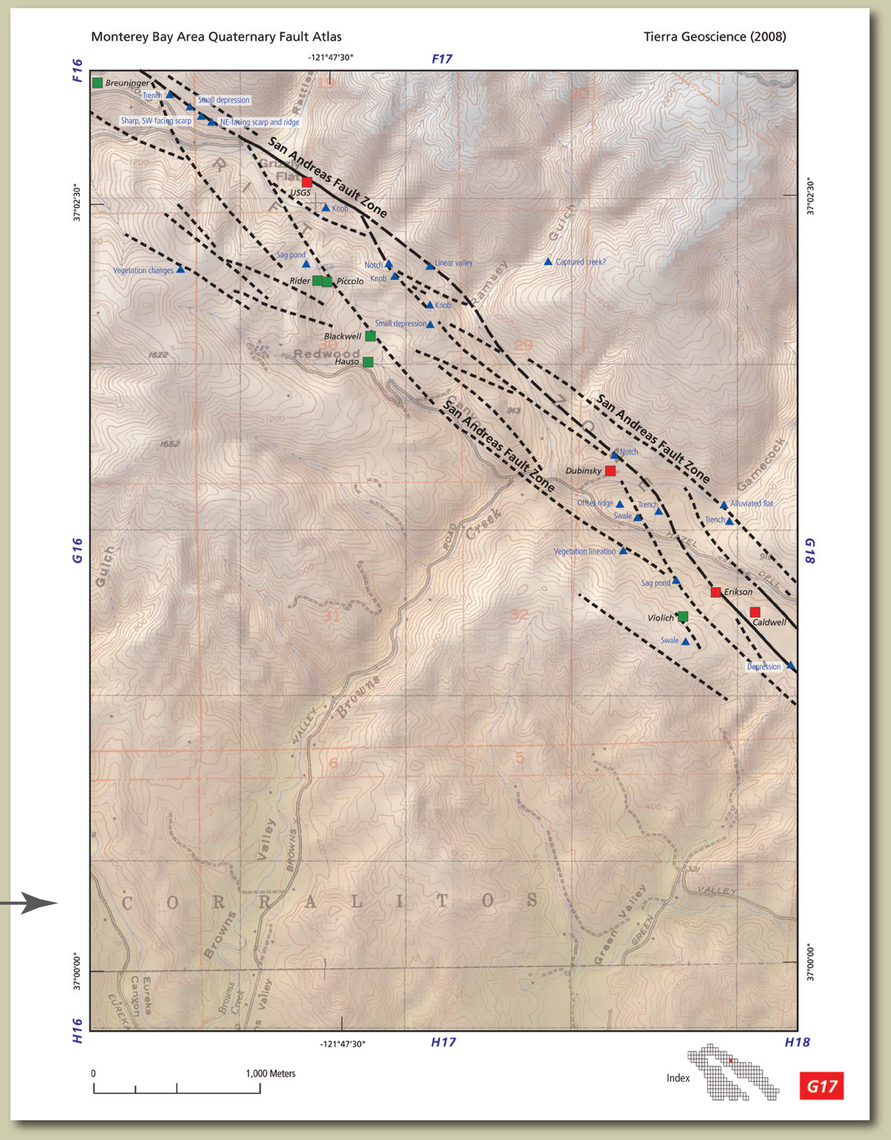
The data for this study were compiled using ESRI ArcGIS software. Even though it is possible to distribute ArcGIS files along with the free ArcGIS Explorer reader, many users have difficulty with this approach. For example, it is not intuitive that ESRI shapefiles consist of three to seven file extensions, not just the .shp file. This misunderstanding can cause difficulty in using GIS files.

For this reason, the data from this study were published as Keyhole Markup (kml) files, in addition to shapefiles. The advantage of this dual-format approach is that there are many more users familiar with kml files from the widely used Google Earth software compared to the specialized ArcGIS software.

Non-technical users can view the fault locations, exploratory trench locations, and geomorphic evidence locations in Google Earth. They can also combine these data with other information, such as house locations provided by their real estate agent. Thus, presenting the information in kml format helps the non-technical user to reduce their risk from earthquake hazards by providing a familiar approach to help them recognize active faults in relation to their property.

The kml file for this study contains low-resolution thumbnail images of the fault trench logs. Hyperlinks to high-resolution scans of the trench logs are also included. The low- and high-resolution images are stored remotely using Amazon's Simple Storage Service. This approach allows distributing a relatively small kml file, with the large image files stored on a server where they can be downloaded from anywhere.

Other methods used to help make the information from this study useful included presenting the maps in an atlas format (shown on the right), instead of oversize map sheets, which would otherwise take several sheets to cover the nearly 12,400 km^2 study area. The atlas format also has the advantage of being easy to update individual pages as more information about fault trenches and geologic mapping becomes available.



Any use of trade, product, or firm names is for descriptive purposes only and does not imply endorsement by the U.S. Government or by Tierra Geoscience.

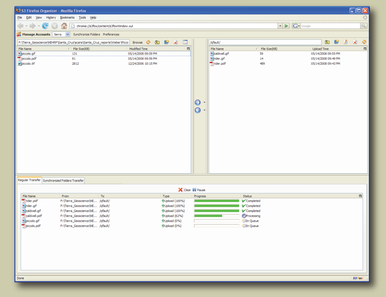
STORING DATA ON AMAZON S3

Files for this study are stored on the Amazon Simple Storage Service (aws.amazon.com/s3), commonly referred to as Amazon S3. The advantage of using Amazon S3 is that the data are stored on a server that is accessible worldwide and is scalable. The cost for storing data is relatively inexpensive at $0.15/gigabyte per month.

However, Amazon does not include a front-end interface for their Amazon S3. One solution is the freeware S3Fox Organizer plug-in (www.rjonna.com/ext/s3fox.php) for Mozilla's Firefox web browser. As shown on the screenshot on the right, S3Fox Organizer provides a graphical interface to move files to and from Amazon S3.

Low- and high-resolution images of fault trenches and site maps are stored as files on Amazon S3 and accessed from URL hyperlinks in the Google Earth information bubble for each fault trench site.

The ArcGIS files for this study are also stored on Amazon S3, which facilitates distribution of the data to those interested in obtaining the GIS files. A URL hyperlink gives access to the GIS files, and is easier and faster than burning and mailing CD-ROM discs.

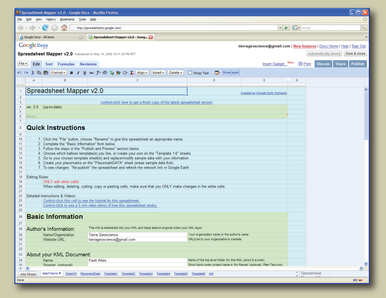


BUILDING THE KML FILE

Google developed an online spreadsheet, Spreadsheet Mapper, for ease in creating kml files. The spreadsheet is preformatted, so the user fills in the blank cells with latitude, longitude, and descriptions. The online nature of the spreadsheet allows collaboration with others, so more than one geologist or cartographer can work on the same project from anywhere. An example of the spreadsheet is shown on the right.

The trench data were exported from ArcGIS files into Microsoft Excel files that contained the site coordinates, the site name, the name of the geologic consultant, and URL links for the low- and high-resolution map and trench log scanned images. The data from the Excel files were then cut and pasted into Spreadsheet Mapper.

Spreadsheet Mapper also has several preformatted "bubble" templates, which are contain descriptive information when an icon in Google Earth is highlighted. The format and content of the bubbles can be modified using an html text editor, or commercially available html creation software.

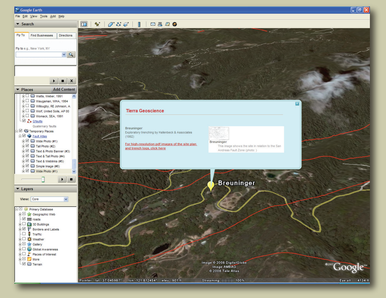


VIEWING AND DOWNLOADING DATA

The resulting kml file can be displayed in Google Earth (shown in the screenshot on the right) and in Google Maps, as well as Microsoft Virtual Earth, or other software capable of reading kml files. Other advantages of using this approach include the ability to combine the fault trenching sites (shown as yellow tear drops) and fault layers (shown as solid red lines) with features such as parcel boundaries and roads.

The approach of using Spreadsheet Mapper, Amazon S3, and Google Earth also has potentially useful application in post- natural disaster mapping. The collaborative nature of Spreadsheet Mapper combined with the distributed storage of Amazon S3 could be valuable for their ease of use, rapid sharing of data, and resistance to data loss from computer servers in the affected areas.

As this technology matures, the application will likely become easier and the uses for collaborative spreadsheets and distributed storage will become more widespread among geologists and cartographers.



PREPARED IN COOPERATION WITH