TECHNOLOGY CORNER

Inexpensive Data Acquisition for the Independent Geologist

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Anyone who has ever put together a prospect knows that one of the biggest problems is pulling together enough data to generate a prospect. For independent geologists, it is a Catch-22. You need to compile a database of relevant geologic information to sell the prospect so you can get paid. But you first have to spend money to build the database before you can even begin to work on generating the prospect. And for geologists who operate on a tight budget, spending your own money on data that may, or may not, help you define a prospect is a harrowing affair. What can be done to help? Believe it or not, there is a wealth of geologic and geophysical information at your fingertips, if you know where to find it. Best of all, much of it is free.

Public domain data are called that because anyone can use them. Much of it is available online, while other data sets are housed in university libraries and state geologic surveys. The key is to discover what kind of data are available, and then consider what can be done to that data with modern computer technology. Geologic and geophysical data are constantly being added on the web. The USGS electronically publishes many of its reports and maps. These are often available just by searching the web and simply downloading the data. These include geologic maps, mineral resource assessments, field investigations, stratigraphic correlations, and aeromagnetic and gravity data, among others.

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For example, consider the well-known digital elevation model, or DEM. Simply put, it is a digital version of the topographic surface for either a 7½ minute quadrangle or a 1º by 1º sheet. What can you do with that? How about downloading a block of them, piecing them together, and then applying different types of filters to see what patterns emerge? I recently compiled a mosaic of over twenty 7½ minute quadrangles in one of the northern states. The principal feature that one saw on the mosaic was a series of drumlins. By applying a high-cut filter to the DEM data, however, an older, underlying structural grain that related to deeper production emerged. This pattern was present in the raw topographic data, and was readily observable, but only when you knew how to look for it. Also, because all of the quadrangles were digital, the maps could be produced at any scale. It was easy to map specific areas of interest at a scale to fit all the client's basemaps. It should be noted that the resolution of the data can be very good. Most of these quadrangles were ten-meter grids. This means that there are over 25,000 data points per square mile. And, best of all, these data are free. Similar to the DEM is the digital raster graphic, or DRG. The DRG is a scanned version of the topographic maps that the USGS compiled and are available at 1:24000, 1:100000, and 1:250000. These maps show varying degrees of cultural detail, depending upon the scale. These digital images, however, have the ability to be expanded or shrunk to any scale. Thus, the geologist can create basemaps showing the land grid, the location of pipelines, and other aspects of the infrastructure at the exact scale desired. The USGS also provides digital line graphs (DLG) that can be displayed as layers on a map. These layers include political boundaries, hydrography, transportation, and public land surveys, among others.

Aeromagnetic and gravity data often are a part of a prospect package. A wealth of potential field data are available online, but the general lack of processing and interpretation experience among prospect developers has limited the amount of use that these datasets receive. To be certain, these datasets are not the "state of the art." But, they can fulfill several very useful roles. These include: determining the regional structural framework of an area, defining the strike and extent of deeper-seated features that affect the stratigraphic column, and predicting the thickness of the overall sedimentary package. Also, these data can help in setting up the most effective geophysical exploration program. I have recently compiled packages of public domain gravity and magnetics on a statewide level for all of the contiguous United States and Canada. One of my clients has used the compilation for the state of New York as an integral piece in choosing parameters for acquiring new geophysical data. Another has used it as a "regional matrix" for dropping newer data into. Still another has used it as ammunition for justifying the purchase of specific seismic lines. Each client used the data differently, but all recognized the usefulness of such an inexpensive tool.

Perhaps one of the best attributes of all of this free data is that it is not that hard to find on the Internet. There is no need to be a computer wizard to search it out. Start by visiting the USGS and various state websites. Many have clear and easy to use interfaces, in addition to offering many useful links. For example, a couple excellent examples are the Kansas (www.kgs.ukans.edu) and Louisiana (www.dnr.state.la.us) site. Tremendous amounts of data exist on well and production at these sites that can be imported to most any type of software. If you hit a wall in your search efforts, visit my website at www.centennial-geo.com or feel free to e-mail me at jpfagan@centennial-geo.com. Good luck and happy hunting!

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