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# Arizona Geology

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ARIZONA  
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## MISSION

To provide unbiased geologic information to assist the public, businesses, and government agencies in developing policies and courses of action for prudently managing Arizona's land, water, mineral, and energy resources.

## FUNCTIONS

- Information about Arizona geology
- Geologic maps and reports
- Databases and files
- Geology library
- Rock cuttings and core repository
- Geologic mapping and framework investigations
- Geologic hazards investigations
- Mineral and energy resources investigations
- Administrative and staff support for Oil and Gas Conservation Commission

A.R.S. § 27-152

## Starting a New Project? We Can Save You a Lot of Time!

Larry D. Fellows  
*Arizona Geological Survey*

When you start a new geologic project or assignment, you will need to know what reports and maps already have been done in that area. Chances are good that Arizona Geological Survey Open-File Report (OFR) 96-6, which we recently released, can save you or your staff a tremendous amount of time. In fact, the time saved on just one project might be enough to pay for the entire report. OFR 96-6, a three-component package, is described below.

**1. Physiographic-area map.** This is a 1:1,000,000-scale map that divides Arizona into 555 physiographic areas, each with its own name such as "Tucson Mountains" or "Luke Basin." The map was released as OFR 95-2a and 2b. You may use either Map 2a, which shows highways, cities, and political boundaries, or Map 2b, which has townships and ranges on the base. Both maps

show physiographic areas. Figure 1 is a portion of Map 2b.

The physiographic-area map is a convenient point from which to start searching for information about the geology of a specific area. Once you have identified the name of a physiographic area, you can use it to find citations in the physiographic-area index, described below.

**2. Physiographic-area index.** This is a 341-

page list of citations of sources of geologic information in each of the 555 physiographic areas, which are listed alphabetically. Beneath each is an alphabetical list (by author) of references that include all or parts of that physiographic area. Each citation is identified by the first 40 characters of the author(s) field (from AZGEOBIB), followed by the year of publication and a unique reference number. Figure 2 is a

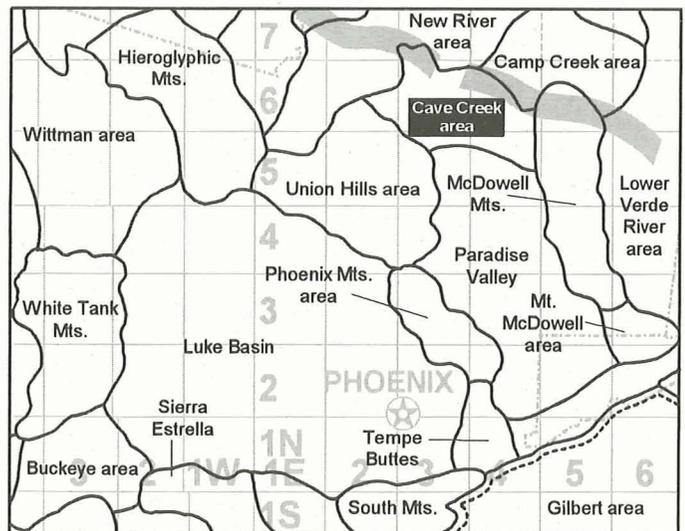


Figure 1. A portion of the physiographic-area map (OFR 95-2b) that shows townships and ranges. The wide gray line is the boundary between the Basin and Range Province and the Transition Zone.

# Starting a New Project ? (continued from page 1)

portion of the physiographic-area index.

Two MS-DOS floppy disks are included. Disk 1 contains physiographic areas whose first letters are A to L and disk 2 includes those from M to Z.

### 3. List of references.

This is a 312-page alphabetical list (by author) of all 11,500 citations in the AZGEOBIB database. The list can be purchased separately as OFR 96-1 (AZGEOBIB, Version 2.1). Multiple citations by the same author are listed from oldest to newest. Each citation has been given a unique reference number. Figure 3 is a portion of the list of references.

Four floppy disks are distributed with the list of references. Two contain a set of ASCII files that are a digital version of the text. They can be directly imported into a word processor, such as Microsoft Word. File sizes are approximately 400 kb. Microsoft Word 6.0 was used for editing these files, which were saved as text files.

The other two disks contain tab-delimited ASCII

files, exported directly from the original database, that can be imported into various database programs. Each record has 6 fields: 1) author(s), 2) year of publication, 3) title, 4) information following the colon, which includes name of the serial or place of publication and publisher, volume and number, pages, etc., 5) unique reference number, and 6) verification information.

### How to use OFR 96-6.

We've provided an example of how to use the three components of the database by referring to Figures 1-3. **Step 1** is to find the physiographic area within which your project is located. Let's assume that it's in the north part of the metropolitan Phoenix area. Figure 1 is that portion of the physiographic-area map that covers the Phoenix area. On close examination you determine that your project is within the Cave Creek area. **Step 2** is to refer to the physiographic-area index and find the Cave Creek area. Figure 2 shows part of the reference list for the Cave Creek area. **Step 3** is to find the

### Cave Creek area

Spencer, J.E.	1986	9595
Spencer, J.E.	1992	14227
Spencer, J.E., ed.	1993	12588
> Spencer, J.E., Emer, D.F., and Shenk, J.	1988	9629
Suck, S., Upchurch, E., and Brock, J.	1976	9879
Sumner, J.S., Schmidt, J.S., Aiken, C.L.	1975	9902
Texas Instruments, Inc.	1978	10051
Thomas, N.O., and Harbeck, G.E., Jr.	1956	10093
Townsend, R.C.	1967	10223
Turner, R.M.	1974	10286
United States Atomic Energy Commission,	1970	10322
United States Bureau of Land Management,	1973	10338
United States Bureau of Reclamation and	1973	10372
United States Geological Survey	1979	10419
United States Geological Survey	1979	10452
Uranium Resource Evaluation Project	1982	10558
Wagner, C.G.	1979	10708
Wells, R.C.	1937	10923
Wenrich, K.J., Chenoweth, W.L., Finch, W	1989	10992

Figure 2. Partial list of reference citations in the Cave Creek physiographic area (OFR 96-6, p. 55). Only 19 of the 137 citations are shown here.

complete citation for any of the partial citations in the physiographic-area index. For example, if you want to know more about the partial citation "Spencer, J.E., Emer, D.F., and Shenk, J. 1988 9629," refer to the list of references (OFR 96-1), which is shown in Figure 3.

If you follow these steps, you can determine which citations appear to be pertinent. Those are the ones you will need to examine. If there are a

hundred citations for a specific area, you might decide that only a dozen or so apply to your project.

The AZGS is committed to expand AZGEOBIB and make it more accessible to users, as time and budget allow.

### Ordering instructions.

Ordering instructions are given on page 3 of this issue. For additional information, please contact Rick Trapp at the AZGS. The address and telephone number are on page 4.

Spencer, J.E., Duncan, J.T., and Burton, W.D., 1988, The Copperstone Mine: Arizona's new gold producer: Fieldnotes [Arizona Bureau of Geology and Mineral Technology], v. 18, no. 2, p. 1-3. 9626 V

Spencer, J.E., Emer, D.F., and Shenk, J.D., 1987, Geology, radioactivity, and radon at the Cardinal Avenue uranium occurrence, southwestern Tucson: Arizona Bureau of Geology and Mineral Technology Open-File Report 87-03, 16 p. 9628 V

> Spencer, J.E., Emer, D.F., and Shenk, J.D., 1988, Background radioactivity in selected areas of Arizona and implications for indoor-radon levels: Arizona Bureau of Geology and Mineral Technology Open-File Report 88-11, 14 p. 9629 V

Spencer, J.E., Emer, D.F., and Shenk, J.D., 1993, Geology, radioactivity, and radon at the Cardinal Avenue uranium anomaly, southwestern Tucson, in Spencer, J.E., ed., Radon in Arizona: Arizona Geological Survey Bulletin 199, p. 10-16. 12590 V

Spencer, J.E., Gehrels, G.E., Bedford, J. Hall, D., Long, K., Miller, L., and Tufts, R., 1993, Geologic maps as interpretive studies: An example from the Dragoon Mountains: Arizona Geology [Arizona Geological Survey], v. 23, no. 1, p. 1-2, 7. 12569 V

Spencer, J.E., Gilbert, W.G., and Richard, S.M., 1992, Geologic map of the eastern Eagletail Mountains, Maricopa, La Paz and Yuma Counties, Arizona [Eagletail Mts. East 7.5 min]: Arizona Geological Survey Open-File Report 92-03, 13 p., 1 sheet, scale 1:24,000. 12473 V

Figure 3. A portion of the list of references (OFR 96-1, p. 255).

# New Publications

The Arizona Geological Survey released the following publications since February 1996:

## **Uranium distribution in sediments of the lower San Pedro Valley, south-east Arizona, and implications for indoor radon:**

R. C. Harris, 1996, Open-File Report 96-2 (Pub. number OFR 96-2), 10 p., map scale 1:100,000. \$5.00

The study area locally contains slightly elevated uranium concentrations in diatomaceous basin-fill sediment. No residences are nearby. Average radon levels in homes that were tested are only slightly above the statewide average, but are below the EPA action level.

## **Geology of the northern Kofa Mountains (Owl Head and northern third of the Kofa Butte 7.5' quadrangles), Yuma and La Paz Counties, Arizona:**

C. A. Ferguson and S. J. Skotnicki, 1996, Open-File Report 96-3 (Pub. number OFR 96-3), 23 p., 2 sheets, scale 1:24,000. \$6.75

Most bedrock exposures are Miocene calc-alkaline volcanic rocks of the Kofa volcanic field. Crystalline basement rocks are exposed in the footwall of two major south-side-down normal faults that transect the north-central part of the map area. The basement consists primarily of Mesozoic(?) granitoids that have intruded amphibolite-facies Proterozoic(?) metasedimentary rocks to the east. To the west the granitoids are in contact

with low-metamorphic grade argillites of probable Mesozoic age. The study area is in a northeast-tilt domain in which the oldest volcanic strata are tilted at least 45°. Along a strike-normal cross section across the widest part of the study area, the total amount of extension is at least 62 percent, and, locally, more than 80 percent. The area includes a number of mineralized zones, all of which have been prospected or mined.

## **Publications of the Arizona Geological Survey (1988-1995):**

T. G. McGarvin and R. A. Trapp, 1996, Open-File Report 96-4 (Pub. number OFR 96-4), 16 p. \$2.50

The Arizona Geological Survey (AZGS) became a stand-alone State agency July 1, 1988. This report lists the geologic maps and reports that have been released in the 7.5 years since. The list includes 165 maps and reports that were completed by AZGS geologists and 75 that were contributed by other geologists to be made available to the public. It does not include reports that were published outside the AZGS.

## **Geomorphology and surficial geology of Garden Canyon, Huachuca Mountains, Arizona:**

Gary Huckleberry, 1996, Open-File Report 96-5 (Pub. number OFR 96-5), 19 p., 1 map, scale 1:12,000. \$6.00

Five alluvial-fan and two stream-terrace surfaces were

identified. Most of these topographically-distinct surfaces are in the lower canyon and upper piedmont and easy to separate by elevation and degree of stream dissection. Elsewhere, mature soils with red, clay-rich horizons indicate that most surficial deposits in the area are of Pleistocene age. This suggests that the present interglacial climate of the last 11,000 years has not been conducive for sediment transport and deposition. Overall, the Holocene has been a period of landscape stability.

## **Physiographic area index for AZGEOBIB v. 2.1 (including AZGS OFR 96-1 and OFR 95-2):**

R. A. Trapp, 1996, Open-File Report 96-6 (Pub. number OFR 96-6), 655 p., six 3.5-inch MS-DOS floppy disks, and 2 sheets, scale 1:1,000,000. \$65.00

This report is potentially so important to the geologic community that we featured it on the cover of this issue.

## **History of stratigraphic name usage for Tertiary rock units in the Superstition and Goldfield Mountains area:**

R. A. Trapp, 1996, Open-File Report 96-7 (Pub. number OFR 96-7), 17 p. \$2.50

This area has been a fertile birthing ground for stratigraphic names. The author has reconciled diverse and conflicting name usage. Current geologic mapping in the area has provided impetus for the project.

## How to Order Them

You may purchase publications at the AZGS office or by mail. Address mail orders to AZGS Publications, 416 W. Congress St., Suite 100, Tucson, AZ 85701. Orders are shipped by UPS, which requires a street address for delivery. All mail orders must be prepaid by a check or money order payable in U.S. dollars to the Arizona Geological Survey or by Master Card or VISA. Do not send cash. Order by publication number and add these shipping and handling charges to your total order:

### Shipping & Handling CHARGES

In the United States:

Less than \$1.01, add \$1.00
1.01- 10.00, add 3.00
10.01- 20.00, add 4.50
20.01- 30.00, add 5.75
30.01- 40.00, add 6.50
40.01- 50.00, add 8.00
50.01- 100.00, add 10.25
Over 100.00, add 12%

Other countries, request price quotation.

Shipping and handling charges include insurance. For rolled maps, add \$1.00 for a mailing tube.

If you purchase Open-File Reports, Contributed Maps, or Contributed Reports at the AZGS office, allow up to two days for photocopying.

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**ARIZONA LEGISLATURE-**

Status of Bills, 15 April 1996

**SB 1075** (continues Oil and Gas Conservation Commission and Department of Mines and Mineral Resources): signed by the Governor.

**SB 1126** (reclassifies producing oil, gas, helium, and geothermal properties): passed by the Senate, but died in the House.

**SB 1144** (mineral lease trade secrets): signed by the Governor.

**SB 1155** (continues Board of Technical Registration): signed by the Governor.

**SB 1380** (gives the State Mine Inspector the responsibility for administering the Mined-Land Reclamation Act): passed by the Senate, amended by the House, and returned to the Senate.

**GEOPHYSICAL MAPS**

The Arizona Geological Survey entered into a cooperative agreement with the University of Arizona Geophysical Society to sell three 1:1,000,000-scale color maps that the Society published: *Residual Aeromagnetic Map of Arizona*, 1970 (Pub. number NP-13, \$10.00); *Depth-to-Bedrock Map, Basin and Range Province, Arizona*, 1980 (Pub. number NP-14, \$10.00), and *Residual Bouguer Gravity Anomaly Map of Arizona*, 1980 (Pub. number NP-15, \$10.00). If you need to have the maps mailed, please use the Pub. number when ordering and add shipping and handling costs, which are listed on page 3 of this issue.

**AASG EARTH SCIENCE EDUCATION SOURCE BOOK**

This book is a list of earth-science-education materials and services that are available from the 50 State Geological Surveys in the United States and the Association of American State Geologists (AASG). The book, the *AASG Earth Science Education Source Book*, was compiled by Robert H. Fakundiny and Neil H. Suneson from the New York State Geological Survey and the Oklahoma Geological Survey, respectively. This compendium is intended to be a quick reference for teachers who need resources for their classes, but might also be useful to postsecondary teachers, hobbyists, and

mineral and fossil collectors. The book is patterned after, and intended to complement, the Earth-Science Education Resource Directory that was published by the American Geological Institute. The AASG plans to periodically update the Source Book.

A paper copy of the AASG book may be purchased from the Arizona Geological Survey for \$12.00. A 3.5 inch MS-DOS floppy disk is included. Please use Pub. number NP-16 when ordering and refer to page 3 of this issue for shipping and handling charges.

**COMING EVENTS**

**"Minerals in Society" Summer Academics**, sponsored by the Arizona Mining Association: Phoenix, June 9-14; Tucson, July 28-August 2. For details call (602) 266-4416.

**Arizona Hydrological Society Symposium**: Prescott, September 12-14. For details call Doug Bartlett [(602) 861-7409] or Abe Springer [(520) 523-7198].



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