DEPARTMENT OF THE INTERIOR

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ARIZONA RADIOMETRIC AGES HYPERCARD STACK

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DESCRIPTION

Arizona Radiometric Ages is a HyperCard Stack for the Apple Macintosh Computer. It comprises the radiometric age determinations previously published by Reynolds and others (1986) and a stack which performs compound Boolean retrievals. Retrieved ages and their rock unit names are displayed on maps with links to the complete record associated with each retrieved age. The stack runs on any model Macintosh with at least two Megabytes of RAM. A Macintosh II is recommended, otherwise searches will be very slow. A hard disk and HyperCard are required. The sample locations of some age determinations of the Galiuro Volcanics have been updated, and the contents of the field Site Name have been changed.

The user should first consult the HyperCard User's Guide (Apple Computer Co., 1987) for information on the basic operation of HyperCard. The floppy disk accompanying this report contains the HyperCard Stack in compressed form, the UnStuffIt utility for decompressing the Stack (courtesy of Aladdin Systems Inc.), and a TEXT file version of this report. Although this program has been extensively tested, the U.S. Geological Survey cannot guarantee that it will give accurate results for all applications, or that it will work on all computer systems. This report and disk constitute the 0.8 version of June 20, 1990.

A GUIDE TO USING ARIZONA AGES

Arizona Ages must be uncompressed using UnStuffIt before it can be used. To uncompress Arizona Ages, copy the disk contents to your hard disk, then double click on UnStuffIt. After clicking on the title screen, choose **Open Archive...** under the **File** menu and double click on the file AGES.sit. Now, click on the file Arizona Ages and on the button called Extract. Finally, click on the button Save and choose **Quit** from the **File** menu.

Before running Arizona Ages, the user must go to the Home Card and set the User Preferences to Scripting. To get to the Home Card, start HyperCard or if HyperCard is running, choose **Home** under the **Go** menu. To get to the User Preferences card from the Home Card, choose **Last** from under the **Go** menu. Now click on the button named Scripting.

The initial view of Arizona Ages is intended to represent a standard field notebook. Buttons on this card link to the following cards within the notebook:

1) DATA CARDS links to the age data records themselves. There are 16 visible fields on these cards which contain the entire data record from Reynolds and others (1986). There is also a small Arizona map which shows the location associated with the age. If the latitude or longitude fields are changed, this small map will be automatically adjusted for the new sample location. There is a 17th hidden field on these cards which contains a flag indicating whether the card has been selected via the current Boolean search. Normally, the user will not need to be concerned with

this hidden field. Figure 1 shows an example of a data card.

2) PRINT CARDS executes a procedure which prints some or all age data records. The user will be asked whether to print all data records or just those data records which have been selected via the current Boolean search.

3) SEARCH HELP links to a card which explains how to do compound Boolean searches. The text of this card is given below.

4) EXPORT DATA executes a procedure which writes some or all age date data records to a TEXT file. The user will be prompted for an output file name and then asked whether to write all data records or just those data records which have been selected via the current Boolean search.

5) IMPORT DATA executes a procedure for loading additional age determinations into the data base. The user will be prompted for an input file name which should be a TEXT file containing the contents of fields 2 through 17 with each field followed by a tab character and the last tab character followed by a carriage return. Note that the last two characters will be tab and carriage return.

6) MAP links to a map of Arizona showing the locations of all age determinations. When the mouse pointer is placed above an age symbol, the corresponding age and rock unit name appear in the Message Window. For example, "Chinle Formation at 169.000 Million Years" might appear. If the user clicks on the symbol, the full data record for this age determination will appear.

7) SEARCH MAP links to a map of Arizona showing the locations of just those age determinations which have been selected via a Boolean search. The search process is explained below. When the mouse pointer is placed above an age date symbol, the corresponding age and rock unit name appear in the Message Window. For example, "Chinle Formation at 169.000 Million Years" might appear. If the user clicks on the symbol, the full data record for this age determination will appear. This map takes several minutes to create. Subsequent references to this map will work much faster until the Boolean search is altered.

8) LOCAL MAP links to a map of Arizona showing the boundaries of all 2 degree map quadrangles in Arizona. When the mouse pointer is placed within a quadrangle, the quadrangle name appears in the Message Window. If the user clicks within the quadrangle, a map showing the outline of the quadrangle will appear along with symbols for each age determination previously selected via a Boolean search. When the mouse pointer is placed above an age symbol, the corresponding age and rock unit name appear in the Message Window. For example, "Chinle Formation at 169.000 Million Years" might appear. If the user clicks on the symbol, the full data record for this age determination will appear. This map takes several minutes to create. Subsequent references to this map will work much faster until the Boolean search is altered.

9) CHANGE MAP links to a card containing the coordinates for the longitude-latitude grid seen on the various maps described above. You may add additional lines and even fill polygons with patterns. Instructions on this card explain how to do this. This may take a long time to execute.

10) CHANGE LOCAL MAPS links to a card containing the coordinates for each of the local maps explained above. You may add new maps or modify existing maps.

Instructions on this card explain how to do this. This may take a long time to execute although not as long as CHANGE MAP.

The SEARCH HELP card contains the following explanation of how to do compound Boolean searches. You conduct a search by entering a succession of special commands in the Message Box. To begin a search, type a FFind command into the Message Box and press **return**. Use other commands to refine this search. Using the FFind command will distroy any previous search selection. Do not use the standard HyperCard command Find except as explained later. Examples of FFind commands follow:

FFind " 'PED' in field 'Sample Number' "
FFind " 'Queen' in field 'Quadrangle' "
FFind "field latitude < 33"
FFind "field latitude <= 33"
FFind "field longitude >= -118"

In the first example FFind will find all cards with the characters PED in the field Sample Number. Use the other format with < >, =, <=, and >= to retrieve cards by location. Note that the parameters to these commands must be enclosed in double quote marks and that text strings and those field names which include blanks must be enclosed in single quote marks as in the first example above. Any of the parameter formats illustrated here can be used with any of the commands. The available commands are: FFind, FRefine, FAdd, and FSub.

You can do complex searches with this stack. Study the following examples and explanations to learn how. NOTE, your search will go much faster if you apply your most restrictive criteria first.

FAdd will add all cards with the indicated characters in the indicated field to the current search. It's basically an OR function. An example which will add all cards with the characters Damon in the field Reference to the current search follows:

FAdd " 'Damon' in field 'Reference' "

FSub will remove all cards with the indicated characters in the indicated field from the current search. The following example will remove from the current search any card that contains the characters basalt in any field. When you don't specify a field to search, the search will take longer than normal because the stack must search every field.

FSub " 'basalt' "

FRefine will keep in the current selection only those cards which meet its criteria. In the first example, it will keep only those cards which represent ages in the Copper Creek Quadrangle. The second and third examples together will keep only those cards within a band of longitude from 110.5 W to 108 W. FRefine is basically an AND function. Examples follow:

FRefine " 'Copper Creek' in field 'Quadrangle' "
FRefine "field longitude < -108"
FRefine "field longitude >= -110.5"

You can use the standard HyperCard command Find to look at the current selection. See the following example.

Find true in field Selected

Every time you press return, you will see the next card in the selection. It will cycle once you reach the end of the selection. By way of explanation, all the search commands described above put the value true or false into the hidden field named Selected. Consequently, you can use the standard command Find as above to look through the search results.

You can also use Find for any other purpose. Just remember that Find does not effect the maps and FFind, FAdd, FSub, and FRefine do. Sort can cause serious damage to the stack and while it will work sometimes, it is NOT recommended.

REFERENCES CITED

Apple Computer Co., 1987, HyperCard user's guide: Cupertino, 221 p.

Reynolds, S.J., Florence, F.P., Welty, J.W., Roddy, M.S., Currier, D.A., Anderson, A.V., and Keith, S.B., 1986, Compilation of radiometric age determinations in Arizona: Arizona Bureau of Geology and Mineral Technology Bulletin 197, 258 p.