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VOLPLOT;

A PC-based program for viewing Cook Inlet volcano-seismic data

by

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INTRODUCTION

The Alaska Volcano Observatory is a distributed multi-site, multi-agency consortium responsible for the monitoring of, and research on, volcanoes in Alaska. Agencies involved are the U.S. Geological Survey, the University of Alaska Geophysical Institute, and the Alaska Division of Geological and Geophysical Surveys. Major sites are located in Anchorage and Fairbanks, Alaska, Vancouver, Washington, and Menlo Park, California. Earthquake hypocenter data, which are recorded and analyzed daily in Fairbanks, need to be readily available for viewing at the other sites. The following describes the procedure to dial a Sun workstation in Fairbanks, download a file containing earthquake hypocenters, and plot the locations and magnitudes on an IBM PC or compatible computer. The accompanying plotting program is not intended to be all-encompassing, but rather to be a simple, fast plot of earthquake location and magnitude data for the last 31 days or less. If desired, the downloaded data can be imported into more sophisticated analysis packages.

DATA COLLECTION AND STORAGE

Volcanic earthquake data is collected by the Alaska Volcano Observatory using MDETECT (Lee, Tottingham, and Ellis, 1988; Lee, 1989) on a DOS-based 386 PC. The data are periodically transferred to a Sun workstation for processing (March and Power, 1990). Earthquake locations are determined on the Sun using the program XPICK, developed by the University of Alaska Geophysical Institute (Robinson, 1990) in conjunction with HYPOELLIPSE, developed by the U.S. Geological Survey (Lahr, 1989).

A summary file of hypocenters for the last 31 days is automatically created every hour by the Unix crontab facility. Crontab runs the Unix shell script DATE.SCRIPT which produces an output summary file on the Sun, BOTH.SUM, in a directory accessible to any user via phone line.

ACCESSING THE DATA VIA VOLPLOT

VOLPLOT has two functions; 1) Acquire the data in BOTH.SUM from the Sun workstation in Fairbanks and 2) Plot the data. The two functions are combined in a single batch file, VP.BAT. Procomm Plus, a communications program by Datastorm Technologies, Inc., is used to automatically download the hypocenter summary file from the Sun to a PC via a 9600-baud modem. Using the script file KISKA.ASP, Procomm automatically:

- 1) Sets the parameters for the PC's modem.
- 2) Dials and logs on to the Fairbanks Sun.
- 3) Transfers the hypocenter summary file BOTH.SUM to the PC using KERMIT.
- 4) Logs off the Sun.

PLOTTING THE HYPOCENTER DATA WITH ABPLOT

The plotting program, ABPLOT, begins immediately after the data is transferred. Written in Microsoft FORTRAN, ABPLOT is included on the accompanying disk. The program asks which volcano's data to plot, the time period desired for the plot, and whether to send the plot to the screen or to the printer. Plots of hypocenter locations and of depths through time then appear on the selected output device.

FORTRAN graphics commands used in ABPLOT are executed using the Geograf library, available from Geocomp Corporation, 66 Commonwealth Ave., Concord, MA 01742. Geograf also supplies the screen and printer drivers and fonts used in the program. The drivers are available from Geocomp exclusive of the library for about \$75 if further program development is not desired.

The summary file BOTH.SUM contains data for four Cook Inlet volcanoes. Included in ABPLOT are parameters which limit the latitude and longitude of the data to be plotted according to which volcano is chosen. Contour plots of the various volcanoes are included in the necessary files. Depth data is measured from sea level.

PRINTING THE HYPOCENTER DATA USING VPREP

The program VPREP is a standalone program that reformats the data in BOTH.SUM to 80-column width. This makes the file more easily viewed on the screen and printed on standard-width printers.

INSTALLING VOLPLOT

The required hardware for VOLPLOT includes a PC running MS-DOS 3.0+ and a modem with a baud rate of up to 9600 baud. Required software is Procomm Plus, Geograf screen and printer drivers and font files (see above discussion) , and the software included in this Open-File Report.

To install VOLPLOT:

- 1) Create the directory VOLPLOT on your computer (Use the DOS command "MKDIR C:\VOLPLOT"). If you choose to place it somewhere other than C:\VOLPLOT, you will have to edit the file VP.BAT (step 5) to reflect the different location.
- 2) Copy VOLPLOT.EXE to the directory VOLPLOT.
- 3) Get into the VOLPLOT directory and type VOLPLOT. VOLPLOT is a self-extracting archive file containing the necessary files and program to run VOLPLOT.
- 4) The file that downloads the earthquake data from the Sun is called KISKA.ASP; it will need to be edited for your site.
 - a) Change the baud rate on line 10 to match that of your modem.
 - b) Line 11 has the dialing instructions for the Sun's modem; (907) 474-5955. "8" is the number to get an outside line, "907" is the area code, and "474,5955" the local number. Change, add, or subtract numbers as appropriate for your phone system. The commas cause a 2-second delay before dialing the next digit. The "^M" indicates the end of the dialing sequence.
- 5) Edit VP.BAT to reflect where VOLPLOT and PCPLUS reside.
- 6) Create SCREEN.DRV and PRINTER.DRV for the PC's graphics adapter and printer as described in the Geograf manual. Note that the Geograf diskette is write-protected and you will have to either copy the contents to your hard disk and create the drivers or, when prompted for the file name, indicate a directory on your hard disk.

Copy the drivers to the VOLPLOT directory.
- 7) Copy SR.FNT from the Geograf utilities diskette to the VOLPLOT directory.

- 8) Create the uniformly spaced SR font file SR_UNI.FNT by running the PFONT.EXE utility on the Geograf Utilities diskette. The command would be (executed from the diskette):

```
PFONT SR.FNT C:\VOLPLOT\SR_UNI.FNT
```

In some versions of PFONT, this will give an error in opening SR_UNI.FNT. This is due to a bug in the program. It apparently creates SR_UNI.FNT as a readonly file and when the program tries to write to it, it cannot. In this case you must change the attribute of SR_UNI.FNT so that it is NOT READONLY. This can be done through the DOS command:

```
ATTRIB -r C:\VOLPLOT\SR_UNI.FNT
```

PFONT should now run properly.

- 9) Get into C:\VOLPLOT and type VP to execute the procedure and plot the data. To erase the plot from the screen and get back to the menu press <Enter>.

FILE.LST contains a list of files on the diskette.

REFERENCES

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