

2. SeisVoleE basic navigation and data[©]



Lawrence W. Braile,
Professor
Department of Earth and
Atmospheric Sciences
Purdue University
West Lafayette, Indiana

Sheryl J. Braile, Teacher
Happy Hollow School
West Lafayette, Indiana

January 14, 2002

Objective: Learn the basic operation of the computer program **SeisVoleE** – an effective tool for exploring earthquake and volcano occurrences and plate tectonics. The SeisVoleE computer program (written and distributed by Prof. Alan Jones, State University of New York, Binghamton) can be easily downloaded and installed (see teaching module 1) on your computer and then used to view “speeded-up-real-time” displays of earthquake and volcano activity on a variety of base maps. The program is powerful and easy to use and allows one to view many pre-assembled maps (views) or to select a new view and control the display.

Information: The SeisVoleE program contain extensive earthquake and volcanic eruption data files (catalogs), and can be updated from the Internet to include the most recent earthquake information. Additionally, information on individual events can

[©] Copyright 2001. L. Braile and S. Braile. Permission granted for reproduction for non-commercial purposes.

be obtained and statistical analyses can be performed on the earthquake or eruption data by controlling the time, area and magnitude ranges of the display. The earthquake catalog (world.hy4) contains hypocenter (the hypocenter is the epicenter location and the depth of focus) information (latitude, longitude, depth, origin time, magnitude) for worldwide events of magnitude 5.0 and above for 1960 to the present. The catalog also includes earthquakes of magnitude 4.0 and above for the United States and of magnitude 3.0 and above for California. Hypocenter data can be updated to include current events through connection to the Internet (see **Teaching Module 13**). Additional catalogs can be created for specific areas and for additional time or magnitude ranges using earthquake searches available on the Internet and then plotted and analyzed using SeisVolE. The volcanic eruption catalog contains eruption data for 1960 to early 2000. More information on the volcano data, including a discussion of estimation of the magnitude (size) of volcanic eruptions, is contained in the **Help** file of SeisVolE.

The program is very useful and produces attractive maps. It is worthwhile to have individual students use the program in a computer lab or with their own computers. Alternatively, the program can be used in demonstration mode in a classroom to illustrate interesting and important earthquake and plate tectonic concepts. The seismicity maps can be displayed for large and small areas (for example the world display in Figure 2.1 or the view of California and Nevada in Figure 2.2).

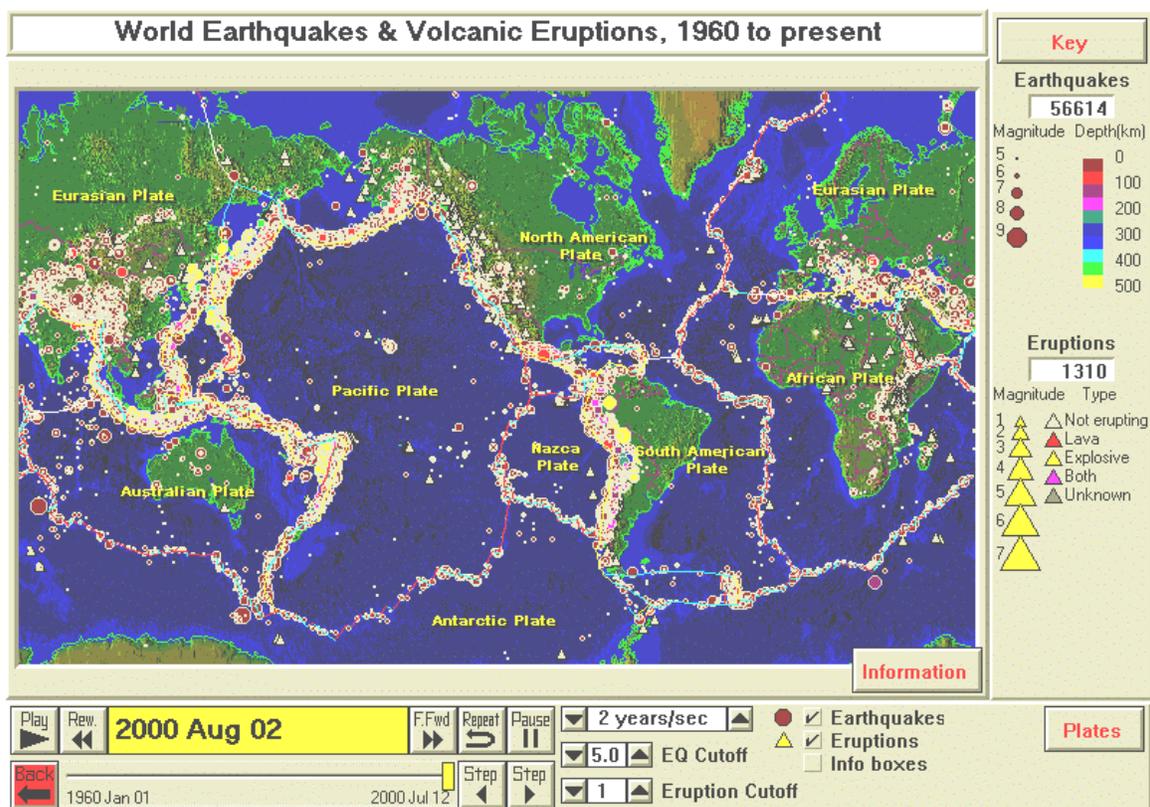


Figure 2.1 Screen image of the SeisVolE display for worldwide earthquakes and volcanic eruptions from 1960 to 2000. Dots are epicenters. Triangles are volcanoes. Heavy colored lines

are inferred plate boundaries. The Key provides color-coded information on earthquake and volcanic eruption magnitude and earthquake depth. Counters provide information on numbers of events in the map area over the selected period of time. This information can be used for statistical analysis of earthquake and volcano activity. Buttons (near the bottom of the screen), pull-down menus (not shown, at top of screen) and a slider provide display control and information about the earthquakes and eruptions.

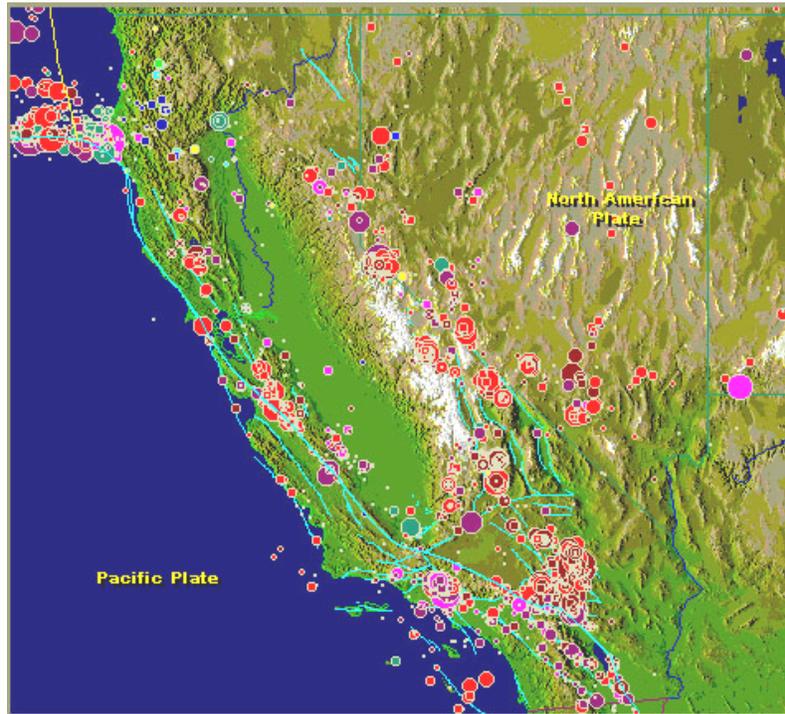


Figure 2.2 SeisVolE map (extracted from screen image) of California and Nevada showing earthquakes from 1960 to 2000. Base map illustrates topography. Dots are earthquake epicenters. Dot size is proportional to magnitude of the event. Blue lines are faults.

Basic Operation of SeisVolE: SeisVolE has many options that allow the user to control the data that are displayed and the appearance of the maps that are produced. A “help file” (from the pull-down menus at the top of the screen) provides detailed information on the program, data files and operation. An auxiliary DOS program (EQSELECT, see **Help, Contents**) is available for searching the earthquake data file. Some basic operation options and information are:

Views – Use the buttons on the screen to select pre-assembled maps. The **Back** button will return you to the menus of views. You can create your own views with the “Make Your Own Map” option under the **Map** menu.

Key – The map key on the right side of the screen (Figure 2.1) provides information on the earthquakes and eruptions that are plotted, including a counter that can be useful for analyzing the statistics of earthquake and eruption

sequences. Symbol sizes, ranges and colors can be changed from the **Earthquakes** and **Eruptions** pull-down menus.

Playback Control – Buttons and a slider bar for controlling the display of the earthquake and eruption data through time are provided at the bottom of the screen. You can turn the display of earthquakes or eruptions on or off, adjust the speed of the playback (speeded-up-real-time), the magnitudes that are displayed, and control the playback with buttons (**Pause**, **Repeat**, **Rewind**, etc.) and a slider control, similar to the operation of audio equipment. The **Step** buttons allow you to step through the data (forwards or backwards) one event at a time and see the information on that event (location, origin time, magnitude; earthquake or volcano) on the screen. This feature is very useful for identifying a specific event in the earthquake catalog or finding the event that is closest to a specific time or location.

Menus – The pull-down menus at the top of the screen provide additional control of data that are displayed and map appearance. Figure 2.3 shows the selection screen that is displayed at the beginning of the SeisVolE program. Standard views are opened using the buttons. Various controls and options of standard views and views generated by the user are selected using the pull-down menus (at the top of the screen, for example in Figure 2.3).

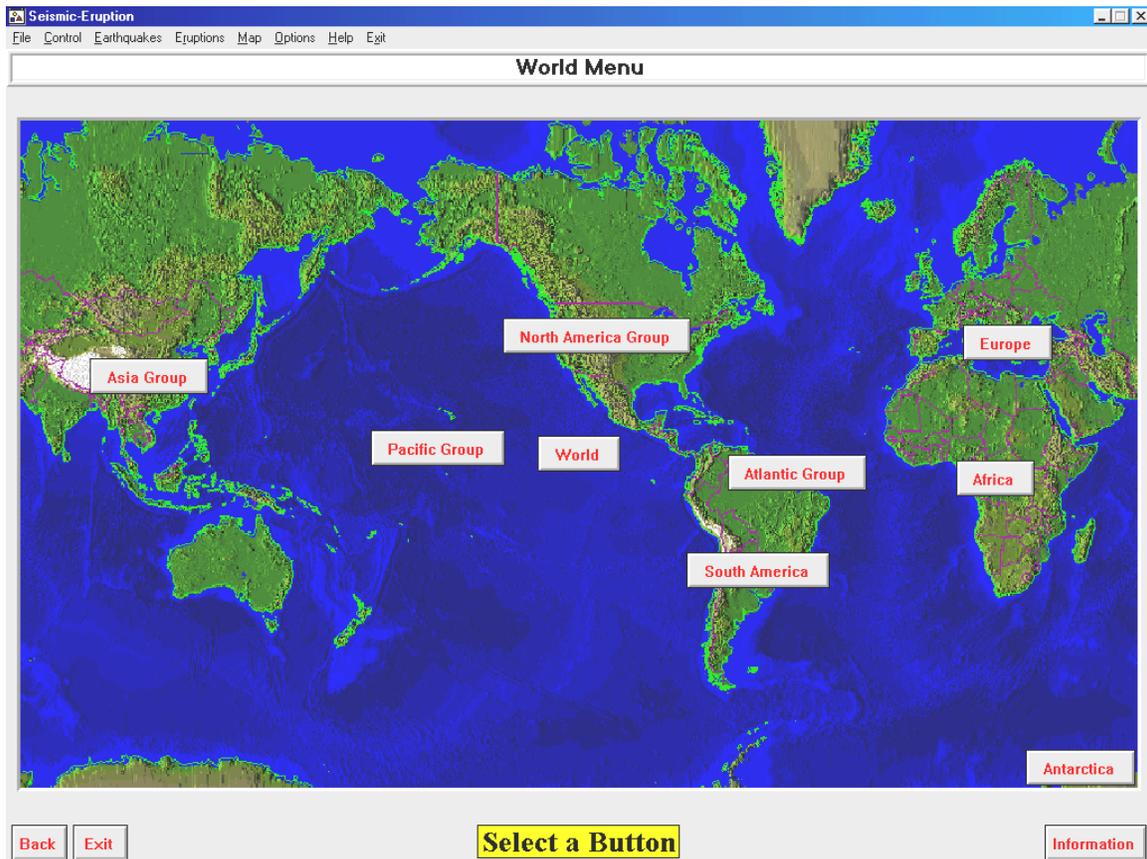


Figure 2.3. Selection screen at the beginning of the SeisVolE program. Pull-down menu items are shown on the upper line (File, Control, etc.). Selection buttons (Asia Group, Pacific Group, etc.) allow opening of standard views.

You can **Set Dates** (range of dates; useful for analyzing statistics of sequences or finding an event of interest) of the events to be displayed from the **Control** menu. The **Earthquake** menu allows one to view the event catalog. The **Map** menu allows you to see the range of latitude and longitude that is included in the view and to make your own maps to “zoom in” on an area. The **Options** menu allows you to display the coordinates (latitude and longitude) of the cursor so that individual locations may be determined, to make a bitmap image of the screen that can be plotted or exported to another file, and to update the hypocenters (earthquake data) from the Internet (this capability is very useful as it allows you to display the location of a very recent local earthquake or large earthquake or any event of interest and to see its location in relation to the historic seismicity. Specific **menu** items (at the top of the screen) of most interest include:

File – The **File** menu allows one to select various views although the views can also be accessed by the buttons on the screen and the **Back** button. Additionally, if you generate a new view by changing the **control**, **earthquake** or **eruption** information or by the **Make Your Own Map** option (**Map** menu), you can save that view for later access by using the **Save as** option.

Control – The **Control** menu allows you to set the dates (**Set Dates**) for the data to be displayed and the **Speed** of the playback (speed can also be set using the button control at the bottom of the screen). The **Map View** and **Set Up Cross-Section View** controls are useful for viewing the earthquake data in a cross-section view. For details on using these controls, see **Teaching Module 14**.

Earthquakes – The audio output associated with each earthquake can be turned on or off with the **Audio** control. The **Earthquake** menu allows one to select the appropriate earthquake catalog using the **Earthquake File** control. Generally, the **world.hy4** catalog is already selected and is the appropriate catalog to use. However, if one creates a new catalog for a specific region, one can select it for the current view using the **Earthquake File** control. Data in the earthquake catalog can be displayed and read using the **Edit Earthquake File...** menu item. The **Magnitude/Depth Scale** control is also useful to set the color-coding of the earthquake depths and the size of the dots for adjusting the appearance of the display.

Eruptions – The **Eruptions** control includes an on/off control for the audio (**Audio**) associated with the eruptions and control of the **Volcano Names** display.

Map – The **Map** controls of most use are: **Latitude/Longitude** – to set (or check) the latitude and longitude range of a view; **Annotations** – to add

geographic and text information (**Title**, **Scale**, **City** names, etc.) to a map display; **Shaded Terrain** – to select the elevation file for a shaded terrain topographic map, particularly for the **Make Your Own Map** option; **Make Your Own Map** – to select an area on the current view to make you own map – using this option, one can “zoom in” on a specific area to view the earthquake and volcano activity – shaded terrain can be added to the make your own map views using the elevation files; **Plates** – controls optional display of plate boundaries; **Redraw** – to redraw the map after a new elevation file has been selected.

Options – useful controls include: **Coordinates** – to display the latitude and longitude of the cursor location; **Make Bitmap** – to produce a bitmap image of the current view that can be copied or inserted into another document such as a Microsoft Word file (when you have a screen display that you’d like to save, select **Make Bitmap** from the **Options** menu; you will be prompted to provide a file name which will be given a file extension of **.bmp**, which stands for bitmap; the file will be stored in your SEISVOLE folder; you can open the bitmap image with a photo processing program such as Adobe Photo Deluxe, or import into an MS Word document by selecting **Insert, Picture, From File...**; then “navigate” to the SEISVOLE folder to select the **.bmp** file that you saved); **Update Hypocenters via Internet** – using this option, you can automatically update the earthquake data file with recent hypocenters (your computer must be connected to the Internet when you select this option).

Help – Access to the SeisVole help files for additional information on the earthquake and volcano data, operating SeisVole and the DOS programs for importing and exporting earthquake data.

Exit – To exit SeisVole.

Summary: Working with SeisVole is interesting and educational. The program allows one to make attractive maps of historic and very recent earthquake and volcanic eruption data and to investigate the temporal and spatial distributions of earthquakes and eruptions. For many demonstrations, investigations and activities, the standard views and the controls that are readily available on the screen are all that are necessary to effectively use SeisVole to explore earthquake and volcanic eruption activity and related plate tectonics. However, to investigate specific areas, events or phenomena, or to conduct independent research projects, many of the controls and options that are described here will be either useful or necessary.

[Go to List of SeisVole Teaching Modules \(in Introduction to SeisVole Teaching...; Module 0\)](#)