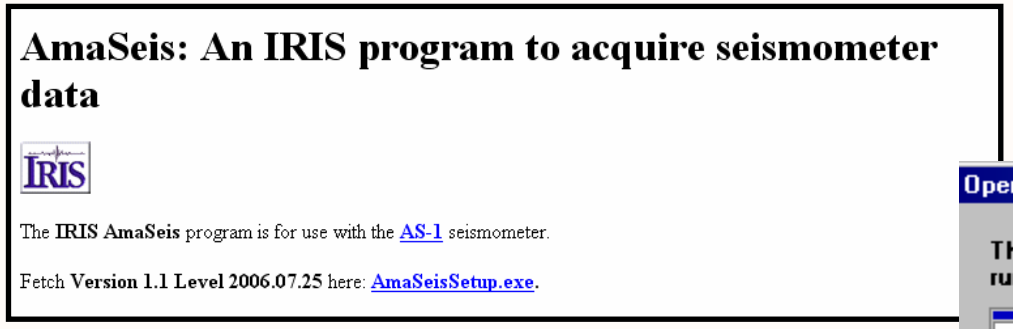
Amaseis seismic recording and analysis software

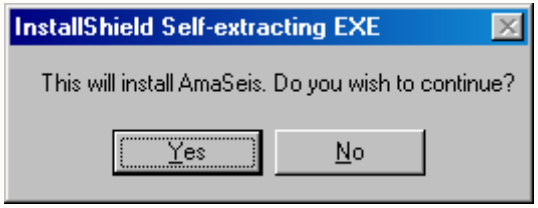
The Amaseis program written by Alan Jones is a freely available software package that can be used to monitor and record data from a school seismometer system but can also be used as a stand-alone program to view and analyse seismic data downloaded from the internet.

The installation package ***AmaSeisSetup.exe*** should be downloaded from http://www.geol.binghamton.edu/faculty/jones/AmaSeis.html



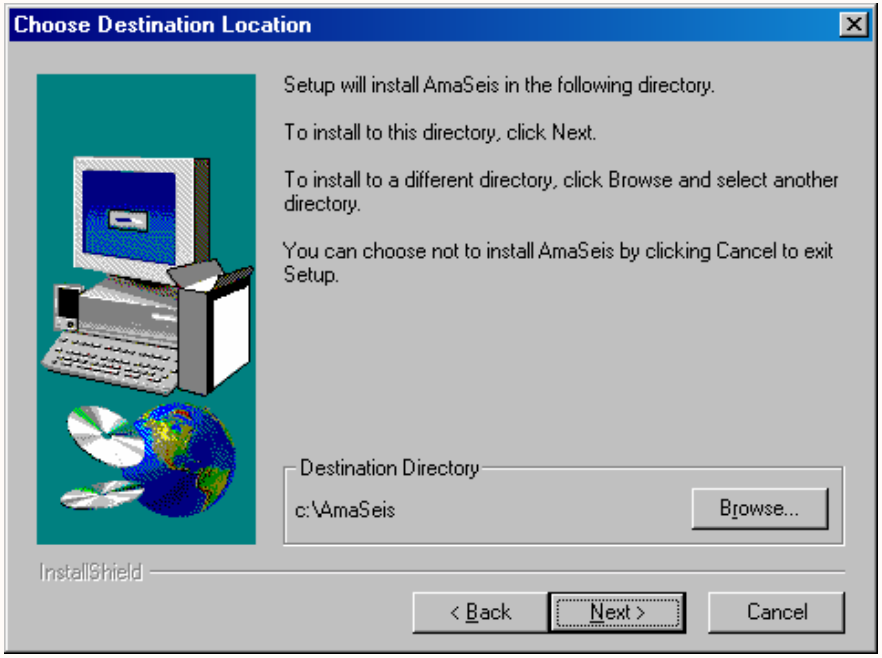
Save the setup program to your hard-disk and then run the program by double clicking (you might need to get your system administrator to install the software for you).

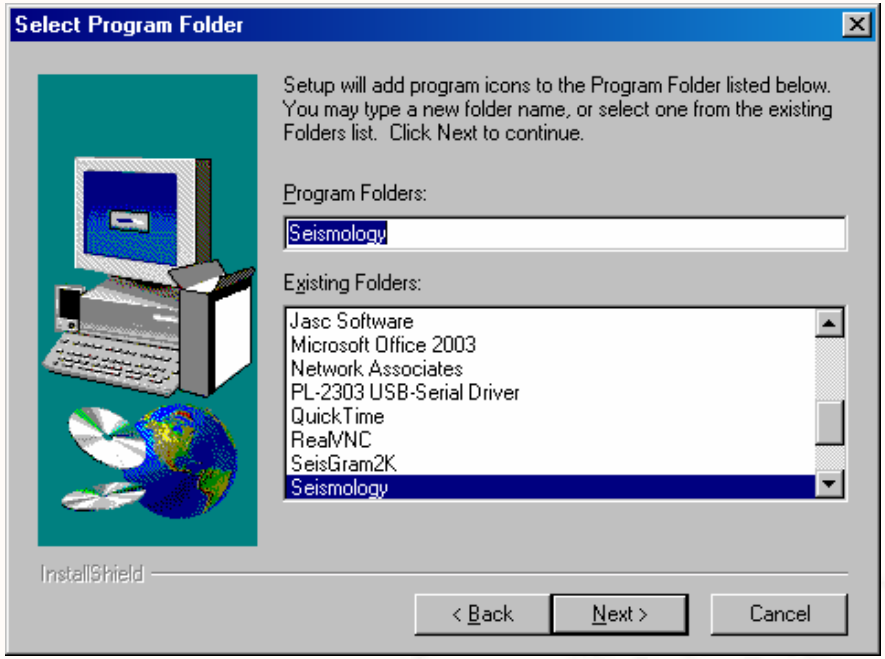
You might get a security warning when you try to install the software, click ***Run*** .. and then ***Yes*** to continue .



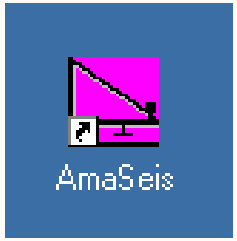
A standard setup sequence will then start, prompting you for your name and institution, default values will be OK at this stage.

If possible try to install the software in the default destination (c:\AmaSeis) and assign it to the default Seismology Program Folder.

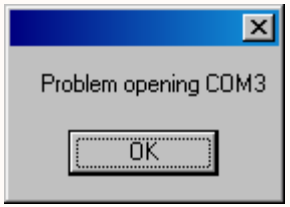


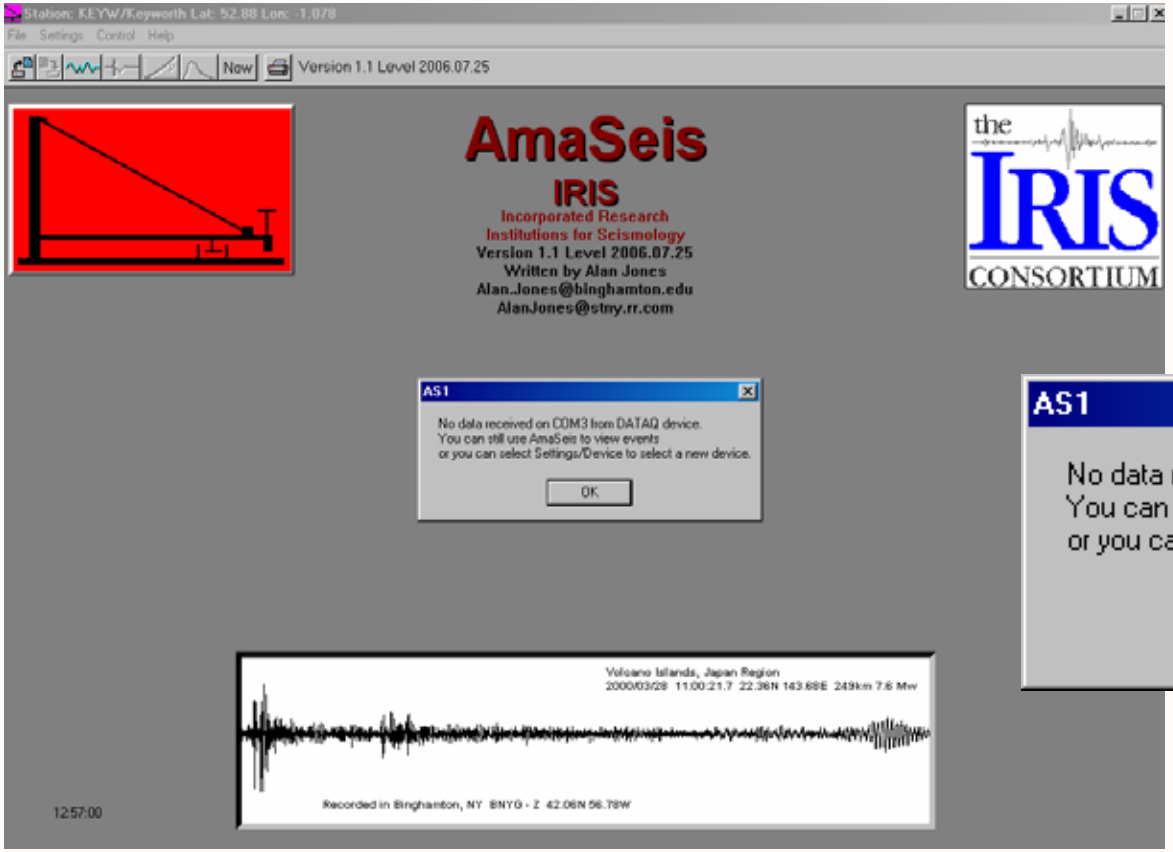


The installation program will have created a desktop icon for AmaSeis, double click to start.

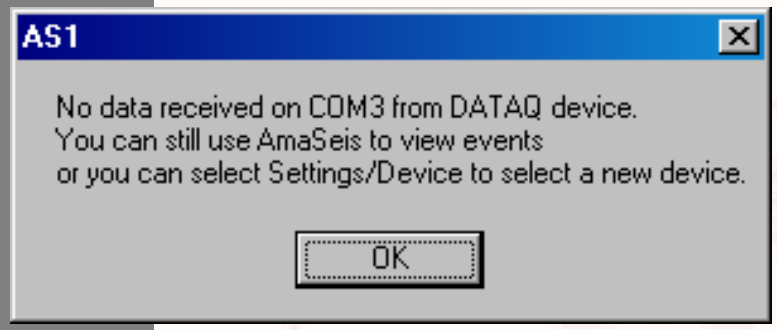


If you try to run Amaseis without a sensor attached it will complain that a COM port could not be opened, you can safely ignore this message and click on ***OK.***

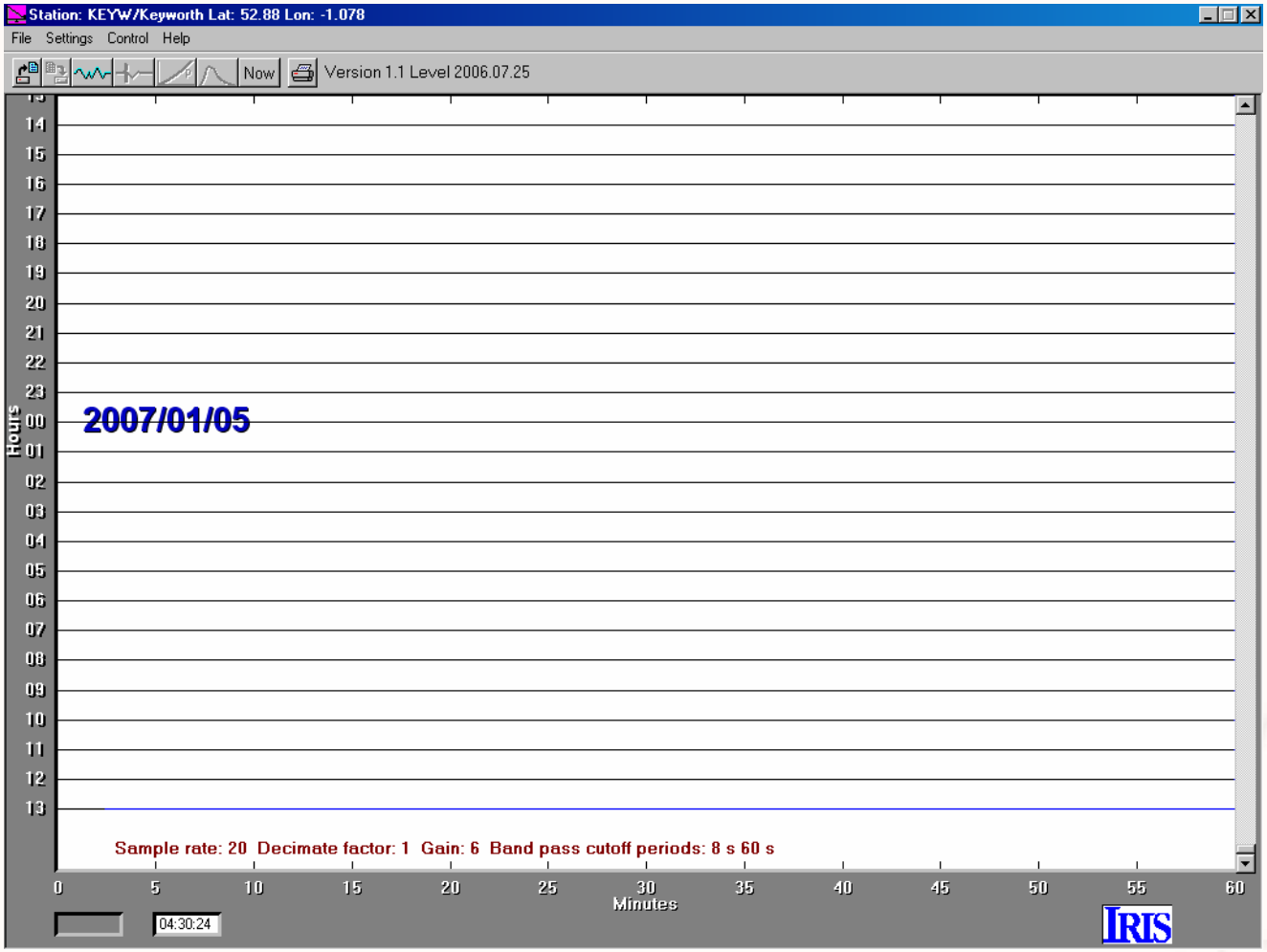




The opening screen of Amaseis will again remind you that no data is being received from a seismometer, if you are not using a seismometer you can safely ignore this message and click ***OK***

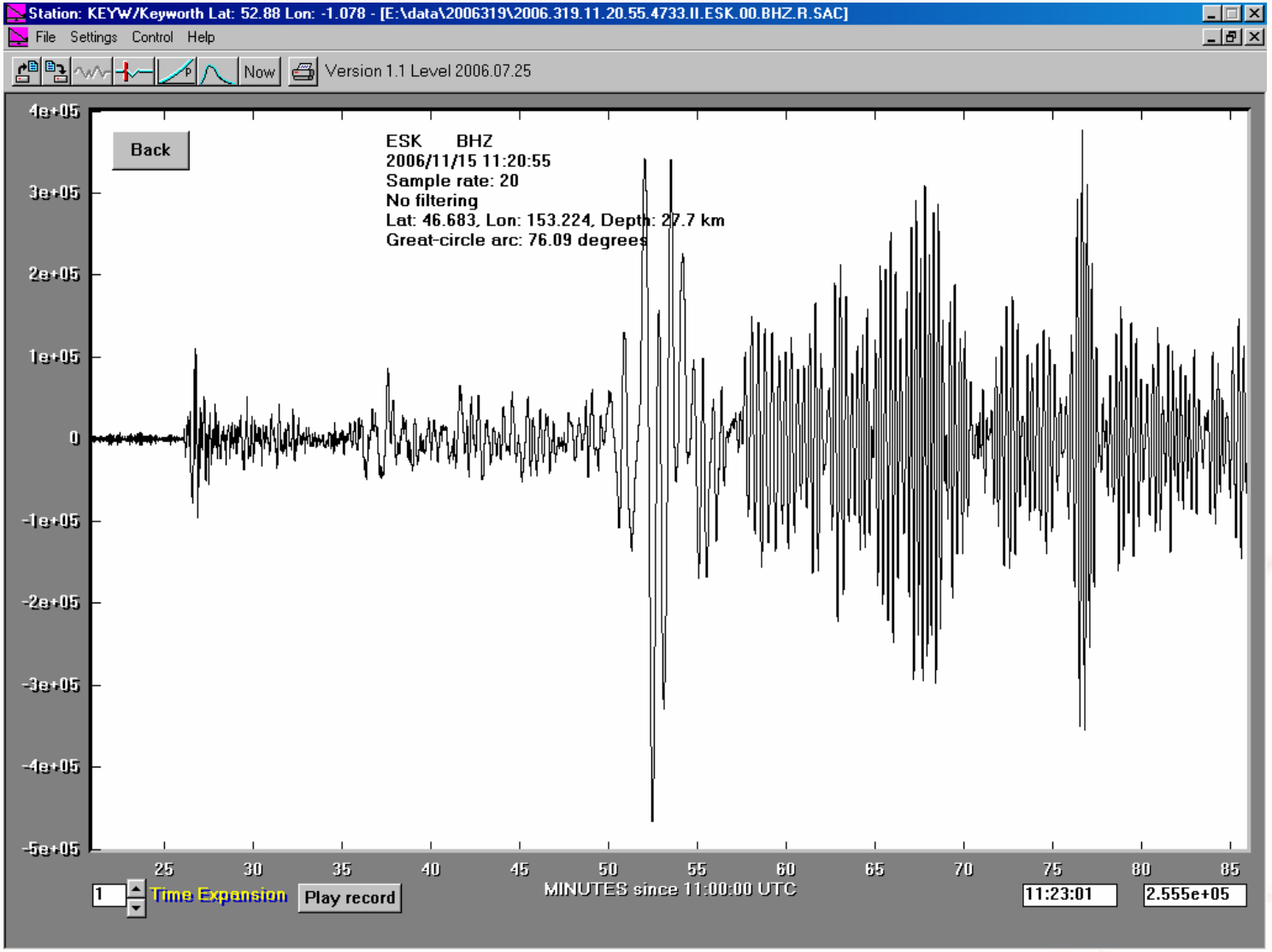


By default AmaSeis will show 24 hours of data as a “helicorder plot” .



In this plot each line of data represents one hour’s worth of data with time along the X axis. The position of the plot down the page is offset for each successive hour of the day (earliest at the top and latest at the bottom). Along each trace the amplitude of the wiggles would correspond to the amplitude of the received signal from the seismometer (all zero in this case since no seismometer is attached).

Using the ***File… open*** tabs or the File open icon. you can review data files downloaded from the internet in ***SAC Binary format .***

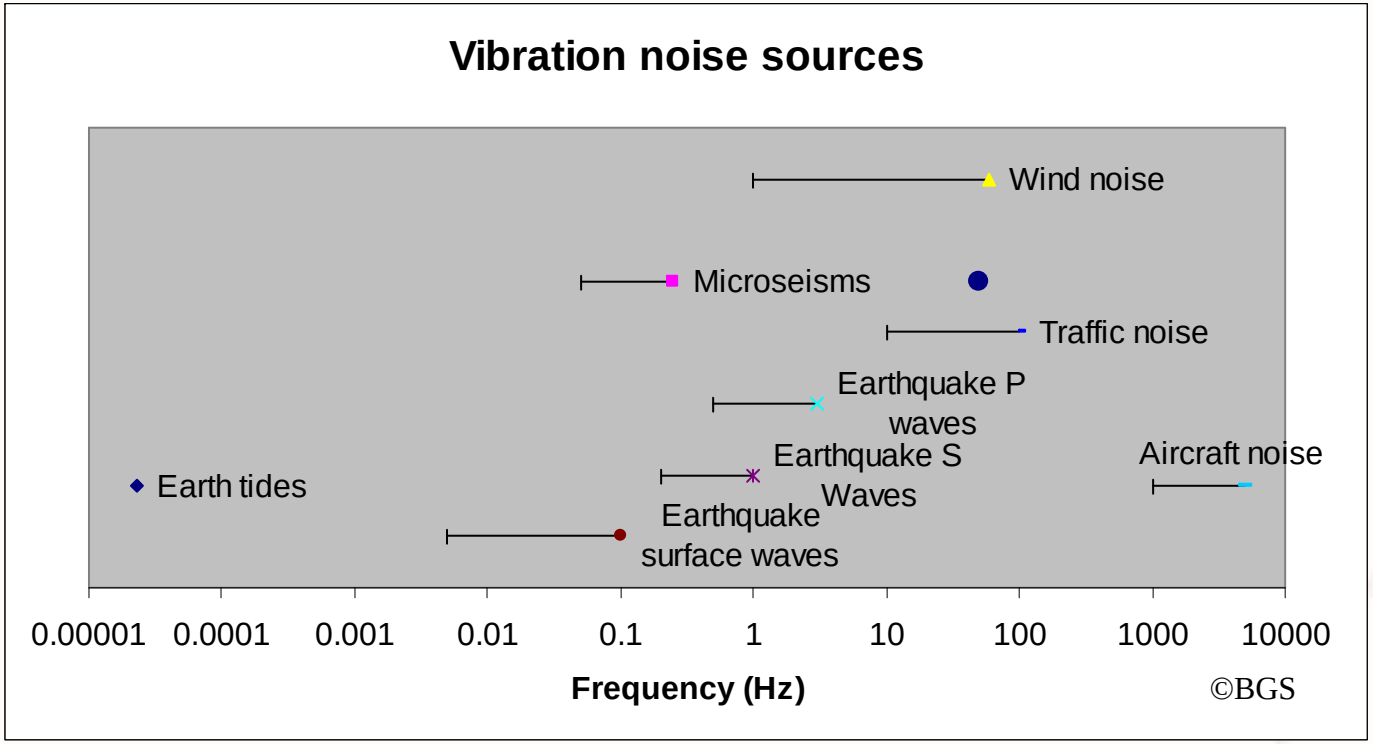


The SAC data files downloaded from IRIS will contain information in their headers about the seismic station which recorded them and the event.

This header information is printed on the display screen.

In this case Station ESK (Eskdalemuir in Scotland) recorded an event located at Lat 46.6 and Lon 153.2 depth 27.7km. This event was 76 degrees distance from ESK.

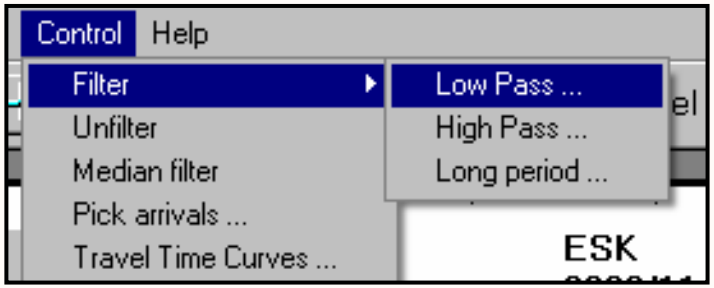
Earthquakes generate vibrations over a very wide of frequencies, for large earthquakes these can range from as low as 0.01Hz (100 seconds period) to 100Hz (0.01seconds period). However the earth will rapidly attenuate vibrations at the higher frequencies so when we look at data from earthquakes that occurred thousands of kilometres away we generally only see signals with frequencies less than 1 Hz (1 second period).

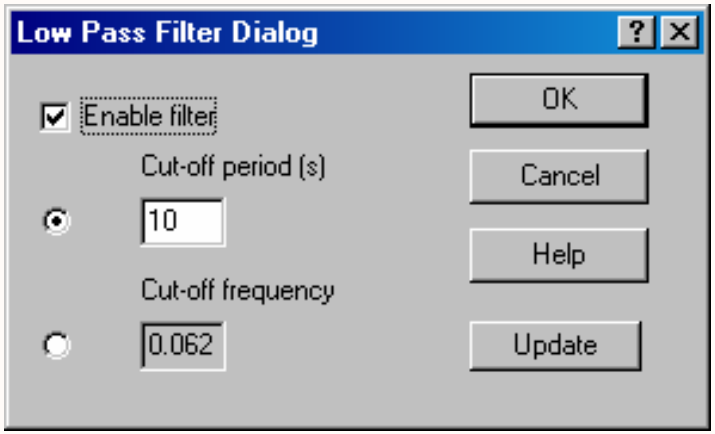


Microseisms are ever present background vibrations in the ground with a dominant period of six seconds. They are caused by the action of oceanic water waves on the coast. When there are large storms in the nearest ocean to a seismic monitoring station the amplitude of these microseismic vibrations increases.

The data can be improved by applying a frequency filter to remove unwanted noise from the data. For large distant events the best filter to apply is one which attenuates all frequencies above 0.1Hz (10 second period), this is called a ***low-pass*** filter

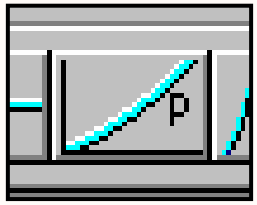
Simple frequency filters can be accessed by using the control filter tabs



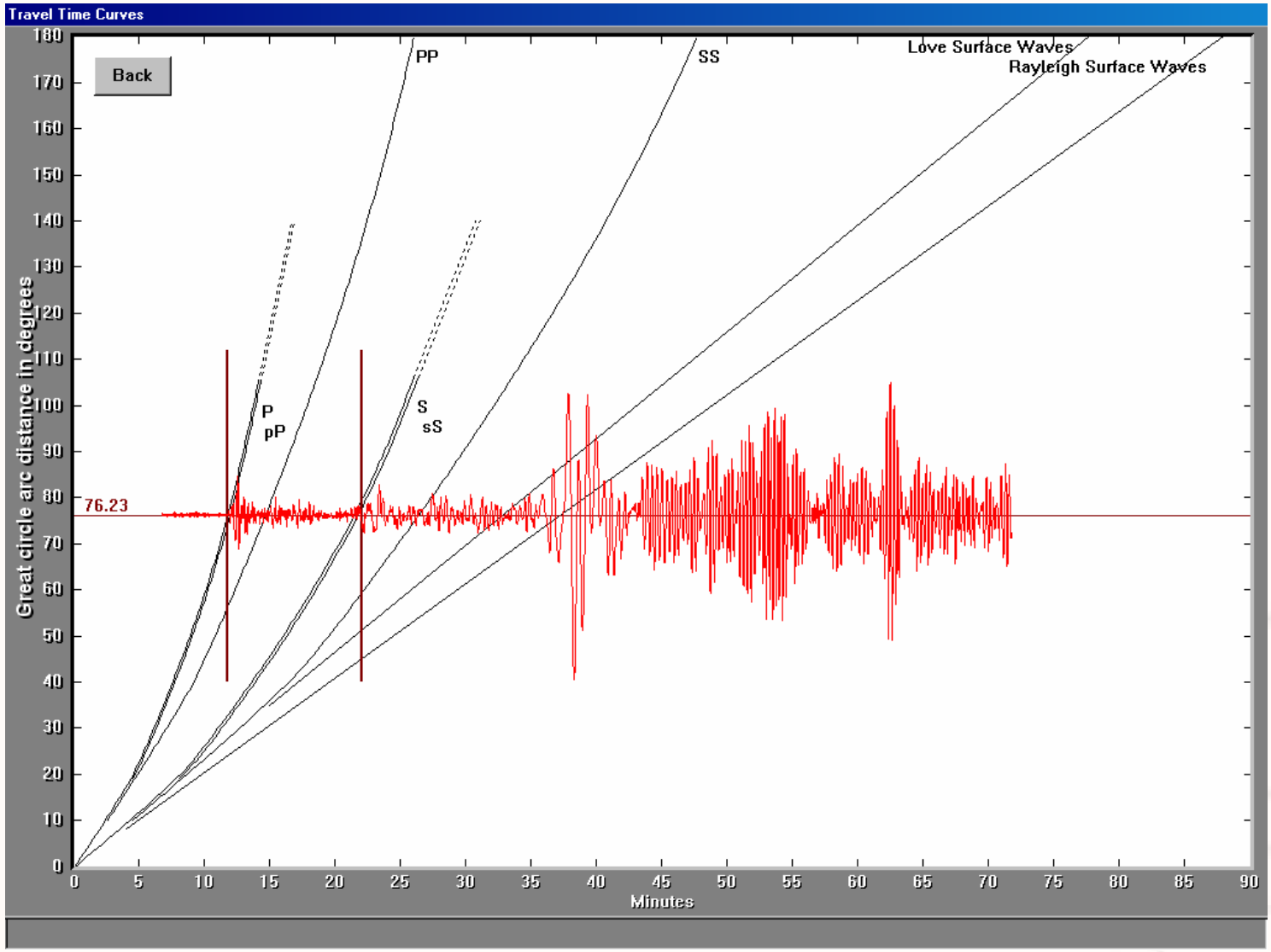


For smaller events, or to emphasis the P and S wave arrivals it is better to concentrate on the higher frequencies by applying a ***high-pass*** filter.

By clicking on the travel time icon you can proceed to a view of this seismogram overlaid by travel time curves.



Enter the earthquake depth in the Depth Dialog box.



The seismogram will then be displayed on a graph of travel time curves.

The seismogram can be dragged around the display area with the mouse.

Drag the seismogram until the P and S arrivals match with the Curves labelled P and S. This should occur at the great circle distance of 76 degrees for this example.

The curves represent travel times for raypaths identified by the phase codes P PP S SS etc (see appendix)