Site Effects Assessment Using Ambient Excitations

SESAME

European Commission – Research General Directorate
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Multiplatform H/V Processing Software

J-SESAME USER MANUAL

(Version 1.05)

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1. Introduction

JSESAME is a JAVA application for providing a user-friendly graphical interface for H/V spectral ratio technique used in local site effect studies. The program uses the functions of automatic window selection and H/V spectral ratio by executing external commands. The automatic window selection and H/V process are standalone application developed in Fortran. JSESAME is mainly a tool for organizing the input data, execute window selection and processing, and display the processing results. The software operates in both Unix and Windows environments.

2. Requirements

The following tool has to be installed in the Operating System:

- ✓ Java Runtime Environment (JRE) (version 1.4.1 or higher). You can download the files relevant for your operating system from the following web site: http://www.sun.com

3. Installation

Three ZIP files are provided for Unix, Linux and Windows environments. The ZIP include three directories with the following files (Windows environment):

In Hvprocess directory

hvproc0_1.exe : main processing module for H/V ratio
hvsource.zip : source files

In WindowSelection directory

Winselection.exe : automatic window selection
winsource.zip: source files

In Jsesame directory

jsesame.jar : java classes and source code
jsesame.bat : script for executing the Java application "Jsesame"
jsesame.pdf : user manual
images : directory with tools-bar images

4. Getting started

Once the ZIP file is uncompressed, user must open a Unix or DOS console, go to Jsesame directory and start the program from the prompt line as:

jsesame

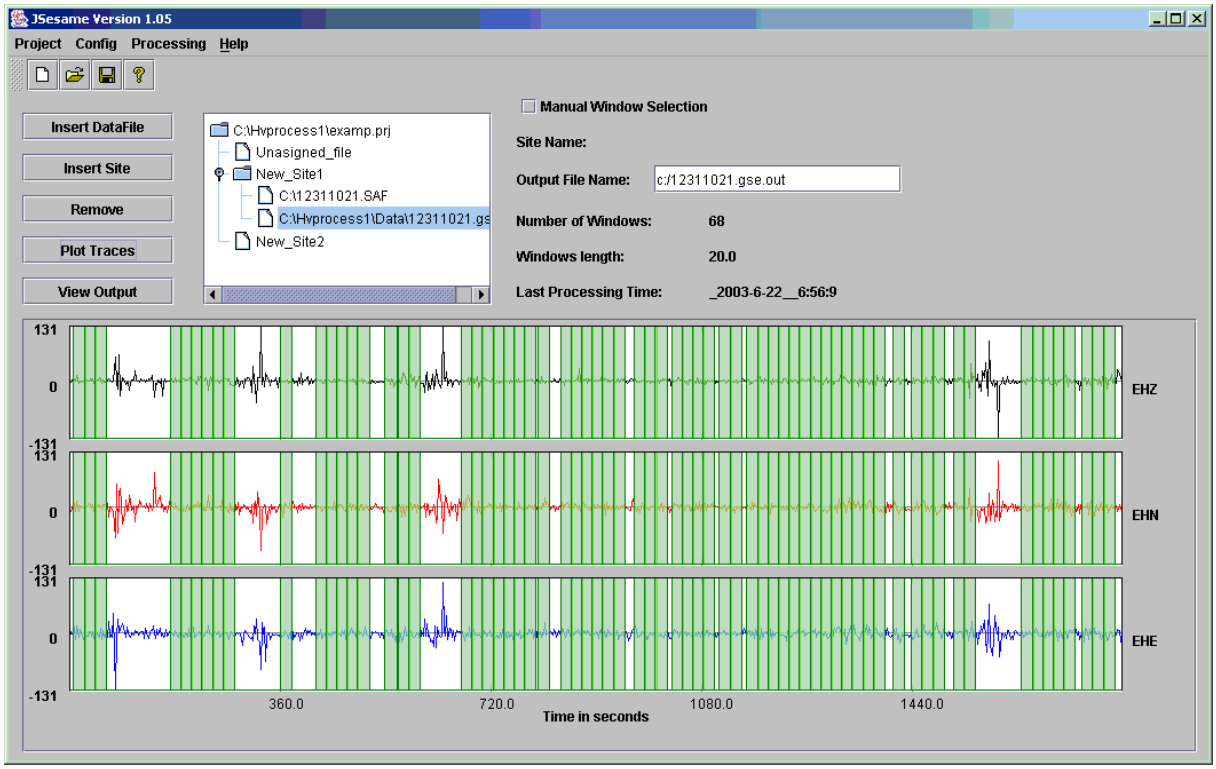

Figure 1. Main window

5. Using JSESAME

The user interaction with JSESAME (Figure 1) can be classified as: (1) Organizing the information, (2) processing the information and (3) displaying the results. The interface has a main window where the user can create a new project or loaded an existing project, plot the traces on the screen, perform automatic or manual window selection, apply the H/V spectral ratio computations and see all the results in a user-friendly interface. Only two waveforms data format are accepted: GSE and SAF (SESAME ASCII Format). The extension of the data files is required to be one of these words (GSE or SAF).

5.1. Configuring the program

JSESAME has several configuration variables to be set up by the user. In order to configure the variables, you have to click the item menu <*Config*> (Figure 2). The configuration parameters are shown in five dialog boxes. The first one is for configuring the automatic window selection (Figure 3), the second for the manual window selection, the third for the H/V processing module (Figure 4), the fourth for the filters parameters (Figure 5) and the last one for general configuration parameters (Figure 6). Note it is very important set the correct path for the window selection and processing module programs since they are external command call by JSESAME.

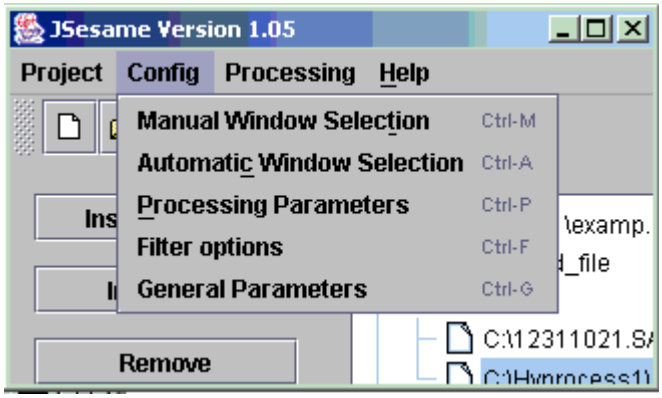

Figure 2. Configuration menu

5.2. Creating a new project

The structure of the project has a tree shape (Figure 1) where the data files are grouped by sites when several noise measurements are performed for a single location. Data files grouped in the "Unassigned_file" node are treated independently. That is the user has only one data file for each site. Each node in the tree has several parameters shown on the right side of the tree. The "Site name" and the "Output File name" parameters can be modified by the user. The changes are applied after pressing the RETURN key. Data file nodes can be dragged and dropped through the tree structure. For inserting new data files or sites and removing nodes from the project, users can press the corresponding button shown on the left site of the tree (Figure 1). The tree structure allow for multi-selection of nodes, which means that batch processing can be performed for several sites or individual data files. The project

can be saved by using the item menu <project> (Figure 7) or by using the tools bar shown below the menu (Figure 1).

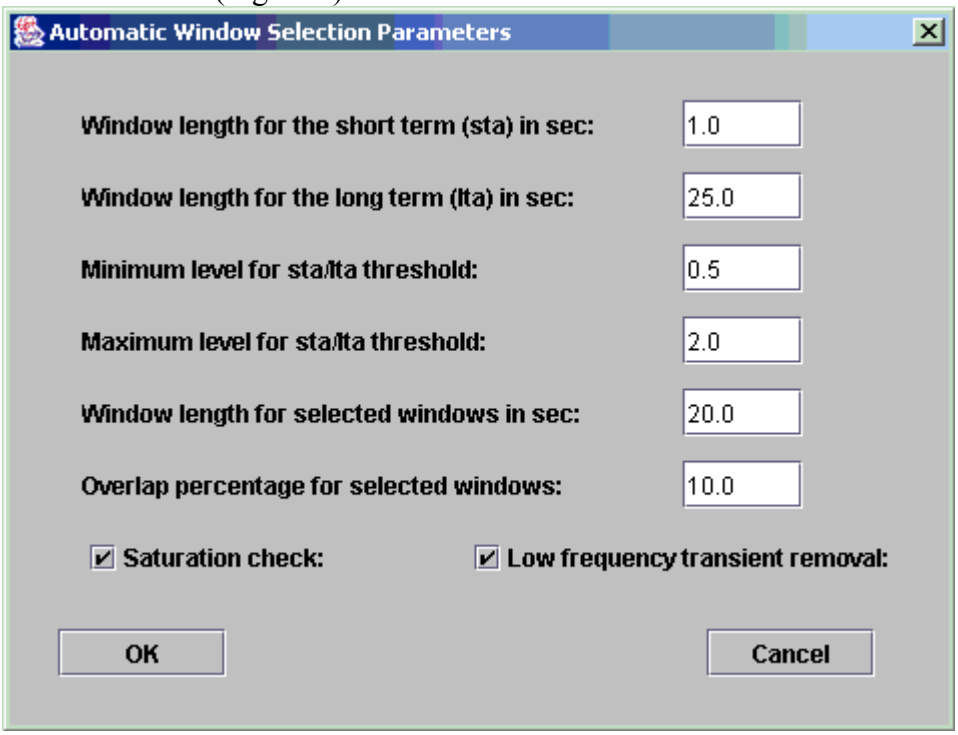

Figure 3. Automatic window selection parameters

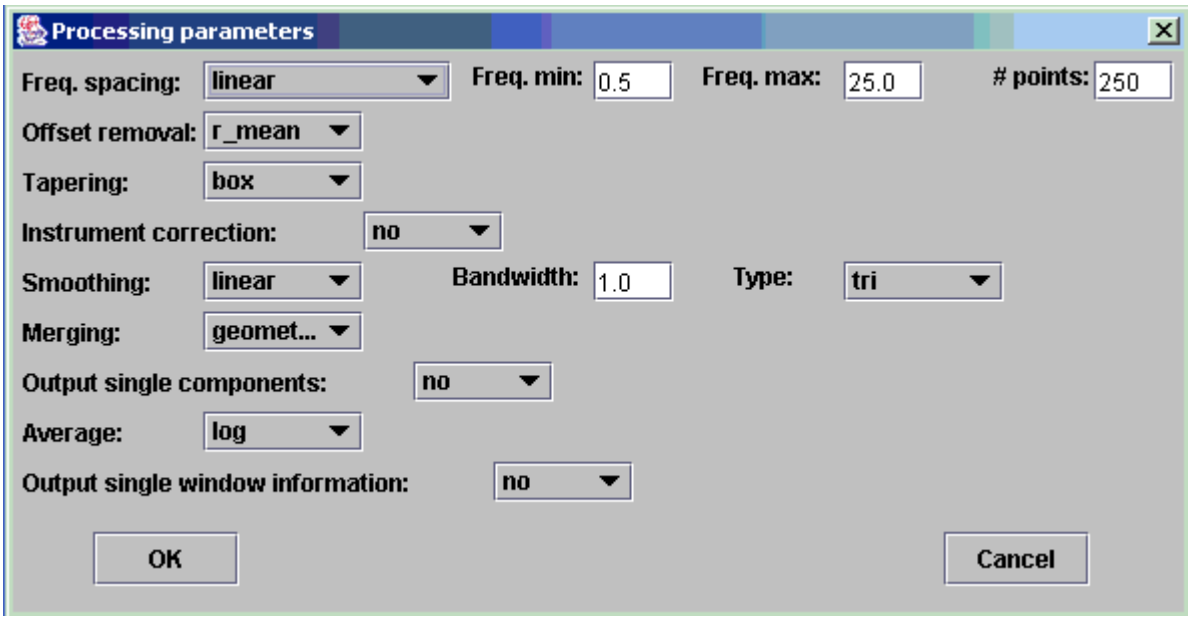

Figure 4. Processing module parameters for H/V spectral ratio

5.3. Plotting data files

The highlighted or selected data-file can be plotted by pressing the button <Plot traces>. All the selected windows will be shown (Figure 8). Zooming can be done by clicking the left

button of the mouse, then drag the mouse and release the button at the end of the selected time of the window. Clicking the left mouse button on anywhere on the plot will take you back to the original trace before zooming.

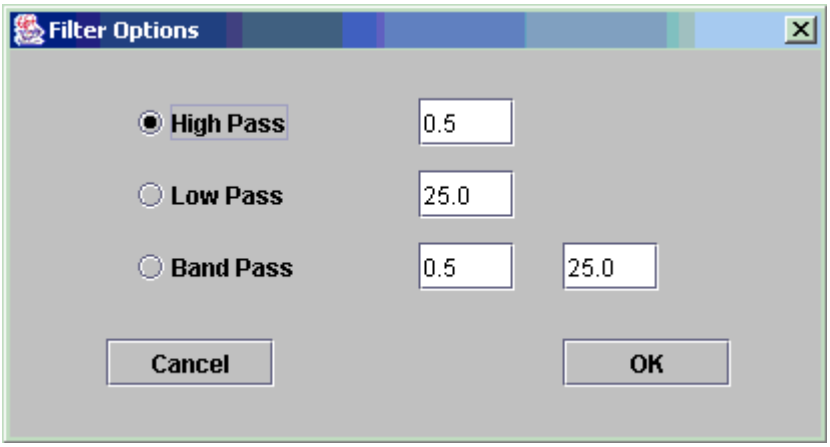

Figure 5. Filter options

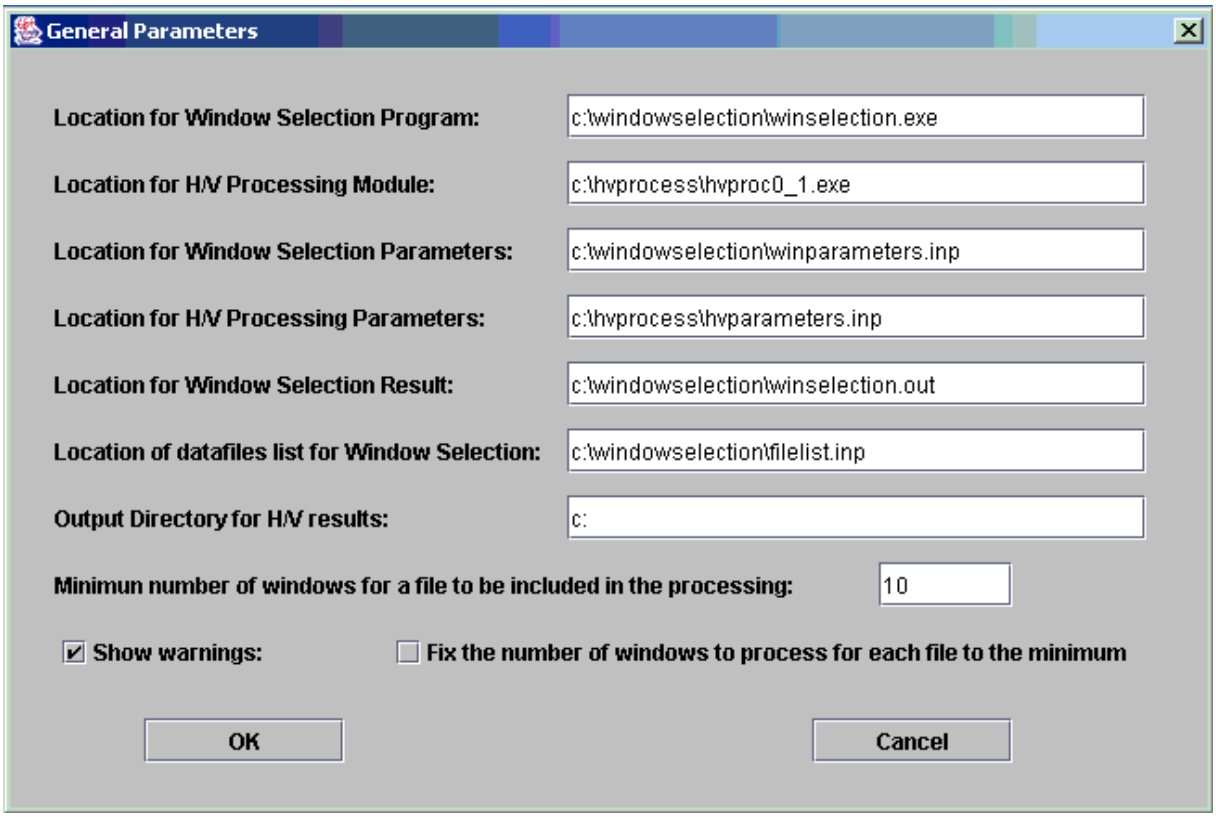

Figure 6. General parameters

5.4. Selecting windows

Windows can be selected automatically or manually. The manual window selection can be done if the check-box labeled as "Manual window selection" (Figure 8) is active. The window is selected using the same procedure as zooming action. Individual windows can be removed by clicking the right button of the mouse twice: one click for selecting the window and another click for the deleting action. Automatic window selection can be performed in four different ways (Figure 9). The first one is applied to the original traces. The second is applied to the filtered trace with the filter selected in the <Config> option. The third is the common windows between the original and the filtered traces. The last option keeps the same selected windows of the first file for the rest of the selected files. This option makes sense when the user highlights (select) a group of files from the project.

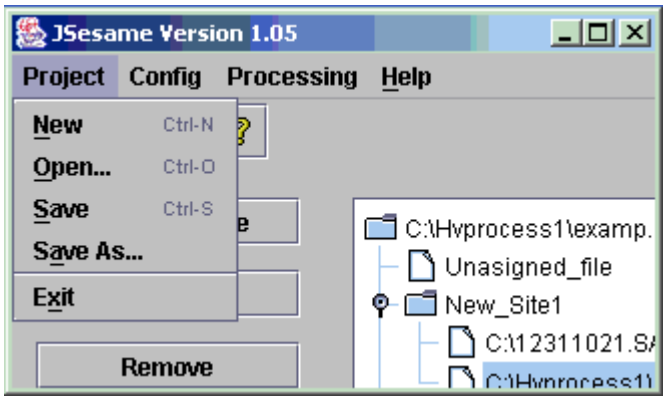

Figure 7. Project options

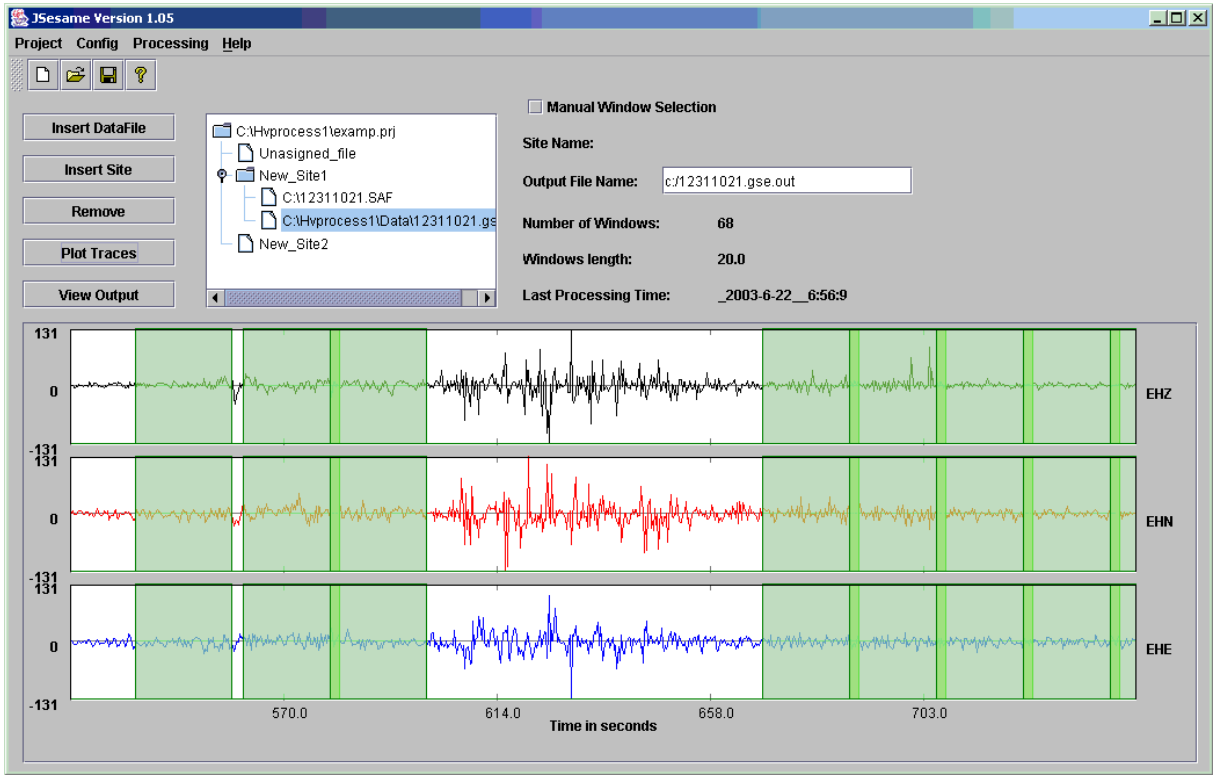

Figure 8. Zoomed traces with the selected windows

5.5. Plotting filtered traces

The selected data-files can be filtered with the previous selected filter in the <Config> option (Figure 5) and then plotted on the screen. This option is available within the <Processing> menu item (Figure 9). The selected windows for the plotted data-file are also shown. Zooming on the filtered traces can be performed as explained in section **5.3**.

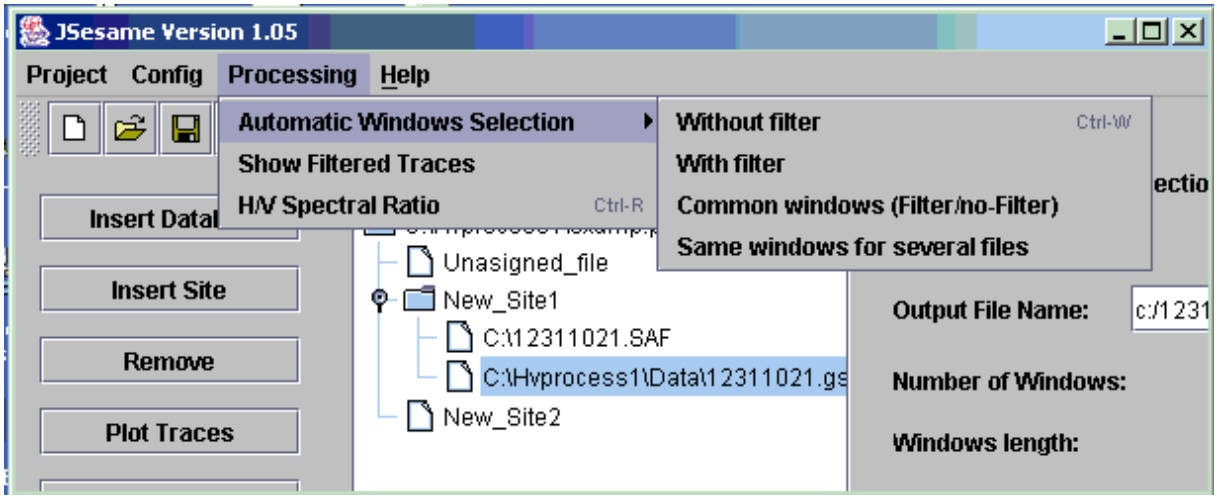

Figure 9. Processing options

5.6. Computing H/V spectral ratio

The processing module (option shown in Figure 9) is applied according to the selected nodes in the tree. If the selected node is a site, then all the selected windows of the data-files collected for this site will be used for computing the average H/V spectral ratio. Output for each window also can be obtained by setting up the configuration parameters of the processing module (Figure 4). Batch processing will be performed when several sites or data-files are selected.

5.6. Showing output results

By pressing the <View Output> button (Figure 8) the user can navigate through three dialog boxes. The first dialog box (Figure 10) shows the H/V spectral ratio of the merged horizontal components. The second dialog box (Figure 11) shows the H/V spectral ratio for each one of the NS and EW components. The third one (Figure 12) shows the spectral ratio of the merged (H), NS and EW horizontal components and the spectra of Z, NS and EW for each individual window, if "output single window information" is selected in the configuration parameter of the processing module (Figure 4). To select an individual window the user has to click the right button of the mouse on it. Zooming action can be done over the spectrum using the same procedure explained in section **5.3**. The individual values of the spectrum can be shown by clicking the middle button of the mouse over the spectral curve.

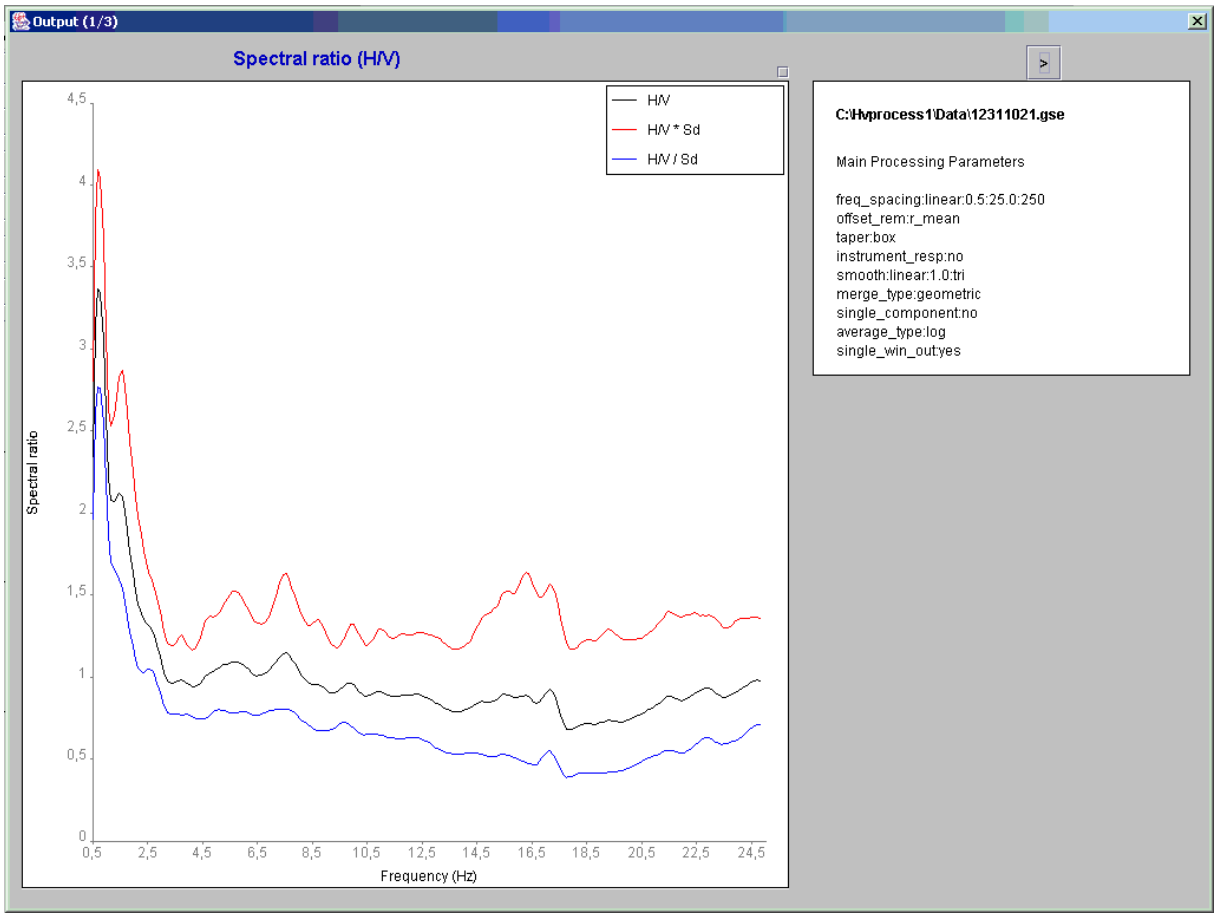

Figure 10. Spectral ratio for merged horizontal components

5.7. Setting graph properties and creating images of the output results

For each graph shown in Figure 10,11 and 12 there is a small box in the upper right corner without any label. By clicking there the properties and scale of the graph can be modified and images of the graph can be created (Figure 13a). The button <Properties and series> pop up a dialog box (Figure 13b) where line type, width and colour (Figure 13c) can be changed for each spectral curve. The button <Scales> pop up a dialog box (Figure 13d) where the minimum, maximum and scale for each one of the vertical and horizontal axes can be modified. The button <Save> allows to create an image of the graph.

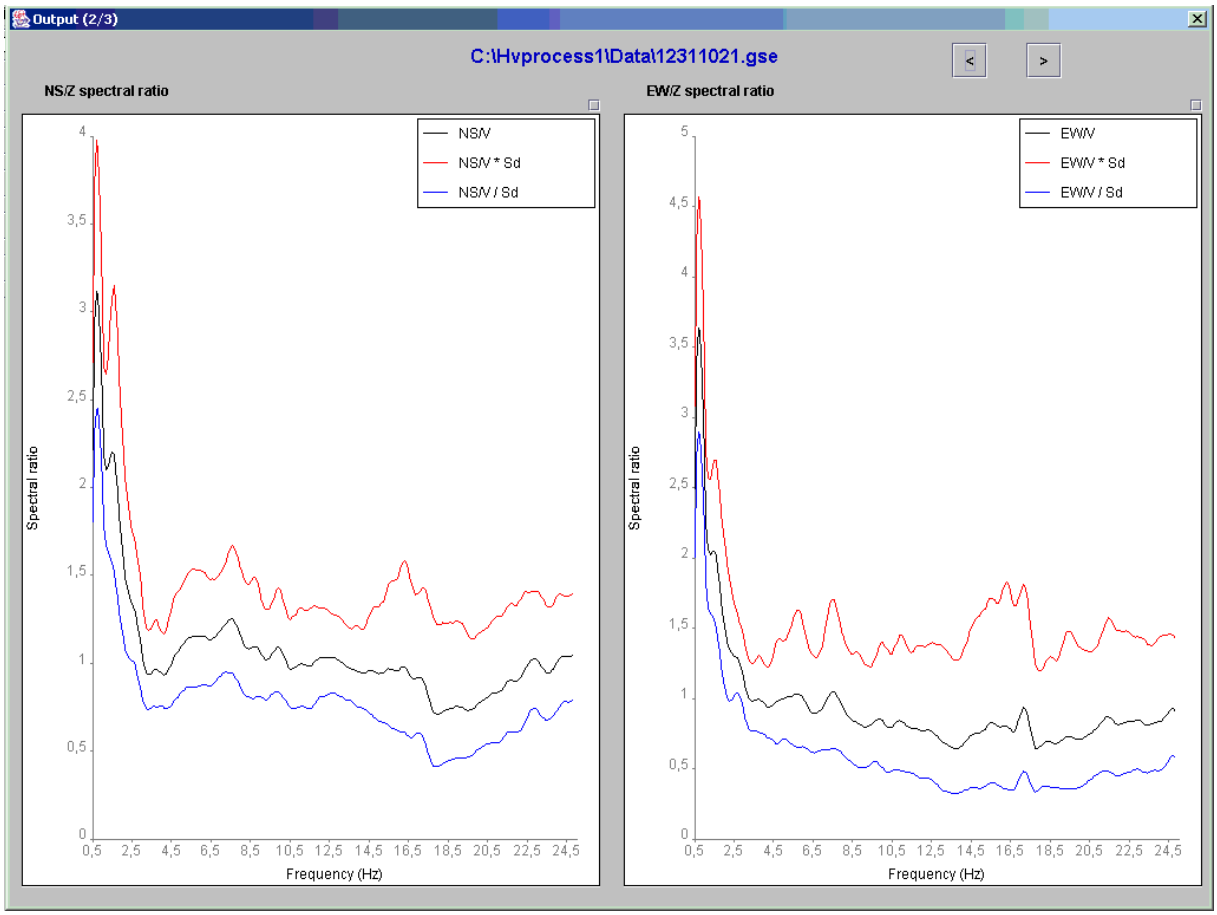

Figure 11. Spectral ratio for each NS and EW horizontal component

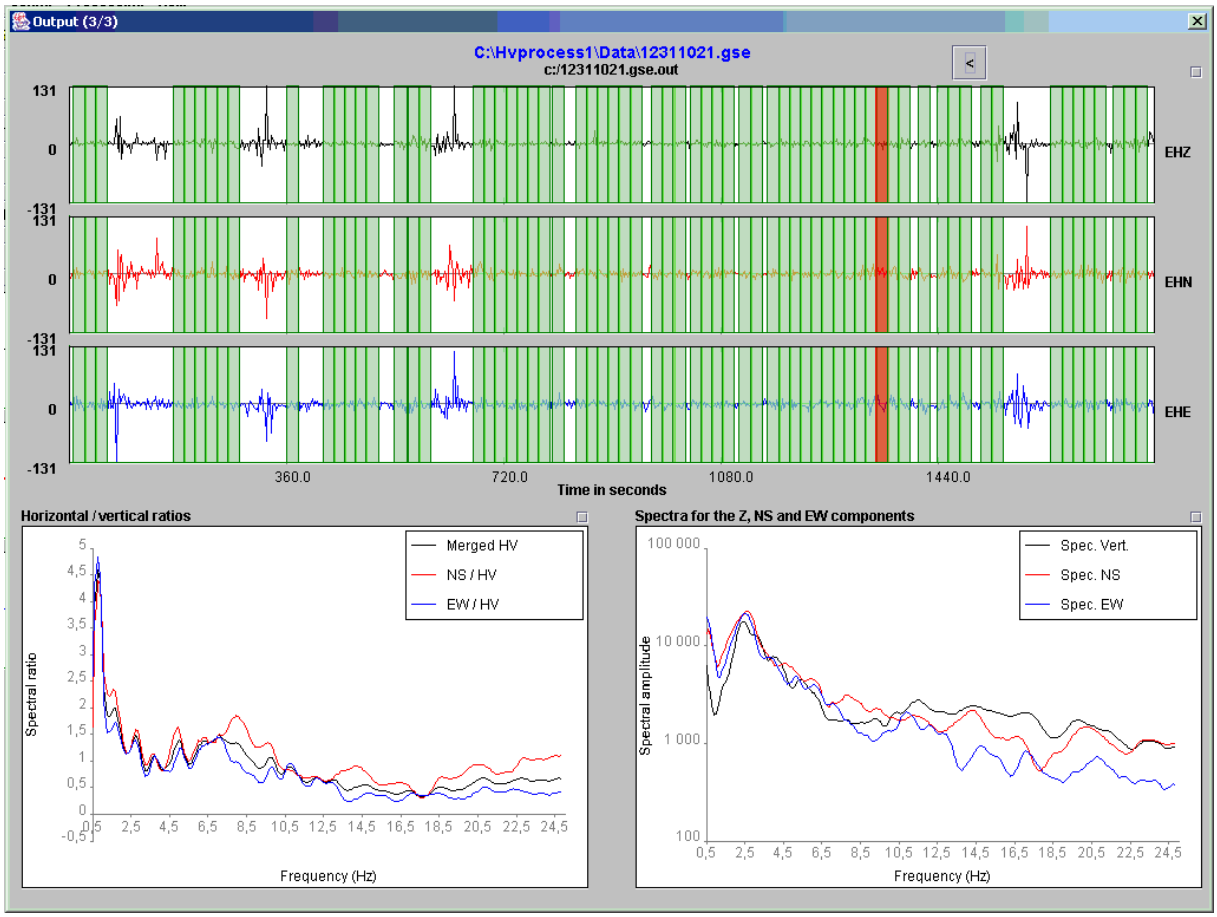

Figure 12. Result for individual windows

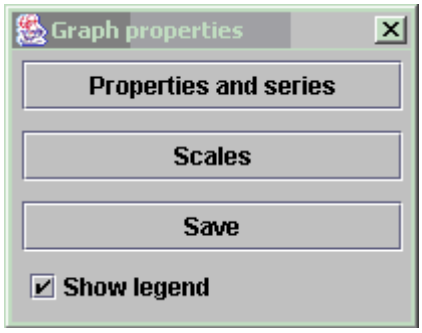

Figure 13a. Graph properties

Figure 13b. Selection of the components

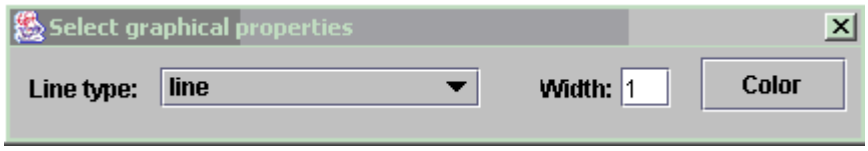

Figure 13c. Properties of the Spectral curve

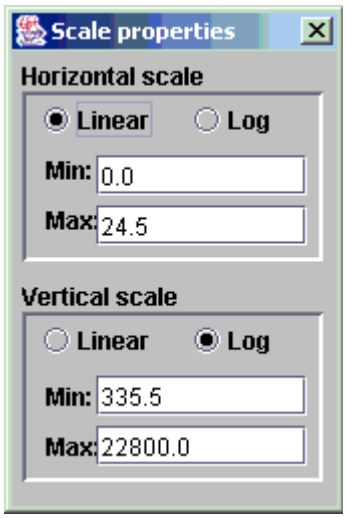

Figure 13d. Scale properties for the spectral curve