InSite Seismic Processor: Import of SEGY data

v 3.16.3

Applied Seismology Consulting Ltd.
Suite 2, Observer House, Abbey Lawn, Shrewsbury SY2 5DE, UK
Tel: +44 (0) 1743 384 171
Email: asc-info@appliedseismology.co.uk ● Web: appliedseismology.co.uk

VAT No 729 0817 21 ● Registered in England and Wales No 3457130

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InSite is an integrated data acquisition, management, processing, visualization and interpretation software developed for seismological studies. InSite provides a solution for all seismology applications, ranging in scale from acoustic emissions in the laboratory, through microseismics around mining and petroleum fields, up to regional-scale earthquakes.

The following sections present a summary on how to import data in SEGY format. You can also find further tutorials and demonstration videos in the 'Support' section of our website appliedseismology.co.uk.

1. Step 1 Project Setup

The first step when working on a project in InSite is the import or creation of a sensor array with channel numbers matching those in the harvested or imported seismic waveform data files.

1. In InSite's 'Data Visualiser' click '`Project->Edit Default Arrays-> Receivers`'.Alternatively, the same Dialog can be called clicking on

Figure 1: Array Input and Edit Button

in the main toolbar in Data Visualiser

2. the array can be imported from a ready-made .sen or .csv file following the format described in the User Manual by clicking `Import from File`. Alternatively, each sensor can be manually added by clicking `Add` and completing the properties menu.

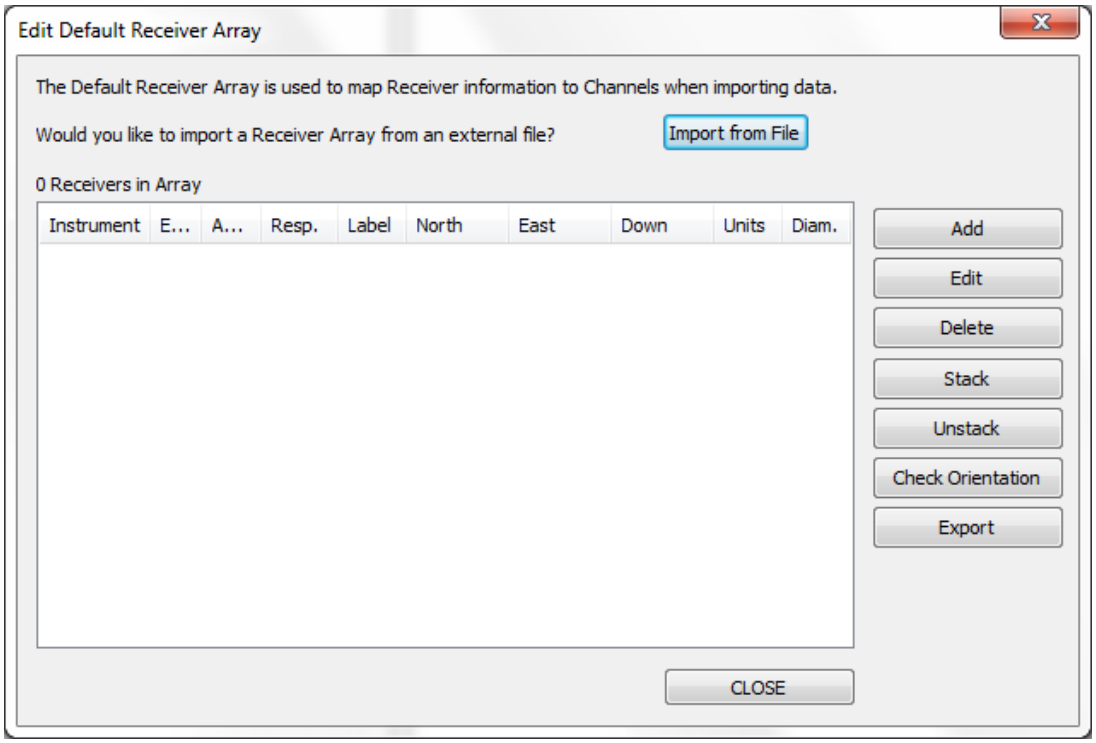

Figure 2: Array Input and Edit Dialog

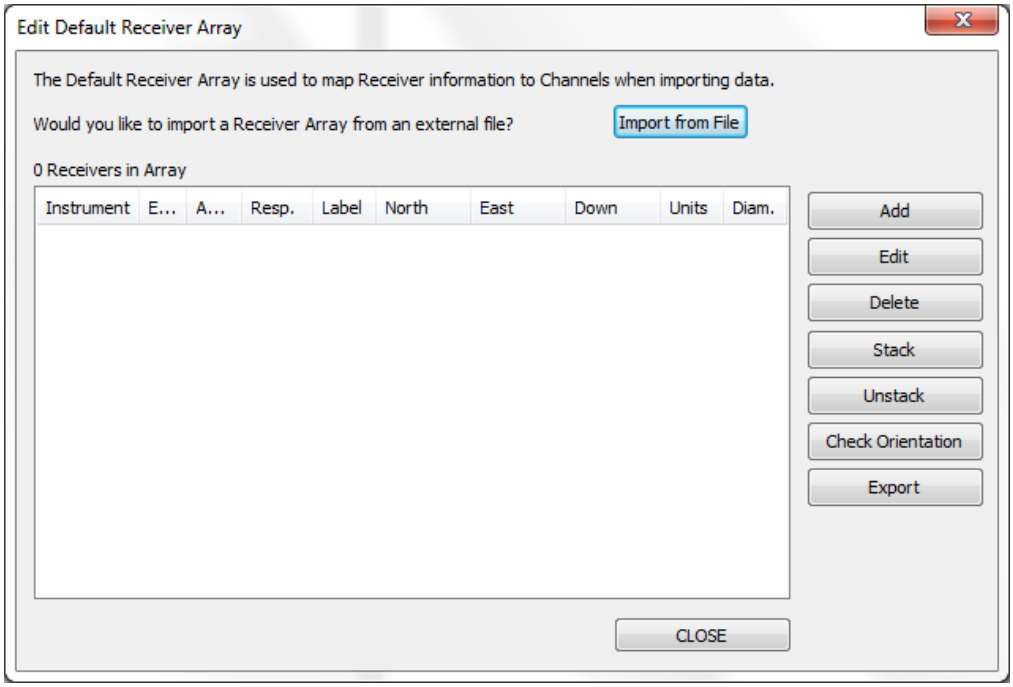

Figure 3: Array Input and Edit Dialog

2. Step 2 Data Import

1. On import of any waveform data, InSite will create an ESF file for each event, containing all the waveforms corresponding to the imported event. Therefore, the first step is creating an empty folder to store the ESF files.
2. From data visualiser, click on the 'Import and Manage Data' button. Alternatively click 'Project>Import and Manage Data…' from the menu bar.

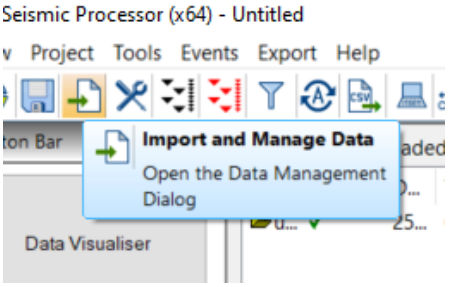

Figure 4: Import and Manage Data button in InSite's data Visualiser

3. The import dialog window will launch. Select the SEGY data format form the drop-down list.

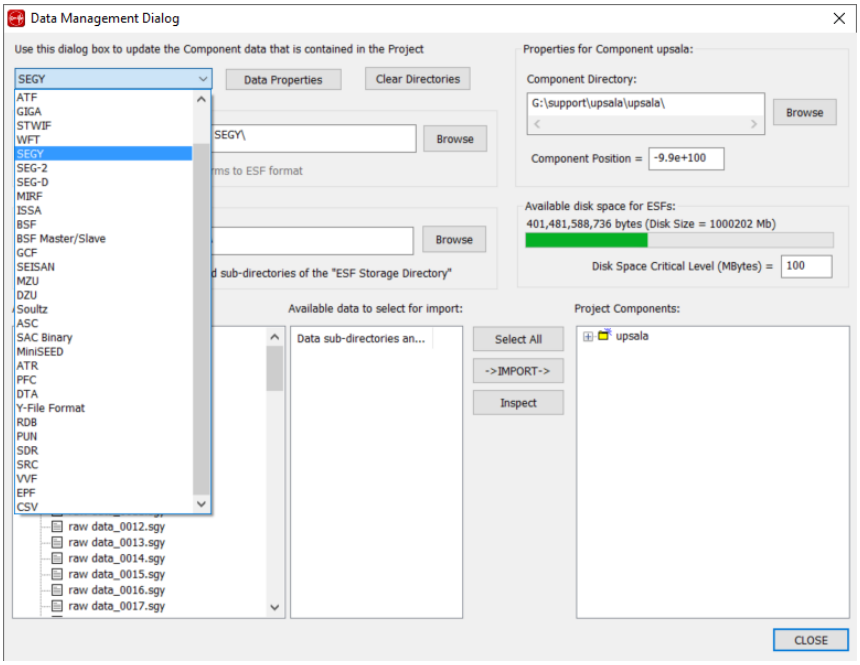

Figure 5: Selecting data format in InSite's 'Data management' dialog

4. Some additional data properties are available for the import of SEGY data related to the scaling of waveforms. The dialog launches automatically on selection of SEGY format or alternatively, can be launched at a later stage by clicking the 'Data properties' button.

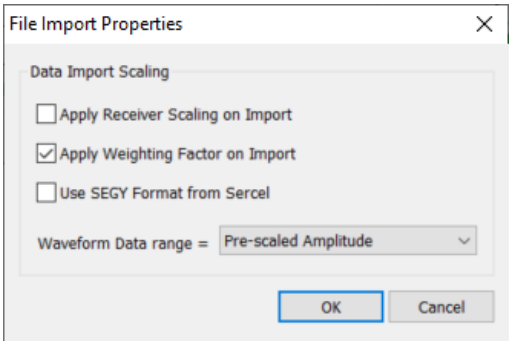

Figure 6: Data Properties dialog for the scaling of imported SEGY files

- If the user selects to 'Apply Receiver Scaling on Import' the sensitivity and gain values from the default receiver array are used to update the imported waveform amplitudes.
- The default behaviour if the 'Apply Weighting Factor on Import' box is checked is to apply the weighting factor from trace header field at byte 169 following the SEGY revision 1 standard.
- The 'Waveform Data range' can be set as 'Pre-scaled Amplitude', where the imported data are assumed to be in volts, or a bit sample range, where the imported data are converted to volts using the counts range specified by the bit sampling chosen by the user and the maximum volts range from the default receiver array.
- Checking the option for SEGY from Sercel reads the trace number and sub-second start time fields from the SEGY headers following the Sercel convention instead of SEGY revision 1 standard. The millisecond is from byte 169-170 and the microsecond is from byte 171-172. In addition, the descaling factor from bytes 207-210 and the descaling power from byte 211-212 are used to compute the descaling factor 10Λ(-descaling power).
- Checking to 'Apply Weighting Factor on Import' when the Sercel type is selected reads and applies the descaling factor from the Sercel file SEGY header, otherwise applies the descaling factor from byte 169. Note in situations when user can only import their SEGY not acquired by Sercel tools using Sercel format is likely due to the missing of trace number. InSite reads trace number from trace header at byte 3,4,5,6 for regular SEGY and from byte 7,8,9,10 for Sercel Segy format.

5. Select the 'Import directory' containing the SEGY waveform files and the 'ESF storage Directory' where Insite will store the created ESF waveform files.

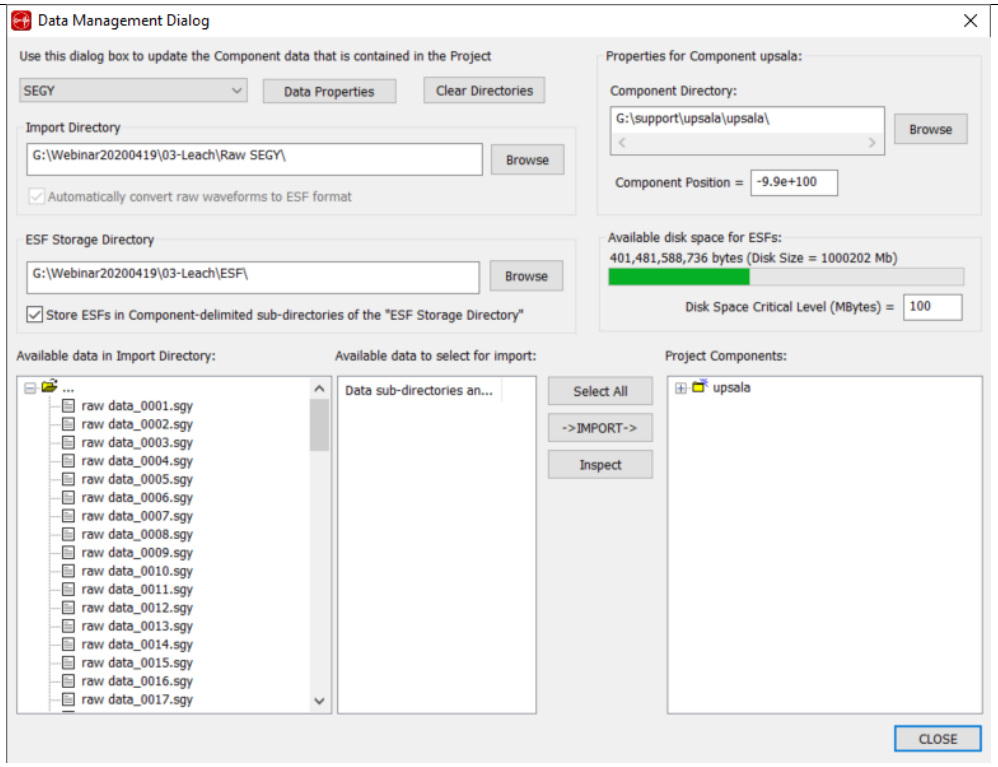

Figure 7:Configuring import and storage folders in InSite's ' Data management' dialog

6. InSite will assign each trace in the Raw SEGY file to a channel defined in the 'Receiver Array'. The trace number in the SEGY header must match the channel number in InSite. By clicking Inspect after selecting a sample SEGY file, you can check the required channel numbers for importing the file. A report will be launched describing the structure and content of the SEGY file

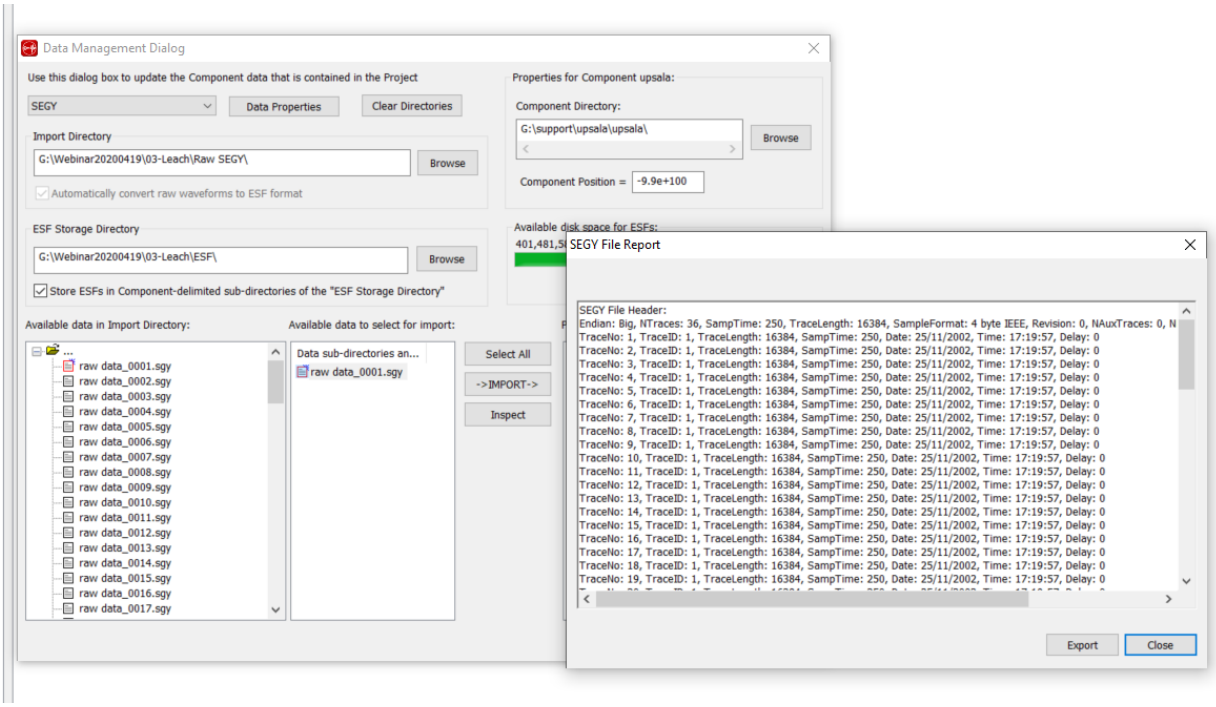

Figure 8: Inspect report for SEGY files

7. If the channel numbers and the project is correctly set, you can now import all SEGY files by selecting the folder icon in the 'Available data in Import Directory' pane and clicking the '->IMPORT->' button. The imported 'Component' (group of events created by InSite based on import folder name) will show in the 'Project Components' pane

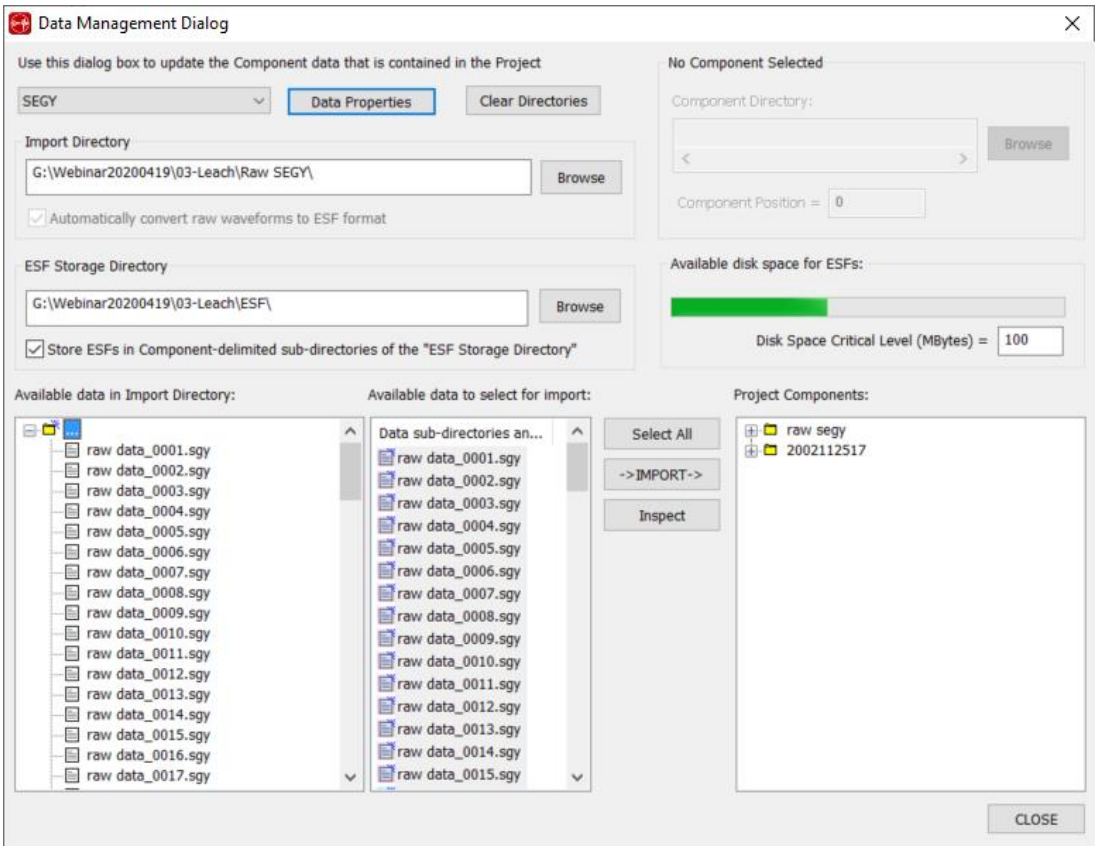

Figure 9: Completed import process in InSite's ' Data management' dialog

8. Once the process is completed, click 'Close' to return to the 'Data Visualiser' view of InSite. The data is imported and ready for visualisation and processing.