

AE monitoring of CNL's (formerly AECL) TSX experiment: clay bulkhead



Microseismic Geomechanics: Increased understanding; reduced risk

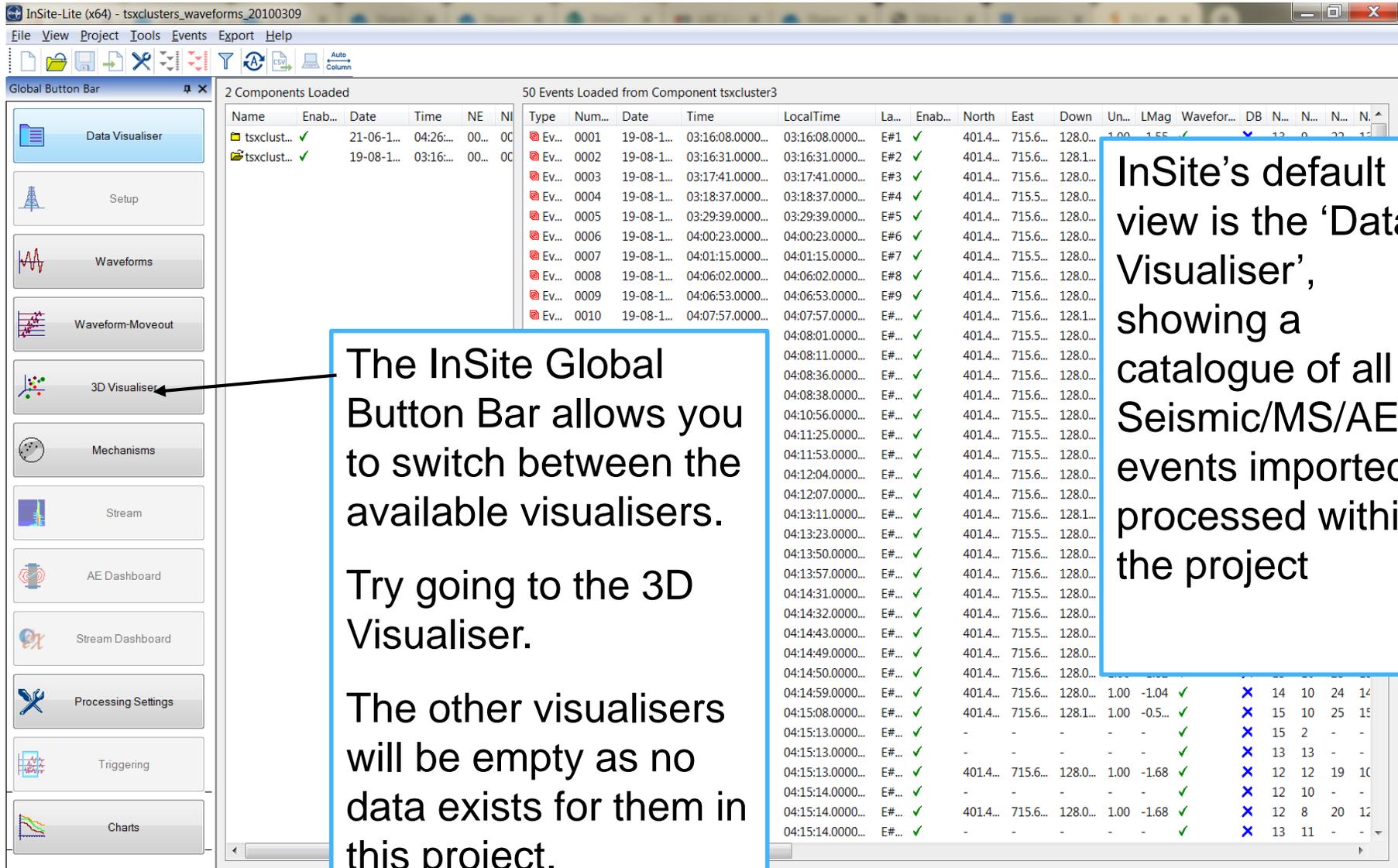
- InSite™ Lite is the free version of Itasca Consulting Ltd.'s InSite Seismic Processing software suite, provided with limited functionality and features.
- The examples shown here are taken from ICL and its partners projects.
- InSite's proprietary project (*.pcf) files contain all the configuration, event information and links to waveforms necessary to run a project in InSite. Double-clicking on the .pcf project file launches the InSite software application.
- The InSite project waveform data (*.esf) files include the results from the data processing. These files are imported for the project (.pcf file) through the data import management tool in InSite. Please note that not all of the available example projects are provided with example waveform data.
- For information on the operation of the InSite software, please refer to the product help files.
- For information on purchasing the full version of the InSite software, please contact us at support@itasca.co.uk

- This example uses AE location data with waveforms. It is designed to give you an overview of the 3D and waveform Visualisers.
- The data is from two example clusters of AE events located around the clay bulkhead of CNL's (formerly AECL) TSX experiment. Monitoring was carried out using an array of 16 uniaxial sensors.
- The following slides give you some options to try in the software.

It's a good idea to ...

... run through the “SKB Prototype” demo presentation first as this gives a more thorough overview of the Location Visualiser.

Navigation: Data Visualiser



The screenshot shows the InSite-Lite software interface. On the left is the Global Button Bar with various visualiser options. The main window displays a table of 50 events loaded from Component tsxcluster3. The table columns include Name, Enab..., Date, Time, NE, NI, Type, Num..., Date, Time, LocalTime, La..., Enab..., North, East, Down, Un..., LMag, Wavefor..., DB, N..., N..., N..., N... The '3D Visualiser' button in the Global Button Bar is highlighted with a blue box and an arrow pointing to it.

Name	Enab...	Date	Time	NE	NI	Type	Num...	Date	Time	LocalTime	La...	Enab...	North	East	Down	Un...	LMag	Wavefor...	DB	N...	N...	N...	N...	
tsxclust...	✓	21-06-1...	04:26:...	00...	00...	Ev...	0001	19-08-1...	03:16:08.0000...	03:16:08.0000...	E#1	✓	401.4...	715.6...	128.0...	1.00	-1.55	✓	✓	13	9	23	15	
tsxclust...	✓	19-08-1...	03:16:...	00...	00...	Ev...	0002	19-08-1...	03:16:31.0000...	03:16:31.0000...	E#2	✓	401.4...	715.6...	128.1...				✓	✓	15	10	25	15
						Ev...	0003	19-08-1...	03:17:41.0000...	03:17:41.0000...	E#3	✓	401.4...	715.6...	128.0...				✓	✓	15	2	-	-
						Ev...	0004	19-08-1...	03:18:37.0000...	03:18:37.0000...	E#4	✓	401.4...	715.5...	128.0...				✓	✓	13	13	-	-
						Ev...	0005	19-08-1...	03:29:39.0000...	03:29:39.0000...	E#5	✓	401.4...	715.6...	128.0...				✓	✓	12	12	19	10
						Ev...	0006	19-08-1...	04:00:23.0000...	04:00:23.0000...	E#6	✓	401.4...	715.6...	128.0...				✓	✓	12	10	-	-
						Ev...	0007	19-08-1...	04:01:15.0000...	04:01:15.0000...	E#7	✓	401.4...	715.5...	128.0...				✓	✓	12	8	20	12
						Ev...	0008	19-08-1...	04:06:02.0000...	04:06:02.0000...	E#8	✓	401.4...	715.6...	128.0...				✓	✓	13	11	-	-
						Ev...	0009	19-08-1...	04:06:53.0000...	04:06:53.0000...	E#9	✓	401.4...	715.6...	128.0...				✓	✓	12	8	20	12
						Ev...	0010	19-08-1...	04:07:57.0000...	04:07:57.0000...	E#...	✓	401.4...	715.6...	128.1...				✓	✓	13	11	-	-

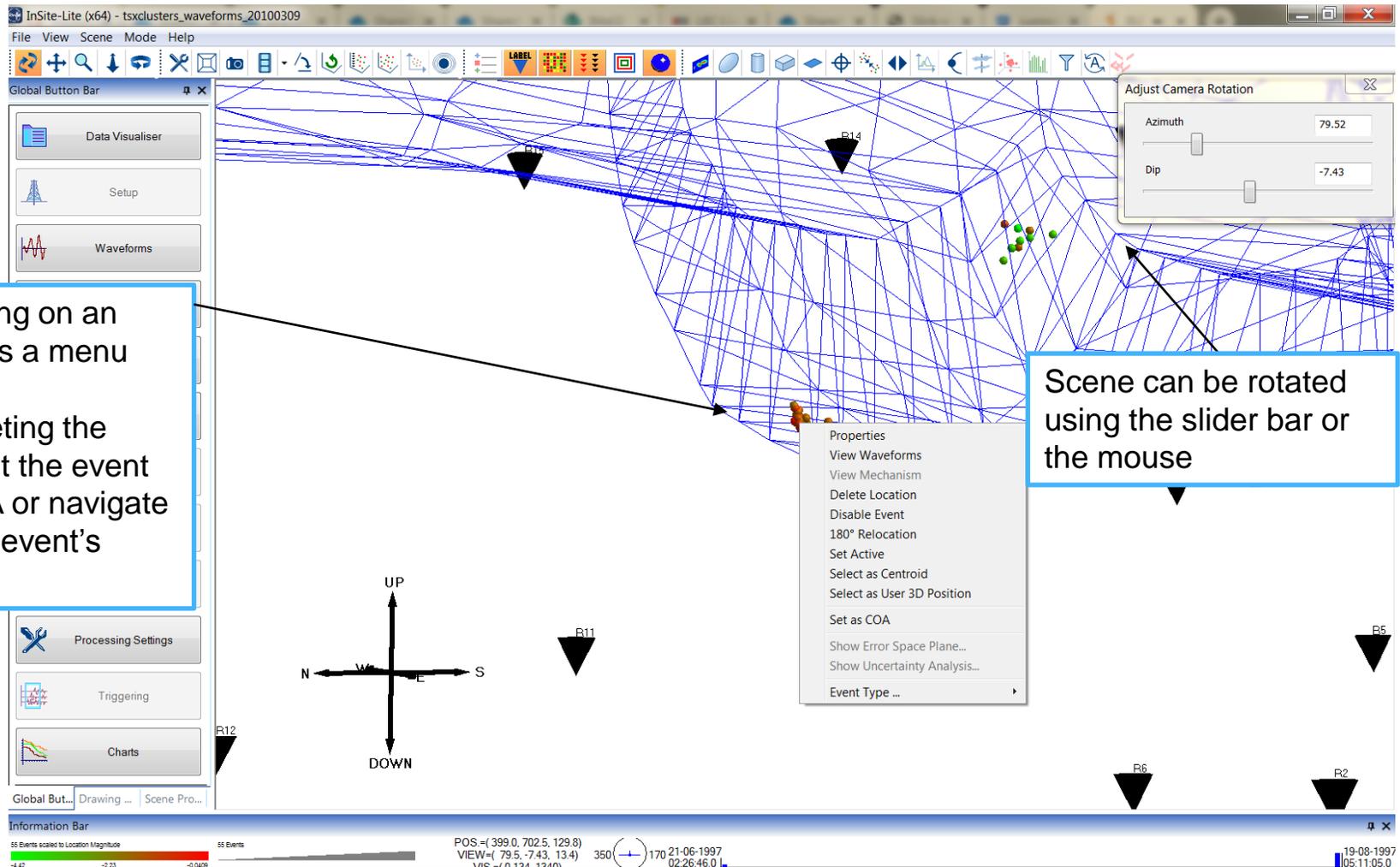
The InSite Global Button Bar allows you to switch between the available visualisers.

Try going to the 3D Visualiser.

The other visualisers will be empty as no data exists for them in this project.

InSite's default view is the 'Data Visualiser', showing a catalogue of all Seismic/MS/AE events imported or processed within the project

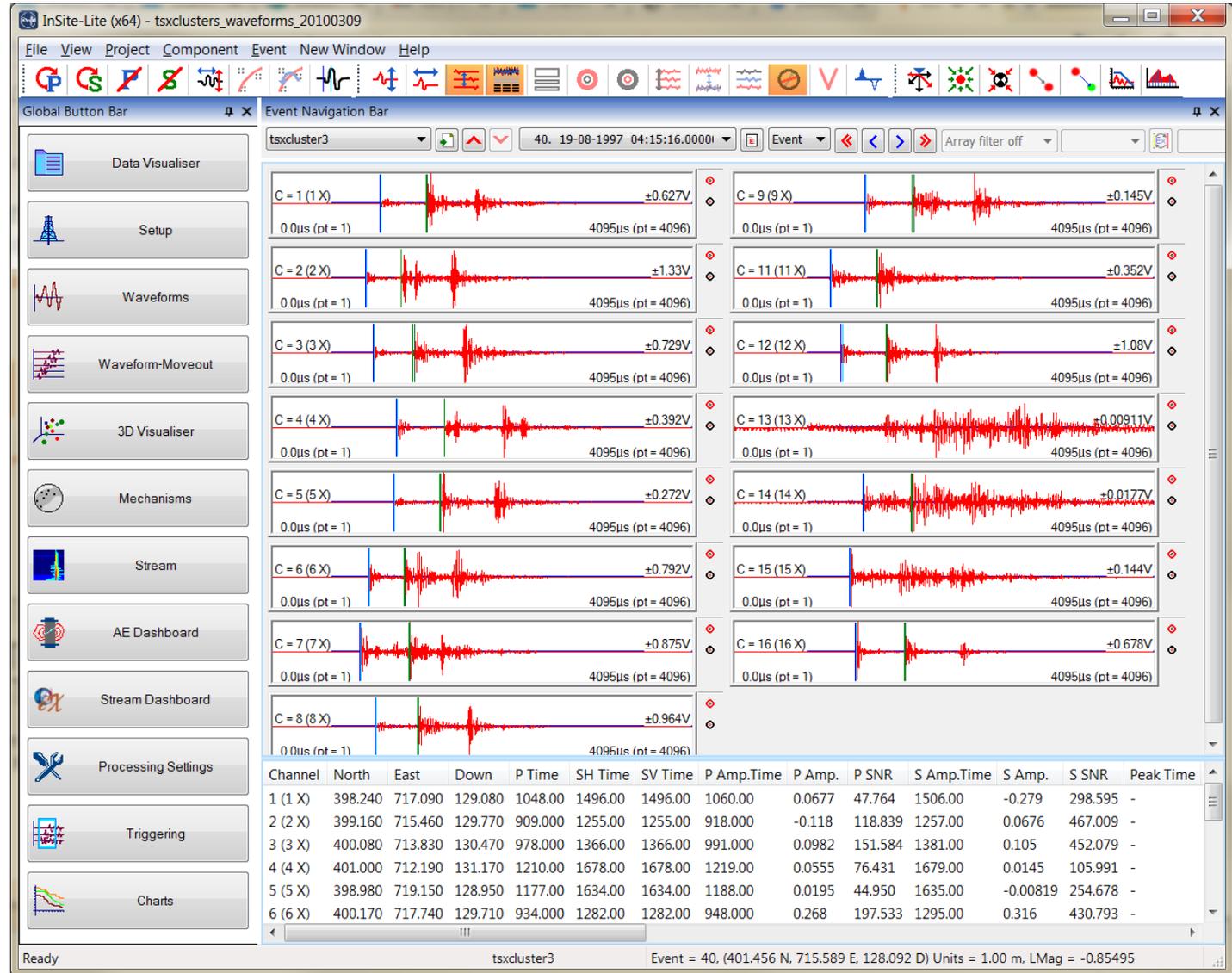
The example has already imported the geometry of the bulkhead, created as a dxf file. InSite's 3D visualiser allows displaying the events with different colour and sizes scales in a 3D scene.



The screenshot displays the InSite-Lite software interface. The main window shows a 3D wireframe model of a bulkhead structure. Several seismic events are plotted as colored spheres (red, orange, green) on the surface. A context menu is open over one of the events, listing options such as 'Properties', 'View Waveforms', 'View Mechanism', 'Delete Location', 'Disable Event', '180° Relocation', 'Set Active', 'Select as Centroid', 'Select as User 3D Position', 'Set as COA', 'Show Error Space Plane...', 'Show Uncertainty Analysis...', and 'Event Type ...'. A callout box points to this menu with the text: 'Right-clicking on an event opens a menu that allows editing/deleting the location, set the event as the COA or navigate to view the event's waveforms'. Another callout box points to the 'Adjust Camera Rotation' panel on the right, which has sliders for 'Azimuth' (79.52) and 'Dip' (-7.43), with the text: 'Scene can be rotated using the slider bar or the mouse'. The interface also features a 'Global Button Bar' on the left with buttons for 'Data Visualiser', 'Setup', and 'Waveforms'. At the bottom, there is an 'Information Bar' showing '55 Events scaled to Location Magnitude', a color scale from -4.2 to -0.049, and technical data: 'POS=(399.0, 702.5, 129.8)', 'VIEW=(79.5, -7.43, 13.4)', '350', '170 21-06-1997 02:26:46.0', and '19-08-1997 10:11:05.0'. A compass rose is also visible in the lower center of the 3D view.

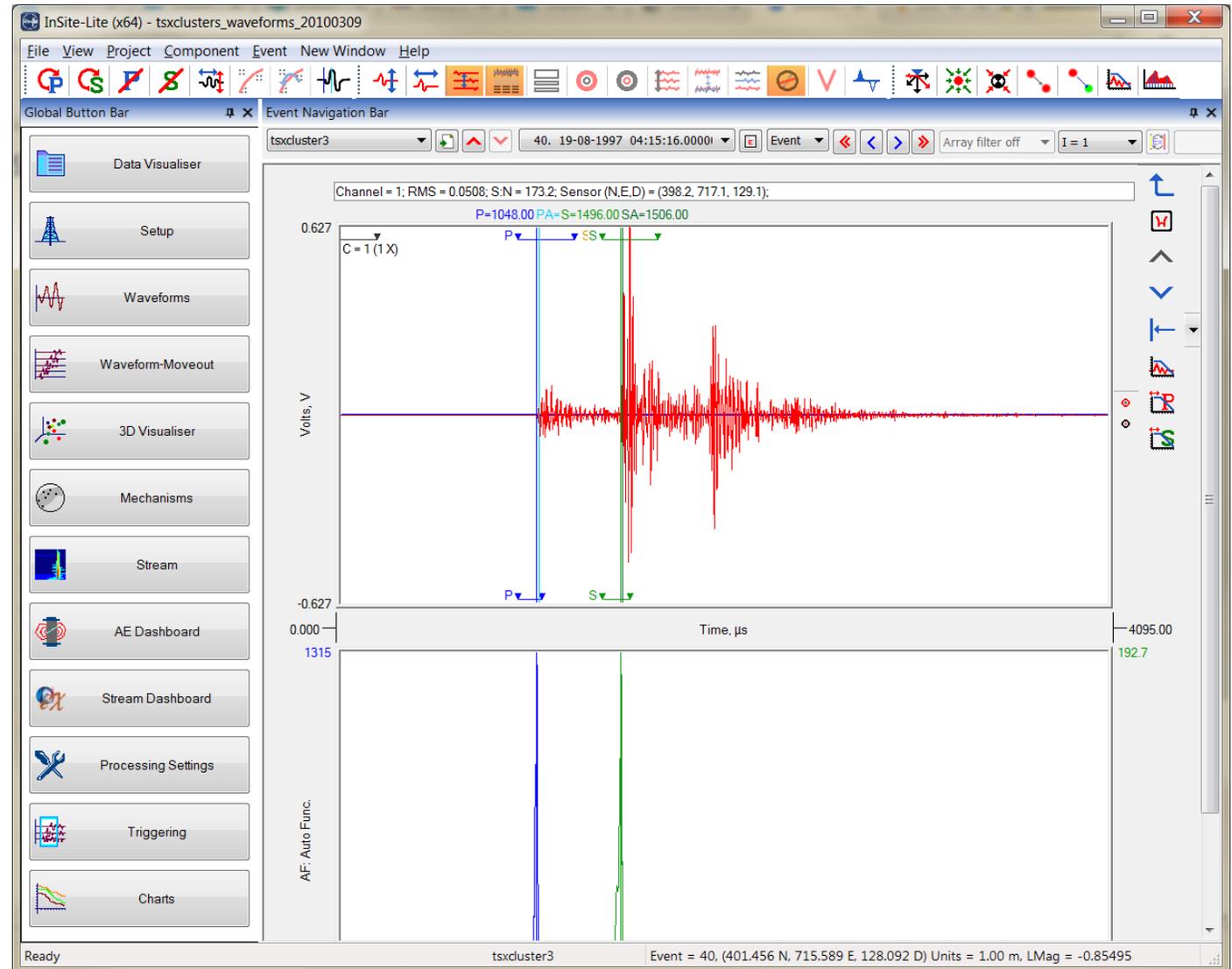
Waveform view shows individual instrument or channel traces together with the processing result.

This view is indicated for sensor arrays arranged in a 3D or 2D geometry.



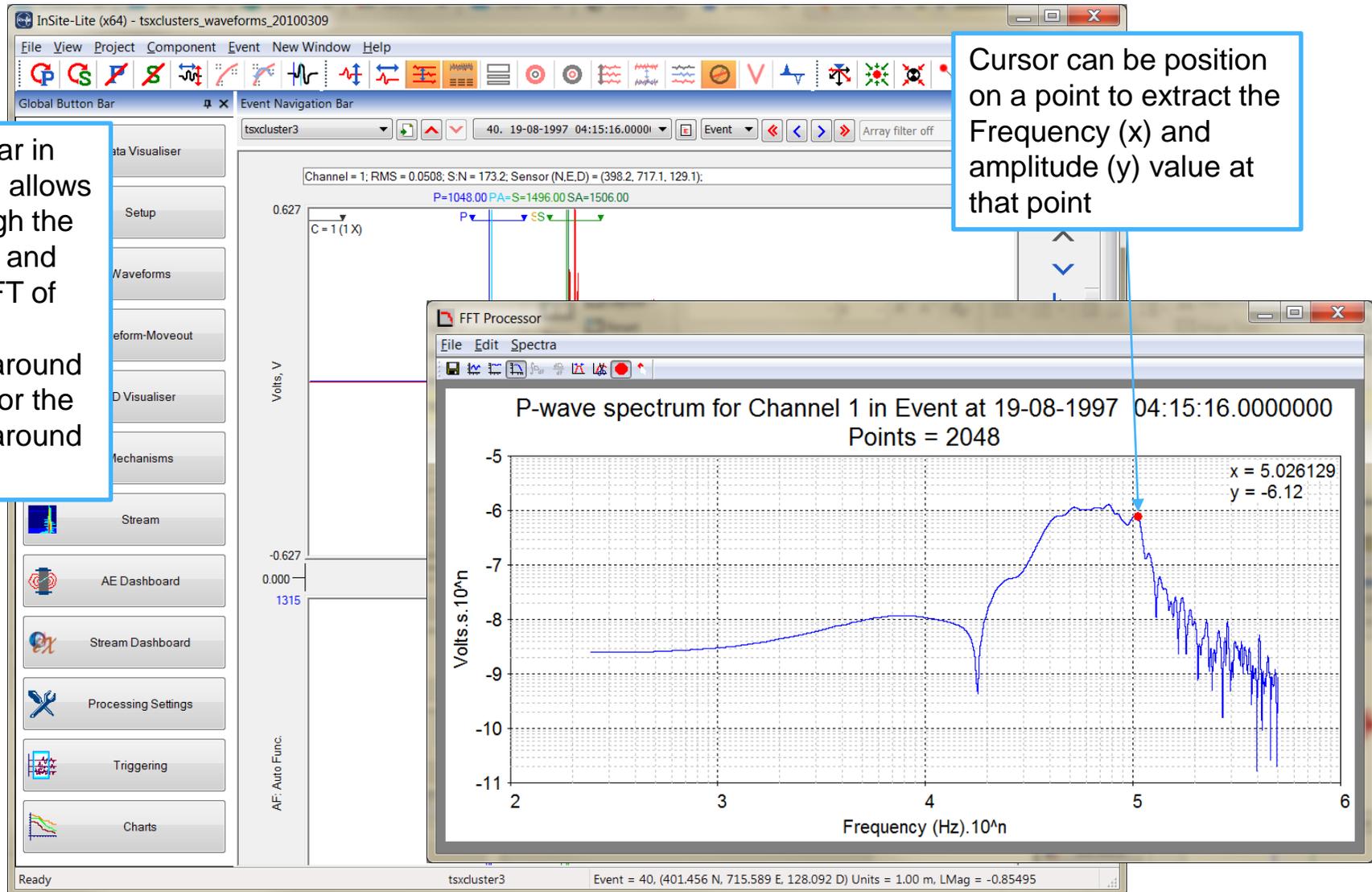
Waveform visualiser: channel view

Right-clicking on one trace brings the channel view. This view displays the recorded trace, processed arrival picks and the picking function (AF) used in the auto-picking



Waveform visualiser: FFT

The right-hand bar in the channel view allows navigating through the different sensors and displaying the FFT of the full trace, the section of trace around the P-wave pick or the section of trace around the S-wave



Cursor can be position on a point to extract the Frequency (x) and amplitude (y) value at that point