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IMS Vantage Sensitivity Analysis Plug-in

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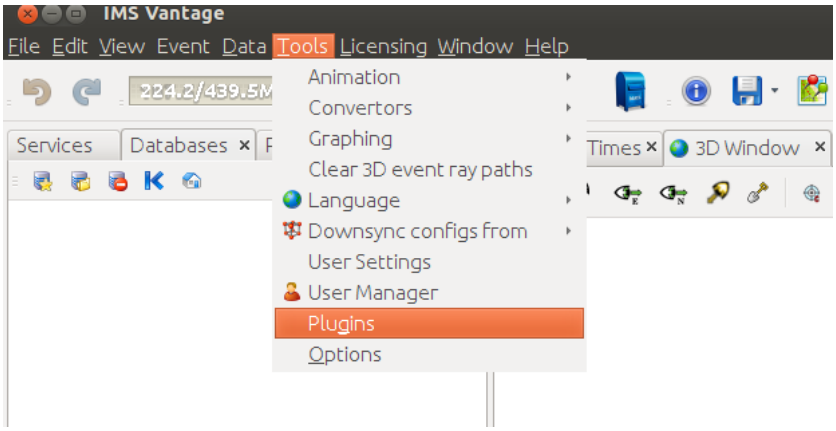
Contents

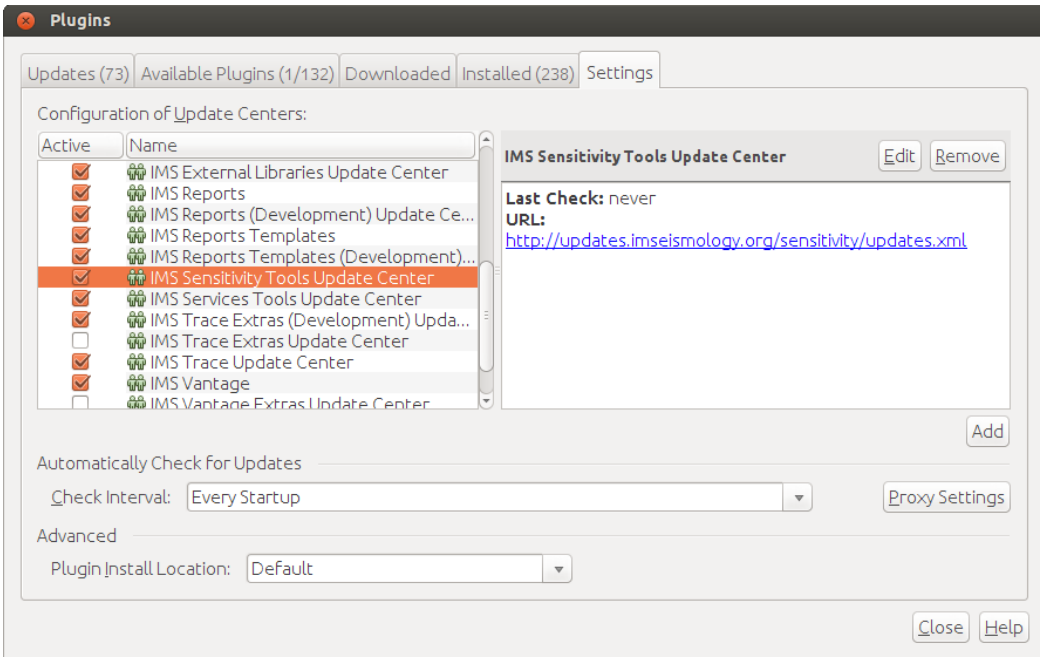
1 Installing the Sensitivity Plug-in

Follow the steps as described below to add the Sensitivity Analysis plug-in into an existing Vantage installation:

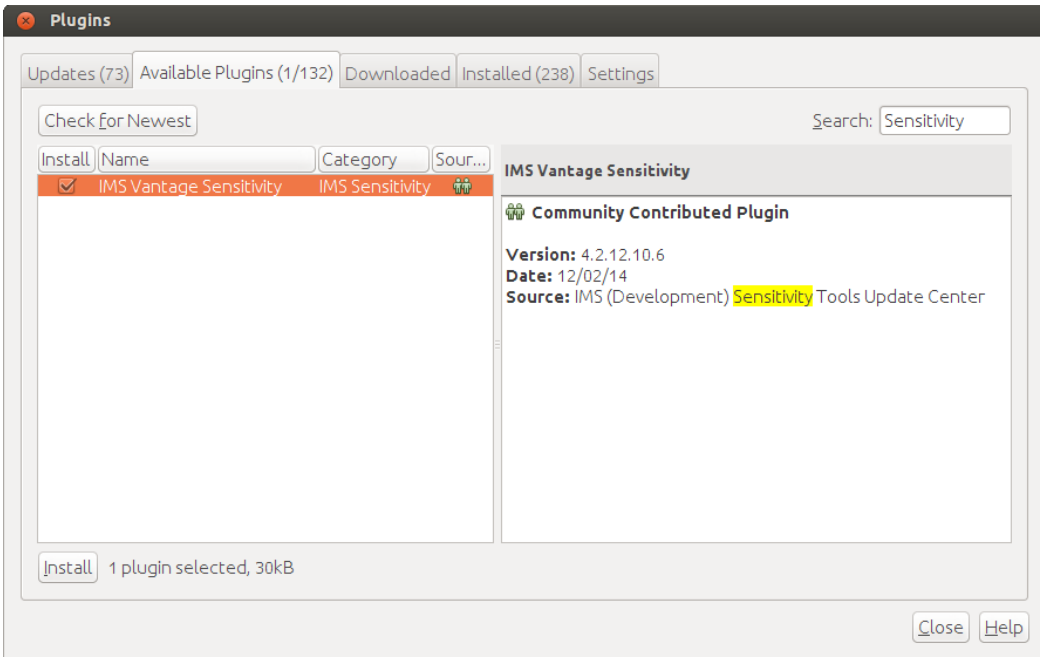
Select the "Plug-ins" action from the Tools menu



Select the "Settings" tab and make sure the "IMS Sensitivity Tools Update Center" is checked.



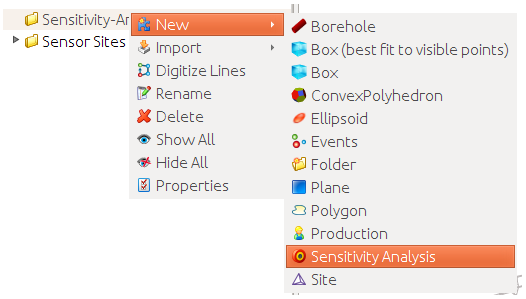
Select the "Available Plug-ins" tab and type "Sensitivity" in the search box. A plug-in called "IMS Vantage Sensitivity" will be listed. Select that module and then select the install button to install.



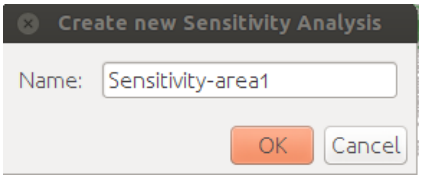
Restart Vantage for the changes to take effect.

2 Creating a new Sensitivity Analysis

Right click on an existing folder inside a Vantage project and select “New” - “Sensitivity Analysis”



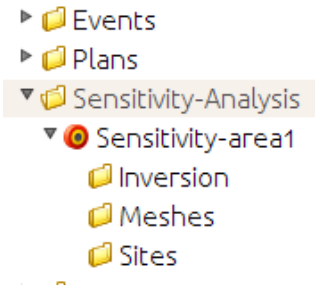
Select a name for the analysis.



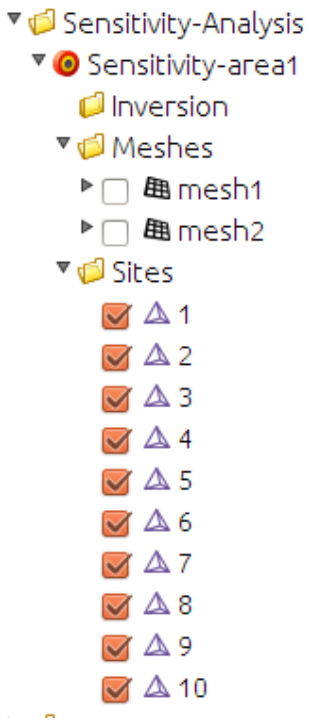
A new node with the selected name will be created in the project tree. Note that three additional folders are created a child nodes of the newly created sensitivity node.

- Inversion - this folder can be ignored
- Meshes - all meshes on which sensitivity analysis contours will be performed must be placed in this folder.
- Sites - all sites of the system that must be used in the sensitivity analysis must be placed in this folder.

Note that the above folders cannot be renamed or deleted.



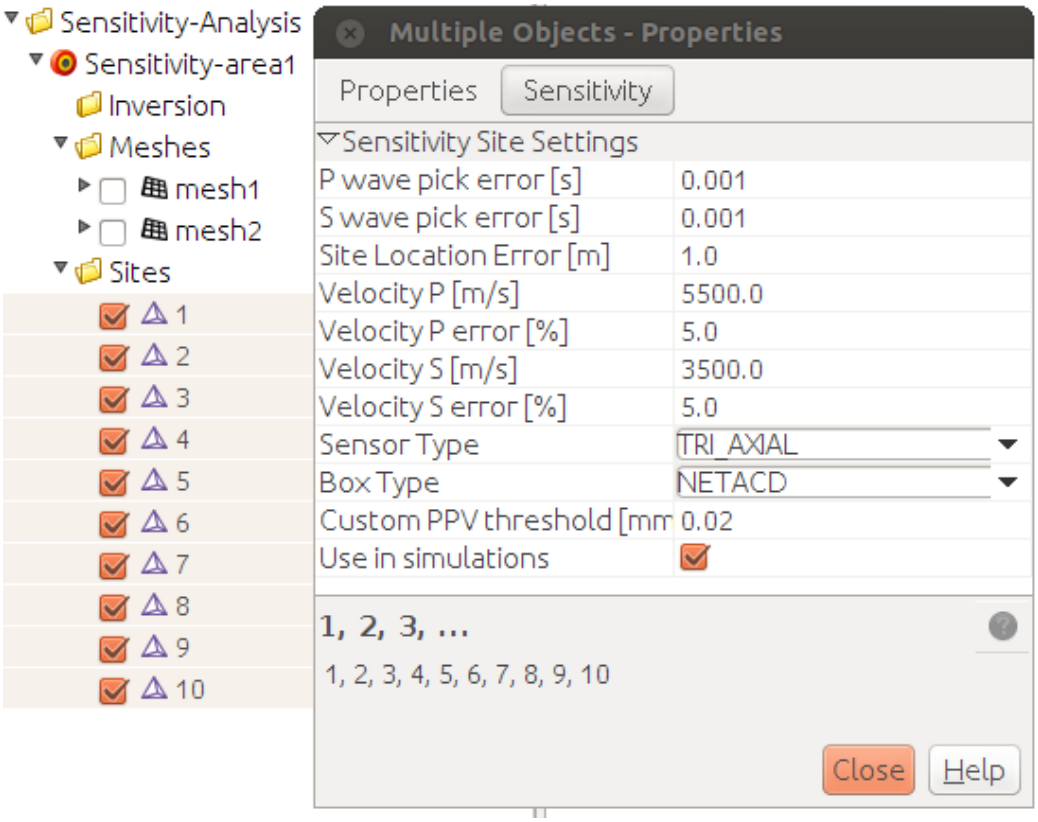
Move all meshes and sites that will be used in the analysis into the correct “Meshes” and “Sites” folders. This can be done by moving existing meshes/sites in the project or it can be imported from files on disk. In the example below two meshes named “mesh1” and “mesh2” are placed in the “Meshes folder” and Sites numbered 1-10 are placed in the sites folder.



Select individual sites in the "Sites" folder and right-click to edit the Sensitivity site properties. The properties include:

- P wave pick error [s] - Assume some error in seconds where the P pick is placed on the waveform
- S wave pick error [s] - Assume some error in seconds where the S pick is placed on the waveform
- Site Location Error [m] - The actual coordinate where the site is installed may not be correct. Specify what error in meters where the site coordinate may differ from the specified location
- Velocity P [m/s] - P wave velocity in m/s
- Velocity P error [%] - P wave velocity uncertainty as a percentage
- Velocity S [m/s] - S wave velocity in m/s
- Velocity S error [%] - S wave velocity uncertainty as a percentage
- Sensor Type - Type of site installed (Uni-axial / Tri-axial)
- Box Type - The IMS/ISS station that the site will be connected to (NetADC, GS, QS, MS, Custom)

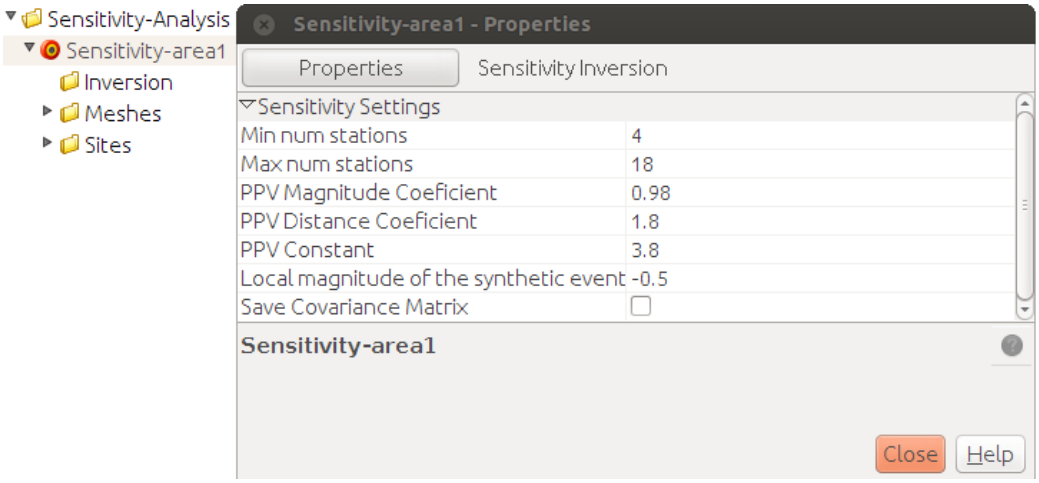
- Custom PPV threshold [mm/s] - Use this property only if “Custom” was selected above and you do not wish to use the default values that area associated with the IMS system
- Use in simulations - This site can be excluded from the analysis



Right click on the Sensitivity Analysis node (in this example “Sensitivity-area1” node) to edit properties of the sensitivity analysis to be performed. The properties include:

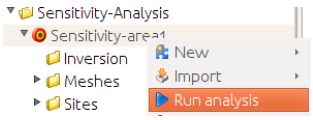
- Min num stations - Minimum num stations that must record the synthetic event to do the location analysis
- Max num stations - Maximum num stations used to record the synthetic event
- PPV Magnitude Coefficient - A in the relation: log(PPV) = A*local_magnitude + B*log(distance) + C
- PPV Distance Coefficient - B in the relation: log(PPV) = A*local_magnitude + B*log(distance) + C

- PPV Constant - C in the relation: log(PPV) = A*local_magnitude + B*log(distance) + C
- Local magnitude of the synthetic event - Local magnitude of the synthetic event used to determine what sites are triggered for a fixed point in space
- Save Covariance Matrix - Save the non-visual results of the sensitivity analysis. This setting can be ignored for all practical purposes

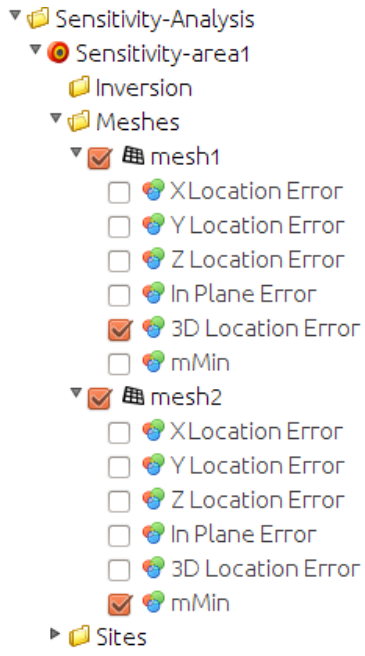


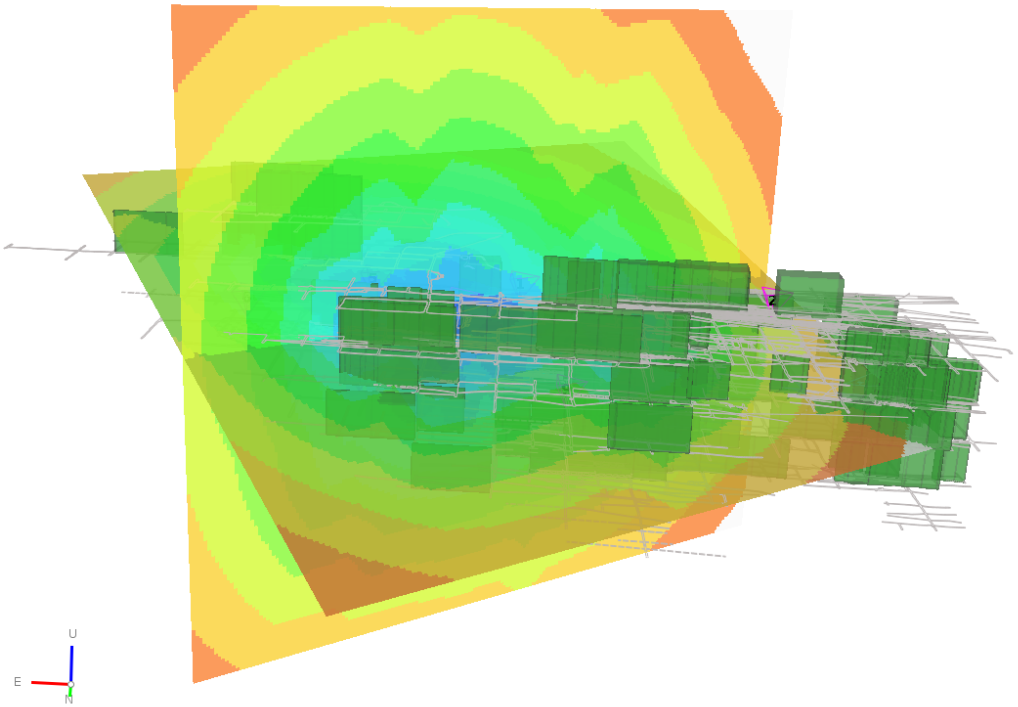
3 Performing the Sensitivity Analysis

Once all the settings have been configured as described in Section 2 the analysis can be performed by right-clicking on the Sensitivity Analysis node ("Sensitivity-area1" in this example) and selecting the "Run analysis" action.



This will perform a sensitivity analysis on the meshes placed in the "Meshes" folder of the Sensitivity Analysis. Once the calculation task has been completed, the meshes can be expanded to view contours of the results of the analysis in the 3 D Viewer.


Sensitivity-Analysis
Sensitivity-area1
Inversion
Meshes
mesh1
X Location Error
Y Location Error
Z Location Error
In Plane Error
3D Location Error
mMin
mesh2
X Location Error
Y Location Error
Z Location Error
In Plane Error
3D Location Error
mMin
Sites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