

*Exceptional service in the national interest*



# USER INTERFACE STORYBOARDS

## Refines Event Magnitude

# Brief Description

This use case describes how the Analyst refines estimated event magnitudes for an existing event hypothesis. The Analyst invokes the same magnitude algorithms used in pipeline processing (see 'System Refines Event Magnitude' UC) or additional magnitude estimation algorithms. The Analyst configures input parameters for estimating magnitude.

# Overview

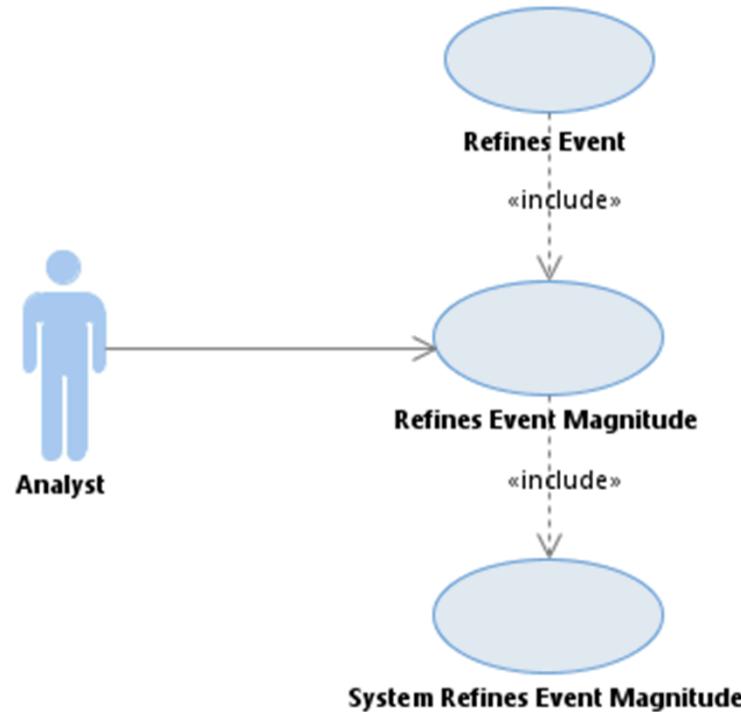
- The Analyst accesses the displays represented by these storyboards by opening the Analyst workspace (Analyzes Events UC), selecting data for analysis (Selects Data for Analysis UC), selecting an event to refine (Refines Event UC), and then selecting to refine the magnitude for the event being refined.



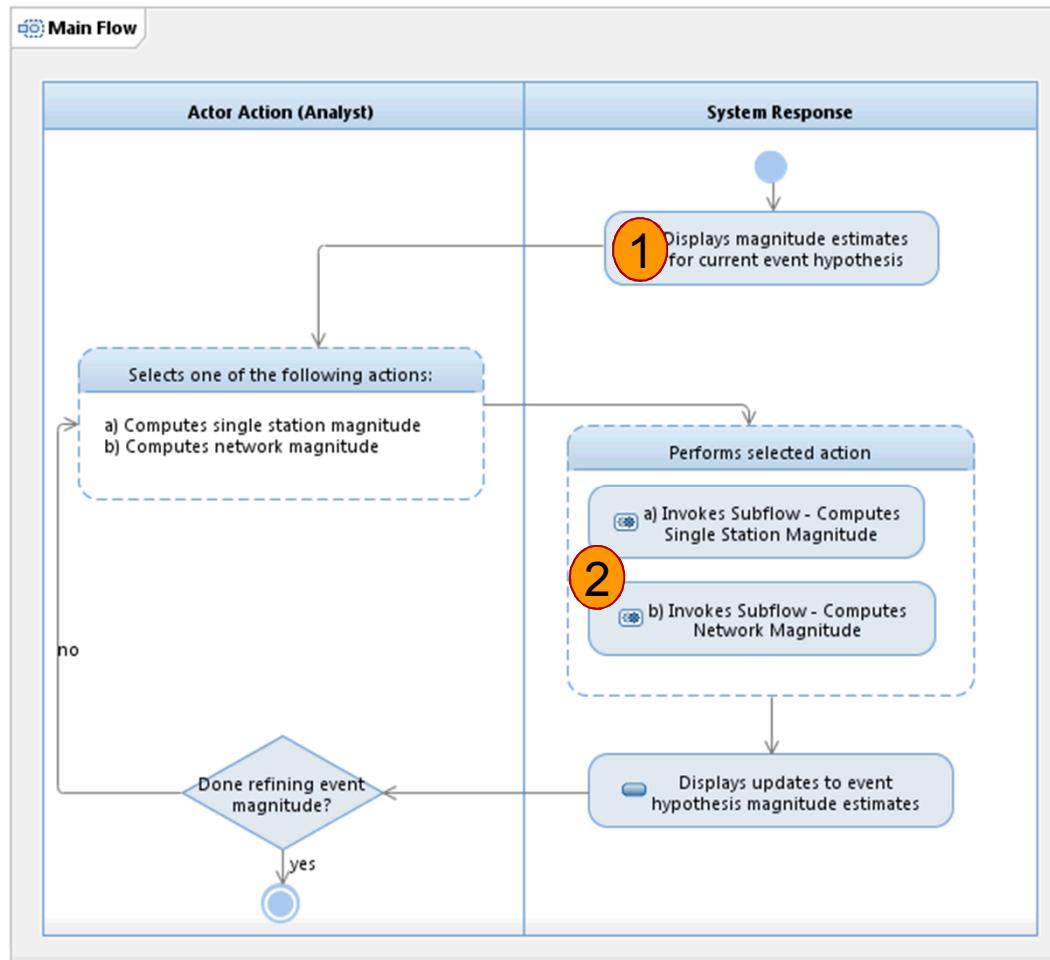
# Key concepts

- Magnitude depends on a location calculation as well as measurements such as amplitude and period.
  - Location refinements in the Refines Event Location display will update the magnitude information in this display.
  - Updates to measurements such as amplitude and period in the waveform display will update the magnitude information in this display.

# Refines Event Magnitude: Use Case



# Refines Event Magnitude: Main Flow

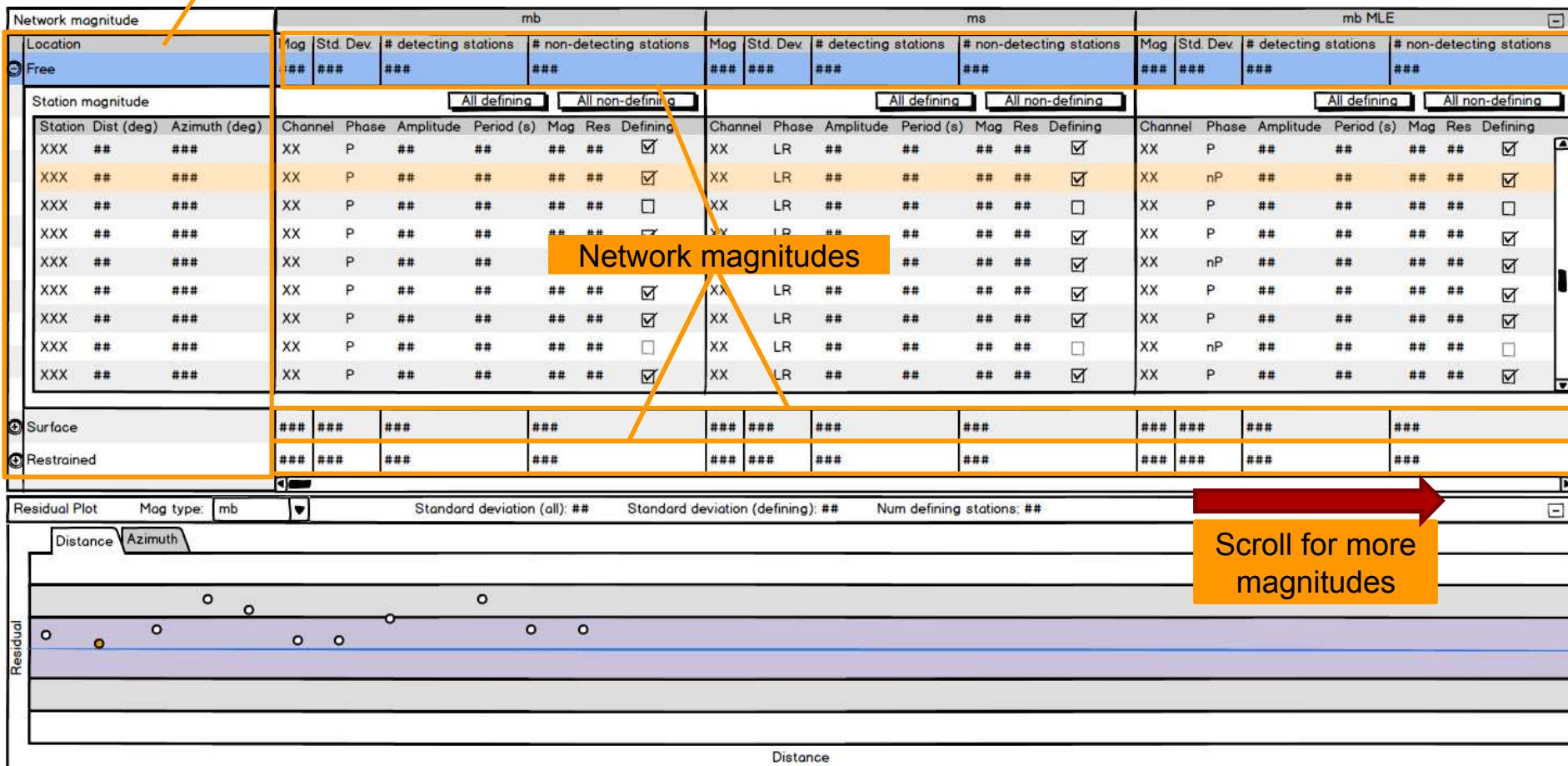


- 1) Displays magnitude estimates
- 2) Computes magnitude estimates
  - a) Single station magnitude
  - b) Network magnitude

## 1) Displays magnitude estimates

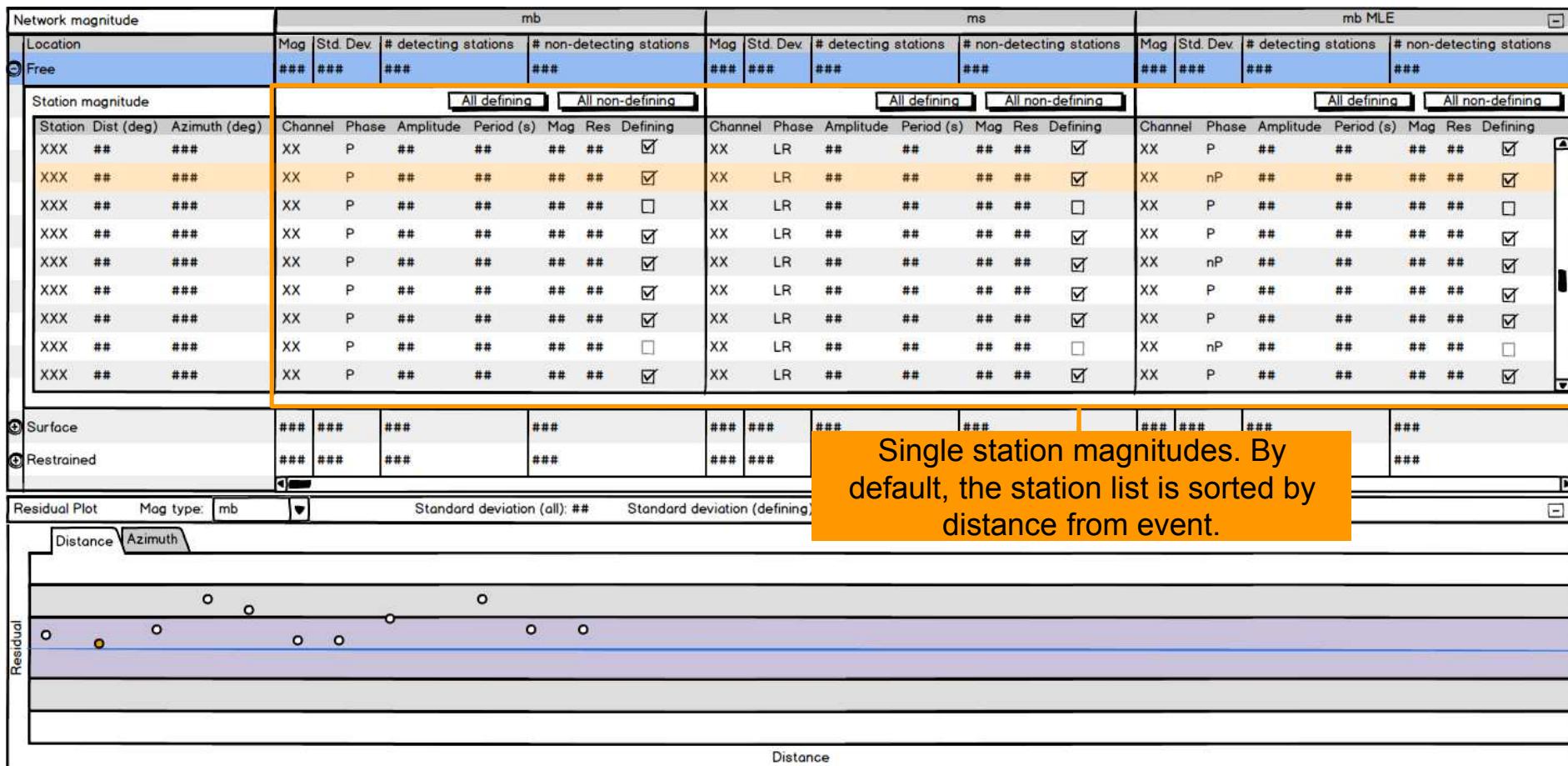
# 1) Displays magnitude estimates

Location solutions. The system calculates magnitudes for all location solutions. The preferred solution is highlighted in blue.

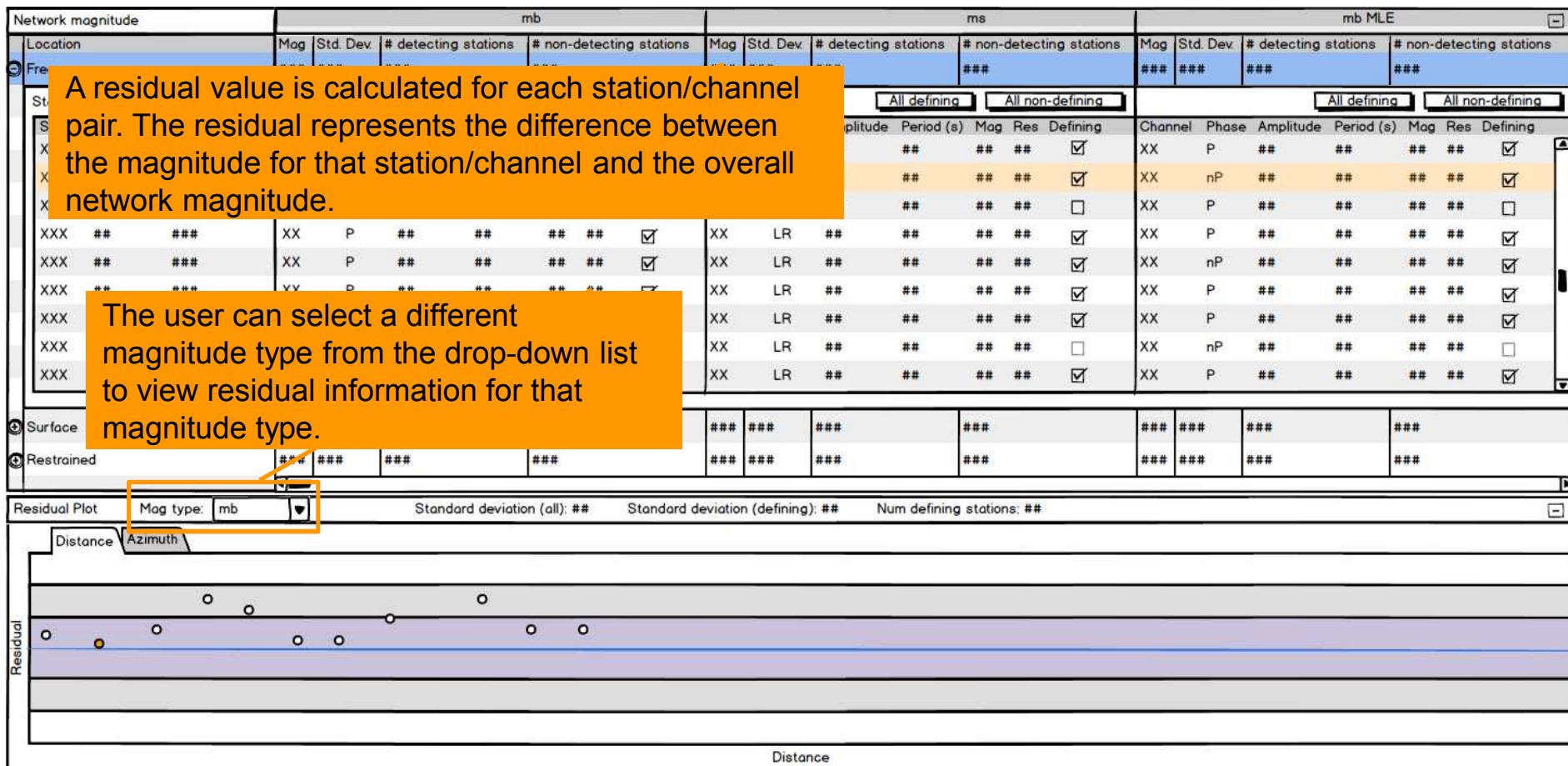


Magnitude information is updated automatically on event relocation

# 1) Displays magnitude estimates



# 1) Displays magnitude estimates



# 1) Displays magnitude estimates

| Network magnitude |            | mb            |           |                      |                          |                  |           | ms                   |                          |              |           |                      |                          | mb MLE           |           |                      |                          |              |           |            |     |                  |          |         |       |           |            |     |     |          |
|-------------------|------------|---------------|-----------|----------------------|--------------------------|------------------|-----------|----------------------|--------------------------|--------------|-----------|----------------------|--------------------------|------------------|-----------|----------------------|--------------------------|--------------|-----------|------------|-----|------------------|----------|---------|-------|-----------|------------|-----|-----|----------|
| Location          |            | Mag           | Std. Dev. | # detecting stations | # non-detecting stations | Mag              | Std. Dev. | # detecting stations | # non-detecting stations | Mag          | Std. Dev. | # detecting stations | # non-detecting stations | Mag              | Std. Dev. | # detecting stations | # non-detecting stations |              |           |            |     |                  |          |         |       |           |            |     |     |          |
| Free              |            | ###           | ###       | ###                  | ###                      | ###              | ###       | ###                  | ###                      | ###          | ###       | ###                  | ###                      | ###              | ###       | ###                  | ###                      |              |           |            |     |                  |          |         |       |           |            |     |     |          |
| Station magnitude |            | All defining  |           |                      |                          | All non-defining |           |                      |                          | All defining |           |                      |                          | All non-defining |           |                      |                          | All defining |           |            |     | All non-defining |          |         |       |           |            |     |     |          |
| Station           | Dist (deg) | Azimuth (deg) | Channel   | Phase                | Amplitude                | Period (s)       | Mag       | Res                  | Defining                 | Channel      | Phase     | Amplitude            | Period (s)               | Mag              | Res       | Defining             | Channel                  | Phase        | Amplitude | Period (s) | Mag | Res              | Defining | Channel | Phase | Amplitude | Period (s) | Mag | Res | Defining |
| XXX               | ##         | ###           | XX        | P                    | ##                       | ##               | ##        | ##                   | ✓                        | XX           | LR        | ##                   | ##                       | ##               | ##        | ✓                    | XX                       | P            | ##        | ##         | ##  | ##               | ##       | ##      | ##    | ##        | ##         | ##  | ##  | ✓        |
| XXX               | ##         | ###           | XX        | P                    | ##                       | ##               | ##        | ##                   | ✓                        | XX           | LR        | ##                   | ##                       | ##               | ##        | ✓                    | XX                       | nP           | ##        | ##         | ##  | ##               | ##       | ##      | ##    | ##        | ##         | ##  | ##  | ✓        |
| XXX               | ##         | ###           | XX        | P                    | ##                       | ##               | ##        | ##                   | □                        | XX           | LR        | ##                   | ##                       | ##               | ##        | □                    | XX                       | P            | ##        | ##         | ##  | ##               | ##       | ##      | ##    | ##        | ##         | ##  | ##  | □        |
| XXX               | ##         | ###           | XX        | P                    | ##                       | ##               | ##        | ##                   | ✓                        | XX           | LR        | ##                   | ##                       | ##               | ##        | ✓                    | XX                       | P            | ##        | ##         | ##  | ##               | ##       | ##      | ##    | ##        | ##         | ##  | ##  | ✓        |
| XXX               | ##         | ###           | XX        | P                    | ##                       | ##               | ##        | ##                   | ✓                        | XX           | LR        | ##                   | ##                       | ##               | ##        | ✓                    | XX                       | nP           | ##        | ##         | ##  | ##               | ##       | ##      | ##    | ##        | ##         | ##  | ##  | ✓        |
| XXX               | ##         | ###           | XX        | P                    | ##                       | ##               | ##        | ##                   | ✓                        | XX           | LR        | ##                   | ##                       | ##               | ##        | ✓                    | XX                       | P            | ##        | ##         | ##  | ##               | ##       | ##      | ##    | ##        | ##         | ##  | ##  | ✓        |
| XXX               | ##         | ###           | XX        | P                    | ##                       | ##               | ##        | ##                   | ✓                        | XX           | LR        | ##                   | ##                       | ##               | ##        | ✓                    | XX                       | nP           | ##        | ##         | ##  | ##               | ##       | ##      | ##    | ##        | ##         | ##  | ##  | ✓        |
| XXX               | ##         | ###           | XX        | P                    | ##                       | ##               | ##        | ##                   | ✓                        | XX           | LR        | ##                   | ##                       | ##               | ##        | ✓                    | XX                       | P            | ##        | ##         | ##  | ##               | ##       | ##      | ##    | ##        | ##         | ##  | ##  | ✓        |
| XXX               | ##         | ###           | XX        | P                    | ##                       | ##               | ##        | ##                   | ✓                        | XX           | LR        | ##                   | ##                       | ##               | ##        | ✓                    | XX                       | nP           | ##        | ##         | ##  | ##               | ##       | ##      | ##    | ##        | ##         | ##  | ##  | ✓        |
| XXX               | ##         | ###           | XX        | P                    | ##                       | ##               | ##        | ##                   | ✓                        | XX           | LR        | ##                   | ##                       | ##               | ##        | ✓                    | XX                       | P            | ##        | ##         | ##  | ##               | ##       | ##      | ##    | ##        | ##         | ##  | ##  | ✓        |
| Surface           |            |               | ###       | ###                  | ###                      | ##               | ##        | ##                   | ##                       |              |           |                      | ##                       | ##               | ##        | ##                   |                          |              | ##        | ##         | ##  | ##               | ##       | ##      | ##    | ##        | ##         | ##  | ##  |          |
| Restrained        |            |               | ###       | ###                  | ###                      | ##               | ##        | ##                   | ##                       |              |           |                      | ##                       | ##               | ##        | ##                   |                          |              | ##        | ##         | ##  | ##               | ##       | ##      | ##    | ##        | ##         | ##  | ##  |          |

The horizontal thresholds on the plot depict one (purple) and two (gray) standard deviations from the network magnitude (blue line).

Residual Plot Mag type: mb Standard deviation (all): ## Standard deviation (defining): ## Num defining stations: ##

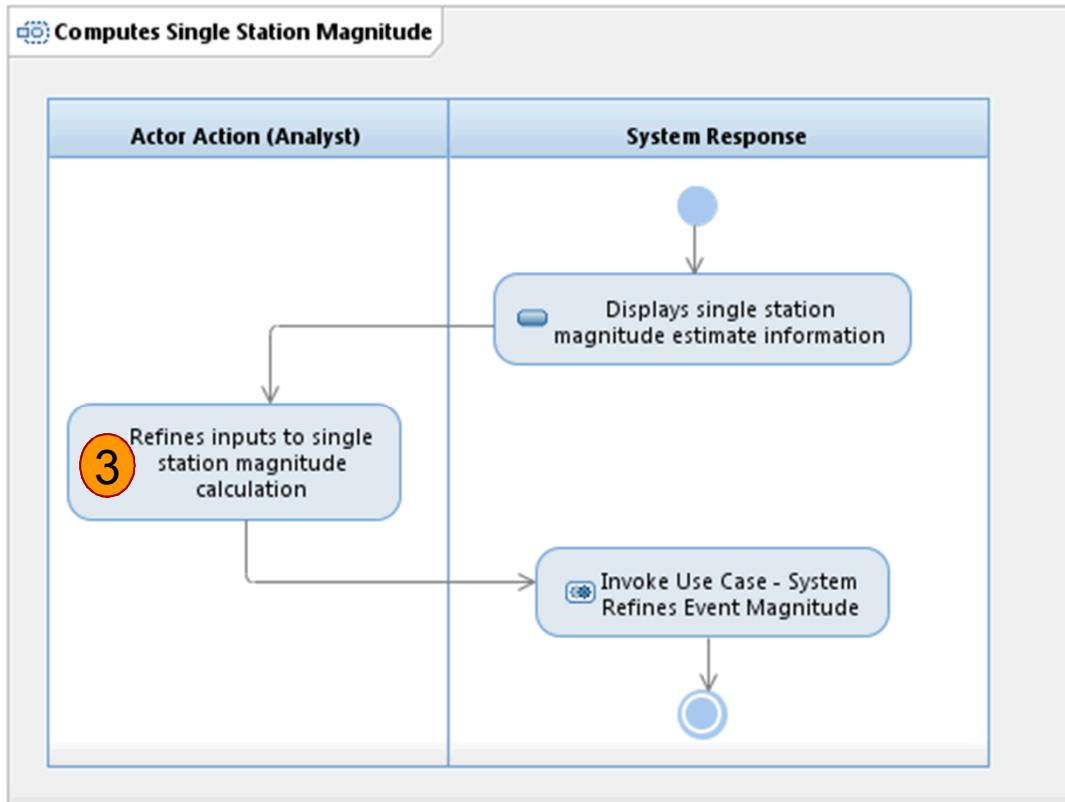
Distance Azimuth

Residual

Distance

Magnitude residuals for each station/channel are plotted vs. distance and azimuth from the event. If a station is selected in the station magnitudes table above, the residual point for that station is highlighted in the plot. The user can click or hover over a point in the plot to see more information.

# Computes single station magnitude

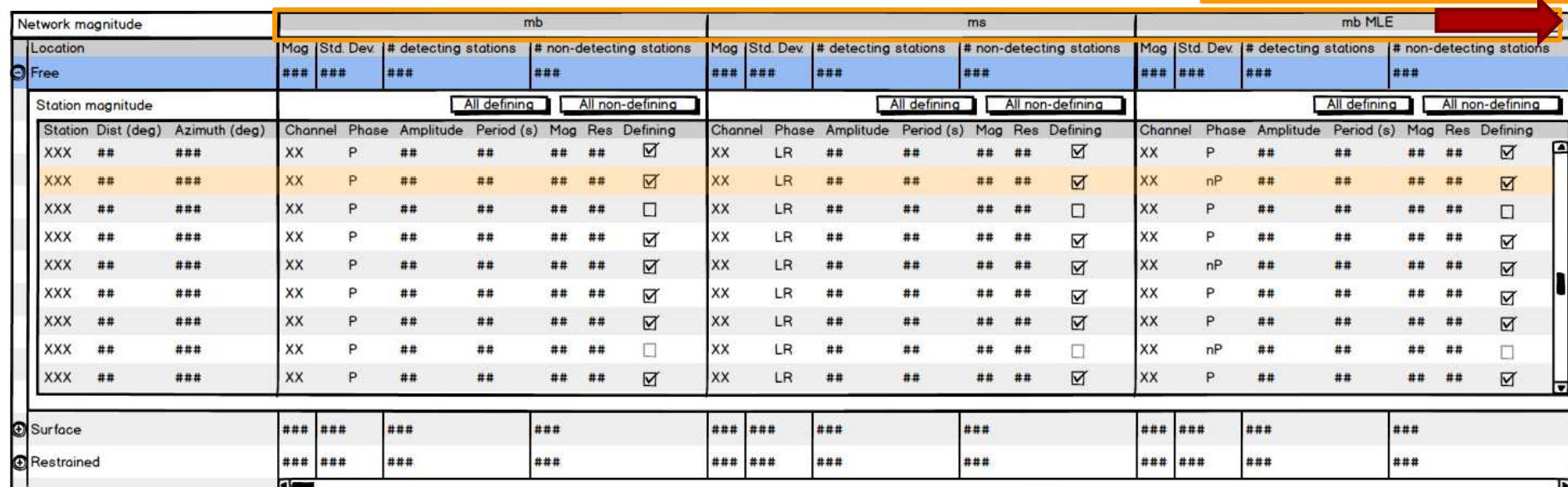


3) Refines inputs to signal station magnitude calculation

# 3) Refines inputs to single station magnitude calculation

- The System will automatically calculate and display all configured single station magnitudes.

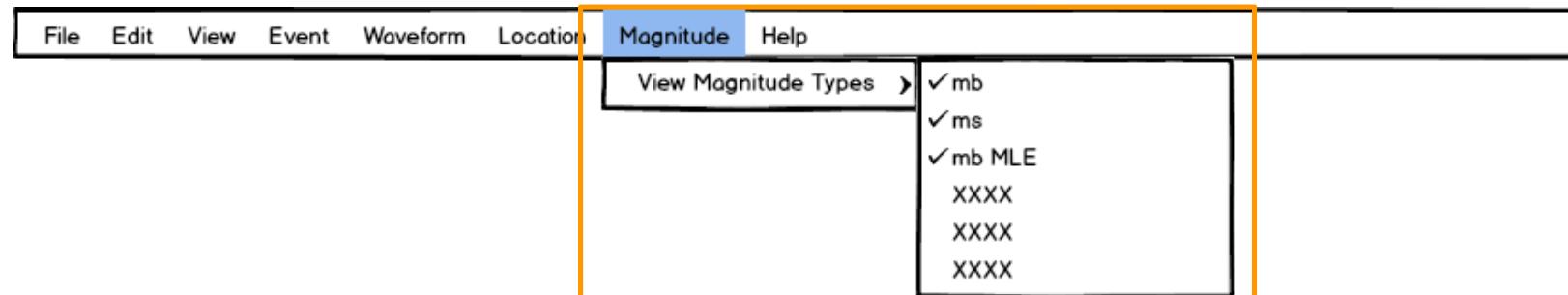
Scroll for more magnitudes



| Network magnitude |            | mb            |           |                      |                          | ms         |           |                      |                                     | mb MLE  |           |                      |                          |     |     |                                     |         |       |           |            |     |     |          |                                     |
|-------------------|------------|---------------|-----------|----------------------|--------------------------|------------|-----------|----------------------|-------------------------------------|---------|-----------|----------------------|--------------------------|-----|-----|-------------------------------------|---------|-------|-----------|------------|-----|-----|----------|-------------------------------------|
| Location          | Station    | Mag           | Std. Dev. | # detecting stations | # non-detecting stations | Mag        | Std. Dev. | # detecting stations | # non-detecting stations            | Mag     | Std. Dev. | # detecting stations | # non-detecting stations |     |     |                                     |         |       |           |            |     |     |          |                                     |
|                   |            | ##            | ###       | ###                  | ###                      | ##         | ###       | ###                  | ###                                 | ##      | ###       | ###                  | ###                      |     |     |                                     |         |       |           |            |     |     |          |                                     |
| Station magnitude |            |               |           |                      |                          |            |           |                      |                                     |         |           |                      |                          |     |     |                                     |         |       |           |            |     |     |          |                                     |
| Station           | Dist (deg) | Azimuth (deg) | Channel   | Phase                | Amplitude                | Period (s) | Mag       | Res                  | Defining                            | Channel | Phase     | Amplitude            | Period (s)               | Mag | Res | Defining                            | Channel | Phase | Amplitude | Period (s) | Mag | Res | Defining |                                     |
| XXX               | ##         | ###           | XX        | P                    | ##                       | ##         | ##        | ##                   | <input checked="" type="checkbox"/> | XX      | LR        | ##                   | ##                       | ##  | ##  | <input checked="" type="checkbox"/> | XX      | P     | ##        | ##         | ##  | ##  | ##       | <input checked="" type="checkbox"/> |
| XXX               | ##         | ###           | XX        | P                    | ##                       | ##         | ##        | ##                   | <input checked="" type="checkbox"/> | XX      | LR        | ##                   | ##                       | ##  | ##  | <input checked="" type="checkbox"/> | XX      | nP    | ##        | ##         | ##  | ##  | ##       | <input checked="" type="checkbox"/> |
| XXX               | ##         | ###           | XX        | P                    | ##                       | ##         | ##        | ##                   | <input type="checkbox"/>            | XX      | LR        | ##                   | ##                       | ##  | ##  | <input type="checkbox"/>            | XX      | P     | ##        | ##         | ##  | ##  | ##       | <input type="checkbox"/>            |
| XXX               | ##         | ###           | XX        | P                    | ##                       | ##         | ##        | ##                   | <input checked="" type="checkbox"/> | XX      | LR        | ##                   | ##                       | ##  | ##  | <input checked="" type="checkbox"/> | XX      | P     | ##        | ##         | ##  | ##  | ##       | <input checked="" type="checkbox"/> |
| XXX               | ##         | ###           | XX        | P                    | ##                       | ##         | ##        | ##                   | <input checked="" type="checkbox"/> | XX      | LR        | ##                   | ##                       | ##  | ##  | <input checked="" type="checkbox"/> | XX      | nP    | ##        | ##         | ##  | ##  | ##       | <input checked="" type="checkbox"/> |
| XXX               | ##         | ###           | XX        | P                    | ##                       | ##         | ##        | ##                   | <input checked="" type="checkbox"/> | XX      | LR        | ##                   | ##                       | ##  | ##  | <input checked="" type="checkbox"/> | XX      | P     | ##        | ##         | ##  | ##  | ##       | <input checked="" type="checkbox"/> |
| XXX               | ##         | ###           | XX        | P                    | ##                       | ##         | ##        | ##                   | <input checked="" type="checkbox"/> | XX      | LR        | ##                   | ##                       | ##  | ##  | <input checked="" type="checkbox"/> | XX      | P     | ##        | ##         | ##  | ##  | ##       | <input checked="" type="checkbox"/> |
| XXX               | ##         | ###           | XX        | P                    | ##                       | ##         | ##        | ##                   | <input checked="" type="checkbox"/> | XX      | LR        | ##                   | ##                       | ##  | ##  | <input checked="" type="checkbox"/> | XX      | nP    | ##        | ##         | ##  | ##  | ##       | <input checked="" type="checkbox"/> |
| XXX               | ##         | ###           | XX        | P                    | ##                       | ##         | ##        | ##                   | <input type="checkbox"/>            | XX      | LR        | ##                   | ##                       | ##  | ##  | <input type="checkbox"/>            | XX      | P     | ##        | ##         | ##  | ##  | ##       | <input type="checkbox"/>            |
| Surface           |            |               | ##        | ##                   | ##                       | ##         | ##        | ##                   |                                     | ##      | ##        | ##                   | ##                       | ##  |     | ##                                  | ##      | ##    | ##        | ##         | ##  | ##  |          |                                     |
| Restrained        |            |               | ##        | ##                   | ##                       | ##         | ##        | ##                   |                                     | ##      | ##        | ##                   | ##                       | ##  |     | ##                                  | ##      | ##    | ##        | ##         | ##  | ##  |          |                                     |

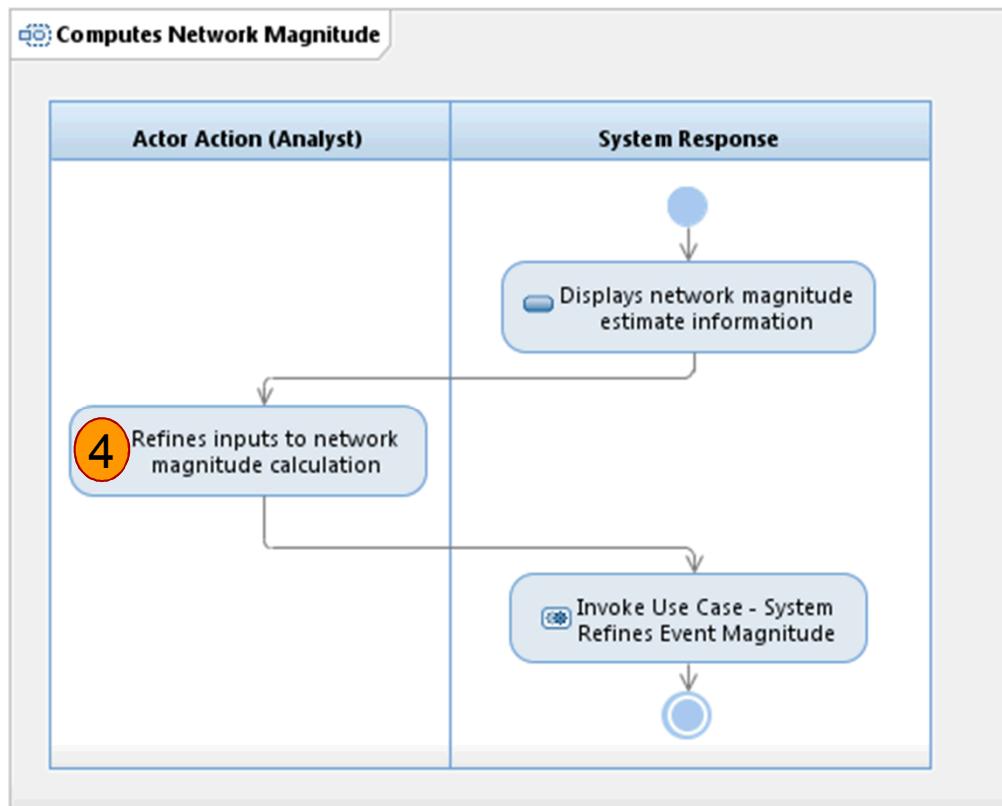
# 3) Refines inputs to single station magnitude calculation

- To calculate/view non-configured magnitudes, use the menu option to add (or remove) magnitude types to the table



| Network magnitude |              |               | mb      |           |                      |                          |              |           | ms                                  |                          |       |           |                      |                          | mb MLE |                                     |                      |                          |           |            |     |     |                                     |
|-------------------|--------------|---------------|---------|-----------|----------------------|--------------------------|--------------|-----------|-------------------------------------|--------------------------|-------|-----------|----------------------|--------------------------|--------|-------------------------------------|----------------------|--------------------------|-----------|------------|-----|-----|-------------------------------------|
| Location          |              |               | Mag     | Std. Dev. | # detecting stations | # non-detecting stations | Mag          | Std. Dev. | # detecting stations                | # non-detecting stations | Mag   | Std. Dev. | # detecting stations | # non-detecting stations | Mag    | Std. Dev.                           | # detecting stations | # non-detecting stations |           |            |     |     |                                     |
| Free              | ##           | ##            | ##      | ##        | ##                   | ##                       | ##           | ##        | ##                                  | ##                       | ##    | ##        | ##                   | ##                       | ##     | ##                                  | ##                   | ##                       |           |            |     |     |                                     |
| Station magnitude | All defining |               |         |           |                      |                          | All defining |           |                                     |                          |       |           | All defining         |                          |        |                                     |                      |                          |           |            |     |     |                                     |
| Station           | Dist (deg)   | Azimuth (deg) | Channel | Phase     | Amplitude            | Period (s)               | Mag          | Res       | Defining                            | Channel                  | Phase | Amplitude | Period (s)           | Mag                      | Res    | Defining                            | Channel              | Phase                    | Amplitude | Period (s) | Mag | Res | Defining                            |
| XXX               | ##           | ##            | XX      | P         | ##                   | ##                       | ##           | ##        | <input checked="" type="checkbox"/> | XX                       | LR    | ##        | ##                   | ##                       | ##     | <input checked="" type="checkbox"/> | XX                   | P                        | ##        | ##         | ##  | ##  | <input checked="" type="checkbox"/> |
| XXX               | ##           | ##            | XX      | P         | ##                   | ##                       | ##           | ##        | <input checked="" type="checkbox"/> | XX                       | LR    | ##        | ##                   | ##                       | ##     | <input checked="" type="checkbox"/> | XX                   | nP                       | ##        | ##         | ##  | ##  | <input checked="" type="checkbox"/> |
| XXX               | ##           | ##            | XX      | P         | ##                   | ##                       | ##           | ##        | <input type="checkbox"/>            | XX                       | LR    | ##        | ##                   | ##                       | ##     | <input type="checkbox"/>            | XX                   | P                        | ##        | ##         | ##  | ##  | <input type="checkbox"/>            |
| XXX               | ##           | ##            | XX      | P         | ##                   | ##                       | ##           | ##        | <input checked="" type="checkbox"/> | XX                       | LR    | ##        | ##                   | ##                       | ##     | <input checked="" type="checkbox"/> | XX                   | nP                       | ##        | ##         | ##  | ##  | <input checked="" type="checkbox"/> |
| XXX               | ##           | ##            | XX      | P         | ##                   | ##                       | ##           | ##        | <input checked="" type="checkbox"/> | XX                       | LR    | ##        | ##                   | ##                       | ##     | <input checked="" type="checkbox"/> | XX                   | P                        | ##        | ##         | ##  | ##  | <input checked="" type="checkbox"/> |
| XXX               | ##           | ##            | XX      | P         | ##                   | ##                       | ##           | ##        | <input checked="" type="checkbox"/> | XX                       | LR    | ##        | ##                   | ##                       | ##     | <input checked="" type="checkbox"/> | XX                   | P                        | ##        | ##         | ##  | ##  | <input checked="" type="checkbox"/> |
| XXX               | ##           | ##            | XX      | P         | ##                   | ##                       | ##           | ##        | <input type="checkbox"/>            | XX                       | LR    | ##        | ##                   | ##                       | ##     | <input type="checkbox"/>            | XX                   | P                        | ##        | ##         | ##  | ##  | <input type="checkbox"/>            |
| XXX               | ##           | ##            | XX      | P         | ##                   | ##                       | ##           | ##        | <input type="checkbox"/>            | XX                       | LR    | ##        | ##                   | ##                       | ##     | <input type="checkbox"/>            | XX                   | nP                       | ##        | ##         | ##  | ##  | <input type="checkbox"/>            |
| Surface           |              |               | ##      | ##        | ##                   | ##                       | ##           | ##        |                                     |                          |       | ##        | ##                   | ##                       | ##     |                                     | ##                   | ##                       | ##        | ##         | ##  | ##  |                                     |
| Restrained        |              |               | ##      | ##        | ##                   | ##                       | ##           | ##        |                                     |                          |       | ##        | ##                   | ##                       | ##     |                                     | ##                   | ##                       | ##        | ##         | ##  | ##  |                                     |

# Computes network magnitude



4) Refines inputs to network magnitude calculation

# 4) Refines inputs to network magnitude

| Network magnitude |            |               | mb        |                      |                          |            |           |                      | ms                                  |         |           |                      |                          |     | mb MLE    |                                     |                          |       |           |            |     |     |                                     |
|-------------------|------------|---------------|-----------|----------------------|--------------------------|------------|-----------|----------------------|-------------------------------------|---------|-----------|----------------------|--------------------------|-----|-----------|-------------------------------------|--------------------------|-------|-----------|------------|-----|-----|-------------------------------------|
| Location          |            | Mag           | Std. Dev. | # detecting stations | # non-detecting stations | Mag        | Std. Dev. | # detecting stations | # non-detecting stations            | Mag     | Std. Dev. | # detecting stations | # non-detecting stations | Mag | Std. Dev. | # detecting stations                | # non-detecting stations |       |           |            |     |     |                                     |
| Free              |            | ###           | ###       | ###                  | ###                      | ###        | ###       | ###                  | ###                                 | ###     | ###       | ###                  | ###                      | ### | ###       | ###                                 | ###                      | ###   |           |            |     |     |                                     |
| Station magnitude |            |               |           |                      |                          |            |           |                      |                                     |         |           |                      |                          |     |           |                                     |                          |       |           |            |     |     |                                     |
| Station           | Dist (deg) | Azimuth (deg) | Channel   | Phase                | Amplitude                | Period (s) | Mag       | Res                  | Defining                            | Channel | Phase     | Amplitude            | Period (s)               | Mag | Res       | Defining                            | Channel                  | Phase | Amplitude | Period (s) | Mag | Res | Defining                            |
| XXX               | ##         | ###           | XX        | P                    | ##                       | ##         | ##        | ##                   | <input checked="" type="checkbox"/> | XX      | LR        | ##                   | ##                       | ##  | ##        | <input checked="" type="checkbox"/> | XX                       | P     | ##        | ##         | ##  | ##  | <input checked="" type="checkbox"/> |
| XXX               | ##         | ###           | XX        | P                    | ##                       | ##         | ##        | ##                   | <input checked="" type="checkbox"/> | XX      | LR        | ##                   | ##                       | ##  | ##        | <input checked="" type="checkbox"/> | XX                       | nP    | ##        | ##         | ##  | ##  | <input checked="" type="checkbox"/> |
| XXX               | ##         | ###           | XX        | P                    | ##                       | ##         | ##        | ##                   | <input type="checkbox"/>            | XX      | LR        | ##                   | ##                       | ##  | ##        | <input type="checkbox"/>            | XX                       | P     | ##        | ##         | ##  | ##  | <input type="checkbox"/>            |
| XXX               | ##         | ###           | XX        | P                    | ##                       | ##         | ##        | ##                   | <input checked="" type="checkbox"/> | XX      | LR        | ##                   | ##                       | ##  | ##        | <input checked="" type="checkbox"/> | XX                       | nP    | ##        | ##         | ##  | ##  | <input checked="" type="checkbox"/> |
| XXX               | ##         | ###           | XX        | P                    | ##                       | ##         | ##        | ##                   | <input checked="" type="checkbox"/> | XX      | LR        | ##                   | ##                       | ##  | ##        | <input checked="" type="checkbox"/> | XX                       | P     | ##        | ##         | ##  | ##  | <input checked="" type="checkbox"/> |
| XXX               | ##         | ###           | XX        | P                    | ##                       | ##         | ##        | ##                   | <input checked="" type="checkbox"/> | XX      | LR        | ##                   | ##                       | ##  | ##        | <input checked="" type="checkbox"/> | XX                       | nP    | ##        | ##         | ##  | ##  | <input checked="" type="checkbox"/> |
| XXX               | ##         | ###           | XX        | P                    | ##                       | ##         | ##        | ##                   | <input type="checkbox"/>            | XX      | LR        | ##                   | ##                       | ##  | ##        | <input type="checkbox"/>            | XX                       | P     | ##        | ##         | ##  | ##  | <input type="checkbox"/>            |
| XXX               | ##         | ###           | XX        | P                    | ##                       | ##         | ##        | ##                   | <input checked="" type="checkbox"/> | XX      | LR        | ##                   | ##                       | ##  | ##        | <input checked="" type="checkbox"/> | XX                       | P     | ##        | ##         | ##  | ##  | <input checked="" type="checkbox"/> |
| Surface           |            |               | ###       | ###                  | ###                      | ###        | ###       | ###                  |                                     | ###     | ###       | ###                  | ###                      | ### | ###       |                                     | ###                      | ###   | ###       | ###        | ### | ### |                                     |
| Restrained        |            |               | ###       | ###                  | ###                      | ###        | ###       | ###                  |                                     | ###     | ###       | ###                  | ###                      | ### | ###       |                                     | ###                      | ###   | ###       | ###        | ### | ### |                                     |

- The Analyst can refine inputs to the network magnitude calculation by setting individual station magnitudes to be defining/non-defining
- For MLE calculations, the Analyst could add noise picks needed for the calculation from the waveform display (See Waveform Display UIS Component for more information)
- Defining state settings are kept in sync between standard and maximum likelihood magnitudes

# Relative Magnitude

- Relative Magnitude is calculated from a reference, or master, event, similar to Master Event Relocation (See Refines Event Location UIS for more information).
- Like Master Event Relocation, Relative Magnitude is an advanced event hypothesis technique that is anticipated to be used by only a subset of Analysts (e.g. Researchers).
- Master Event Relocation is not required prior to performing a Relative Magnitude calculation, but a master event must be selected.

# Relative Magnitude

The Analyst invokes a Relative Magnitude calculation from the main magnitude display via a menu option or hotkey. The System then uses UC System Finds Similar Events to present the Analyst with a list of possible master events to choose from. Alternatively, the Analyst can use other System displays (e.g., the common search display, event comparison display...) to choose a master event.

| Relative magnitude                   |         |           |                     |                         |         |           |                     |                         |       |            |                     |                         |     |                   |
|--------------------------------------|---------|-----------|---------------------|-------------------------|---------|-----------|---------------------|-------------------------|-------|------------|---------------------|-------------------------|-----|-------------------|
| Network Magnitude                    |         |           | mb                  |                         |         |           | ms                  |                         |       |            | mb MLE              |                         |     |                   |
| Location                             | Mag     | Std. Dev. | # defining stations | # non-defining stations | Mag     | Std. Dev. | # defining stations | # non-defining stations | Mag   | Std. Dev.  | # defining stations | # non-defining stations |     |                   |
| Master                               | ###     | ###       | ###                 | ###                     | ###     | ###       | ###                 | ###                     | ###   | ###        | ###                 | ###                     | ### |                   |
| Current                              | ###     | ###       | ###                 | ###                     | ###     | ###       | ###                 | ###                     | ###   | ###        | ###                 | ###                     | ### |                   |
| Station Distance (deg) Azimuth (deg) | Channel | Phase     | Master mag          | SF                      | Rel mag | Res       | Defining            | Channel                 | Phase | Master mag | SF                  | Rel mag                 | Res | Defining          |
| XXX ## ##                            | XX      | P         | ##                  | ## ##                   | ##      | ✓         |                     | XX                      | LR    | ##         | ## ##               | ##                      | ✓   | XX P ## ## ## ##  |
| XXX ## ##                            | XX      | P         | ##                  | ## ##                   | ##      | ✓         |                     | XX                      | LR    | ##         | ## ##               | ##                      | ✓   | XX nP ## ## ## ## |
| XXX ## ##                            | XX      | P         | ##                  | ## ##                   | ##      | □         |                     | XX                      | LR    | ##         | ## ##               | ##                      | □   | XX P ## ## ## ##  |
| XXX ## ##                            | XX      | P         | ##                  | ## ##                   | ##      | ✓         |                     | XX                      | LR    | ##         | ## ##               | ##                      | ✓   | XX P ## ## ## ##  |
| XXX ## ##                            | XX      | P         | ##                  | ## ##                   | ##      | ✓         |                     | XX                      | LR    | ##         | ## ##               | ##                      | ✓   | XX nP ## ## ## ## |
| XXX ## ##                            | XX      | P         | ##                  | ## ##                   | ##      | ✓         |                     | XX                      | LR    | ##         | ## ##               | ##                      | ✓   | XX P ## ## ## ##  |
| XXX ## ##                            | XX      | P         | ##                  | ## ##                   | ##      | ✓         |                     | XX                      | LR    | ##         | ## ##               | ##                      | ✓   | XX nP ## ## ## ## |
| XXX ## ##                            | XX      | P         | ##                  | ## ##                   | ##      | ✓         |                     | XX                      | LR    | ##         | ## ##               | ##                      | ✓   | XX P ## ## ## ##  |
| XXX ## ##                            | XX      | P         | ##                  | ## ##                   | ##      | □         |                     | XX                      | LR    | ##         | ## ##               | ##                      | □   | XX nP ## ## ## ## |
| XXX ## ##                            | XX      | P         | ##                  | ## ##                   | ##      | ✓         |                     | XX                      | LR    | ##         | ## ##               | ##                      | ✓   | XX P ## ## ## ##  |
| XXX ## ##                            | XX      | P         | ##                  | ## ##                   | ##      | ✓         |                     | XX                      | LR    | ##         | ## ##               | ##                      | ✓   | XX nP ## ## ## ## |

When the Relative Magnitude calculation is complete, the results are shown in a separate display (shown here). Relative network and station magnitude information is shown for both the current event hypothesis and the master event (i.e., by expanding the Master row in the table).

# Notes

- In some cases, a single array element magnitude (i.e., a channel mag) is treated as a station mag when calculating the network magnitude. In these cases, each individual element magnitude would be displayed as a row in the station magnitude table.
- Magnitude estimates depend on event location, so whenever an event is relocated, magnitudes are no longer valid. Assuming that magnitude calculations are robust and quick, magnitudes will automatically update when locations are recalculated, thus there are no stale standard magnitudes.
- When magnitude values are recalculated (e.g., following event relocation), defining state settings are preserved.