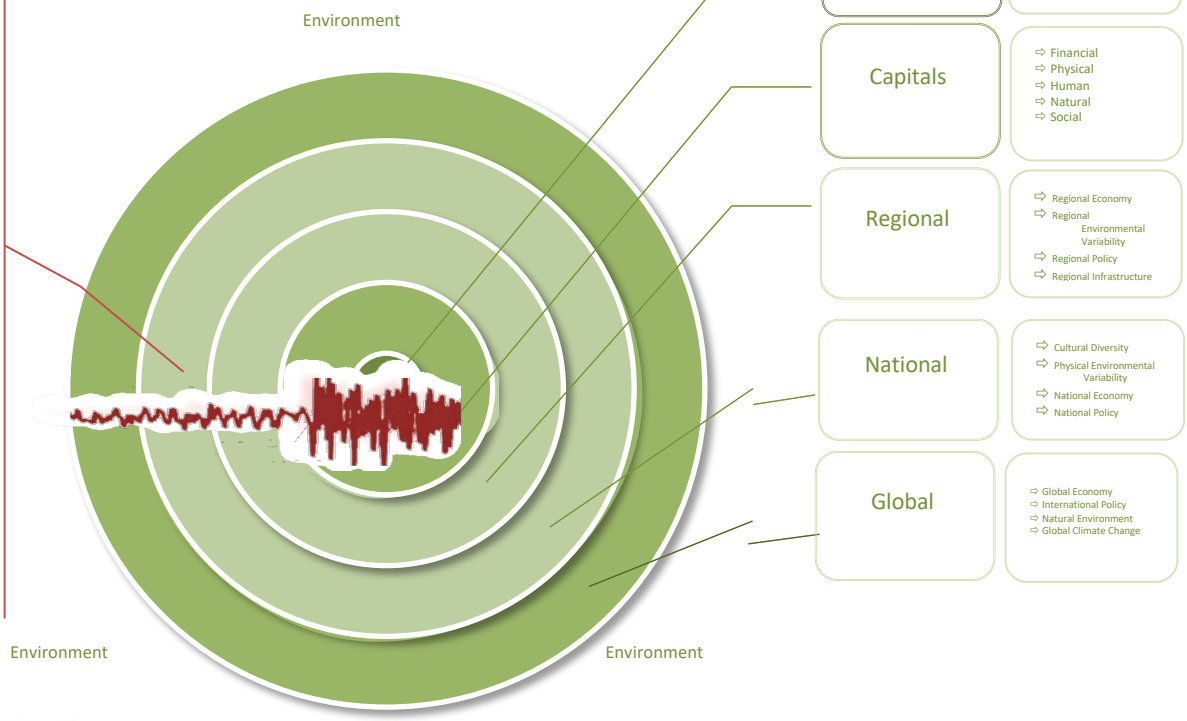
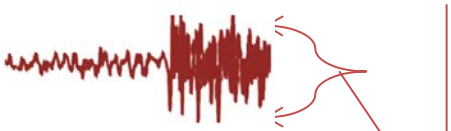
Model: Toxic Legacy of Cascading Disasters

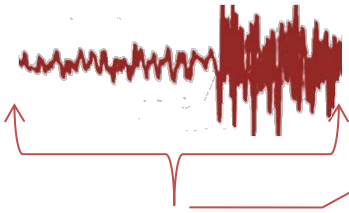
Disturbance Fracturing - Big event, catastrophe tearing through levels through pathways or interactions with environment; Layers open.

Disturbance incorporates climate impacts



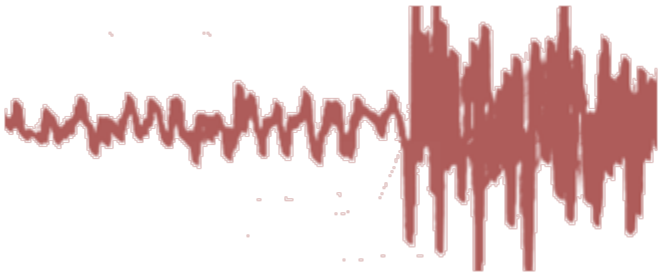


Represents Intensity & Severity of Insult-Hazard, Catastrophe speed, contamination, effect is greater



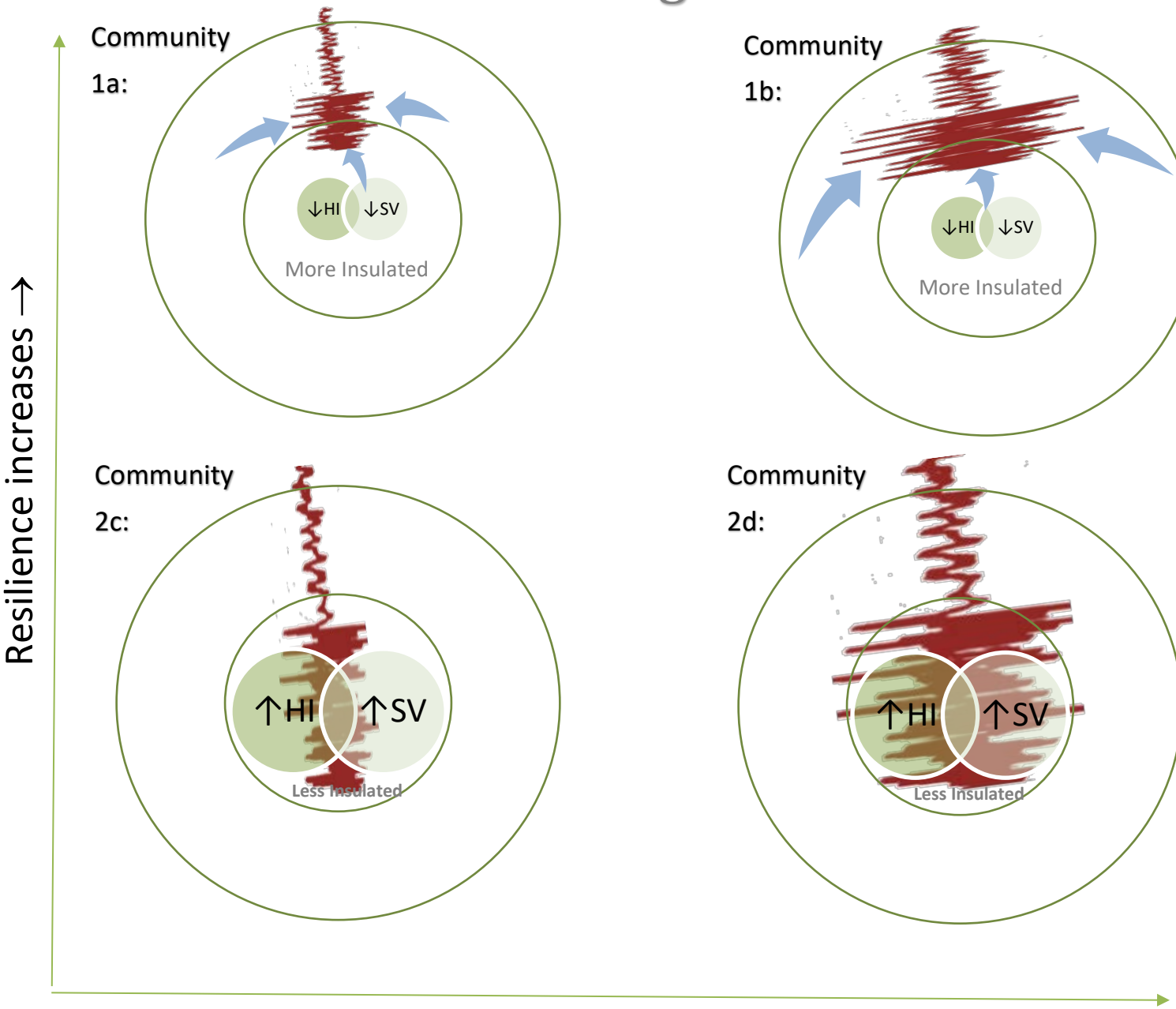
Not all levels are impacted the same

I. Invert fracturing original wedge and jagged sides
Insults, fractures generate the field. The field varies on a range of scales or layers where not all levels are impacted the same. The order is low frequency (e.g. global scale) to high frequency variations at the local community scale. So that greatest impact or frequency occurs at the community level….



Resilience captured by lower frequency, less resilient community impacts represented by greater frequency…number of oscillations = cascades, size = intensity width and boldness… oscillations similar to magnitude of earthquakes or heartbeat…. Oscillations, insults, fractures increase over time during a disaster window

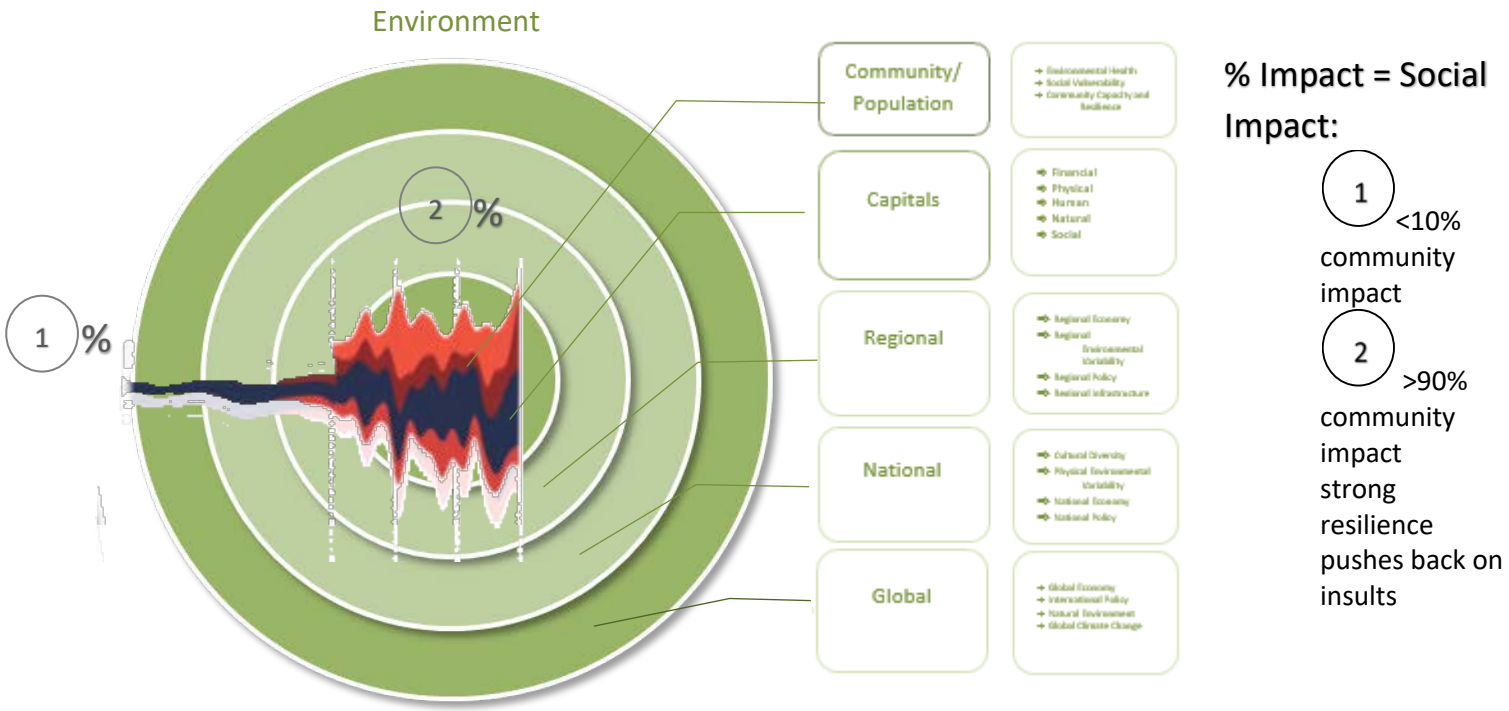
Broad Scenarios - Cascading Disasters

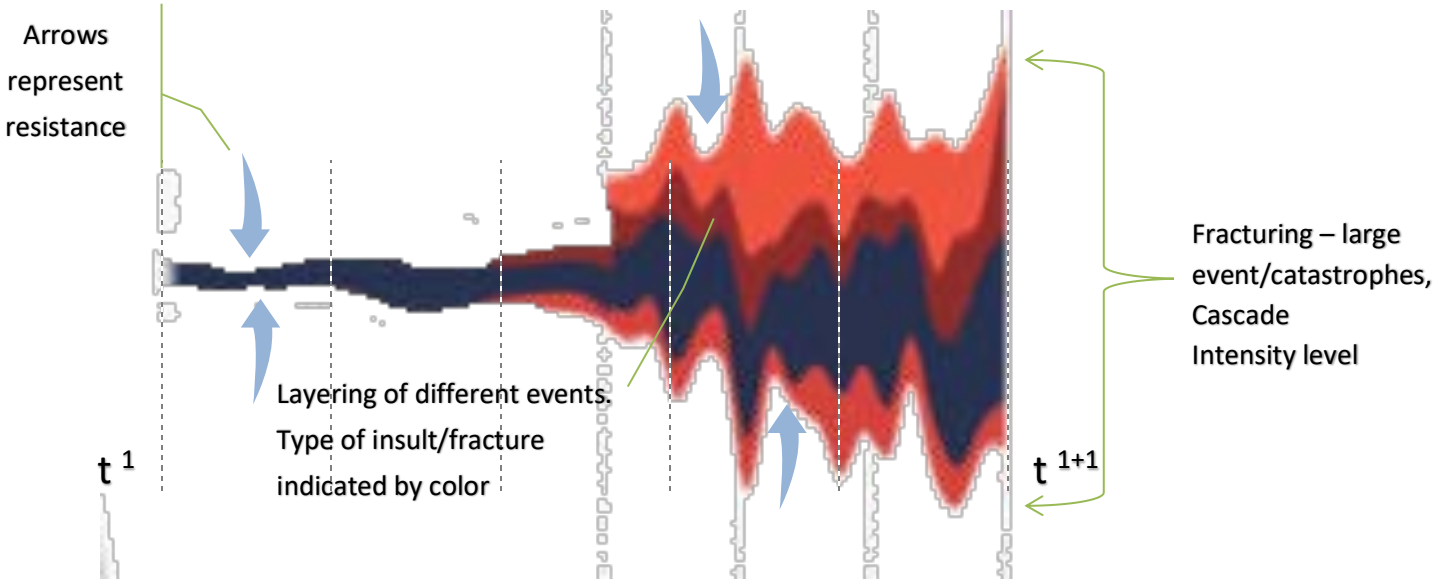


Community 1: ↓HI ↻ ↓SV Community 2: ↑HI ↻ ↑SV

High SV (social vulnerability, Social Determinants of Health SOD) contributes to High HI (health care disparities and health outcomes). Insulation related to outcomes → = process of resilience

III. Apply graph with small multiples labeled 1a, 1b…: resilience on y axis and insult on x axis. As resilience increase, oscillations/stream more narrow and new insult added like new growth…As resilience decreases, new insult added but earlier insults never fully healed or resolved, oscillations/stream wider over time…

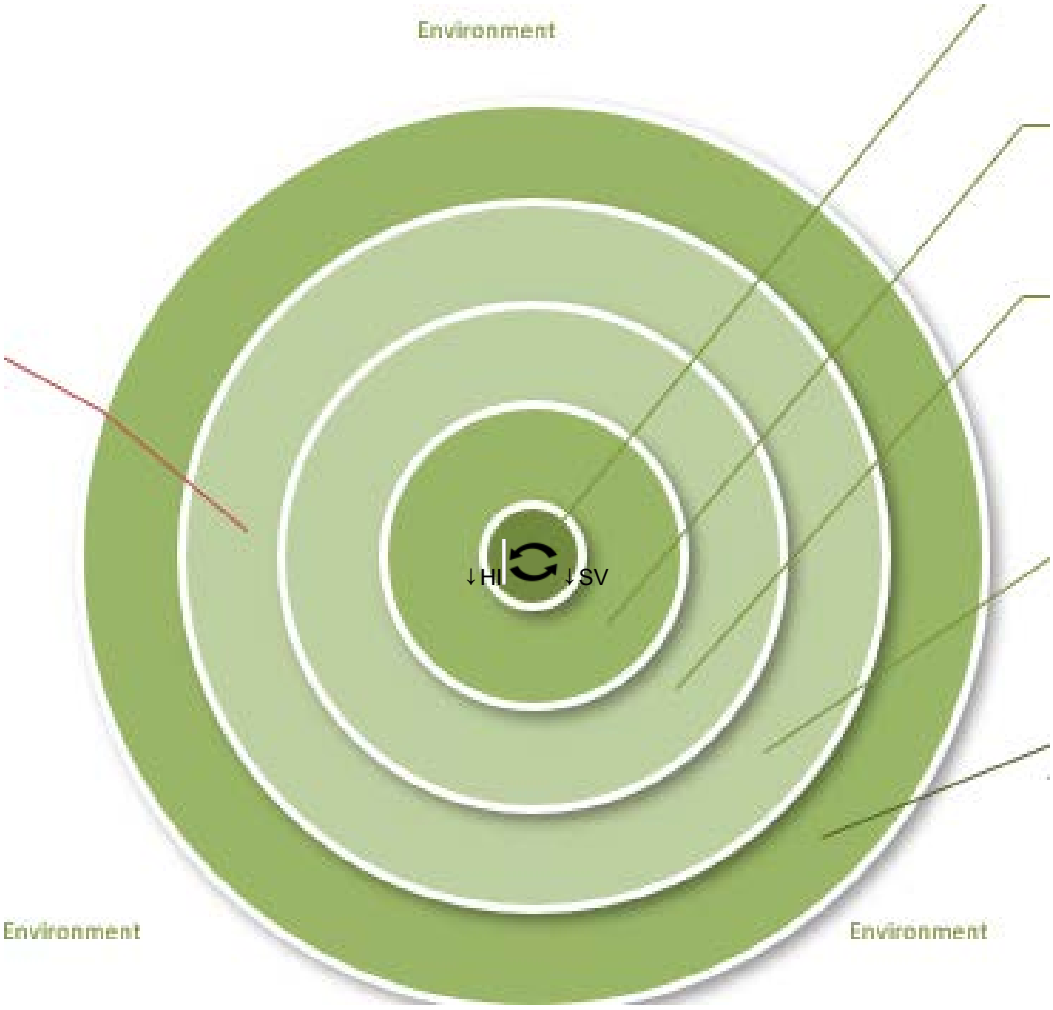




Time = t → Cascade

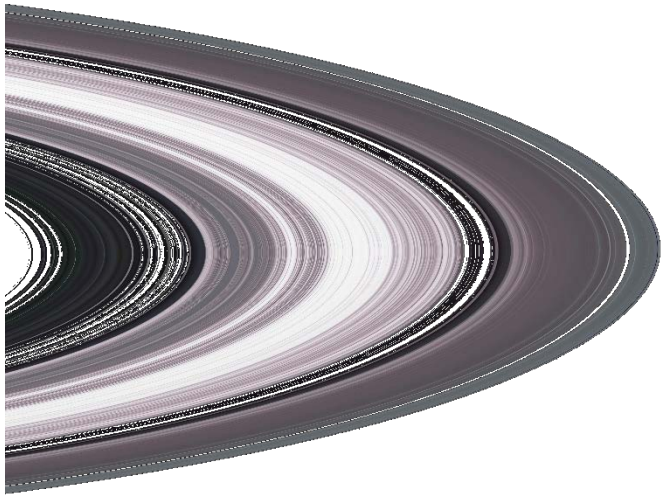
All events not happening at time 1 (i.e., tail) Potential for impacts to persist overtime

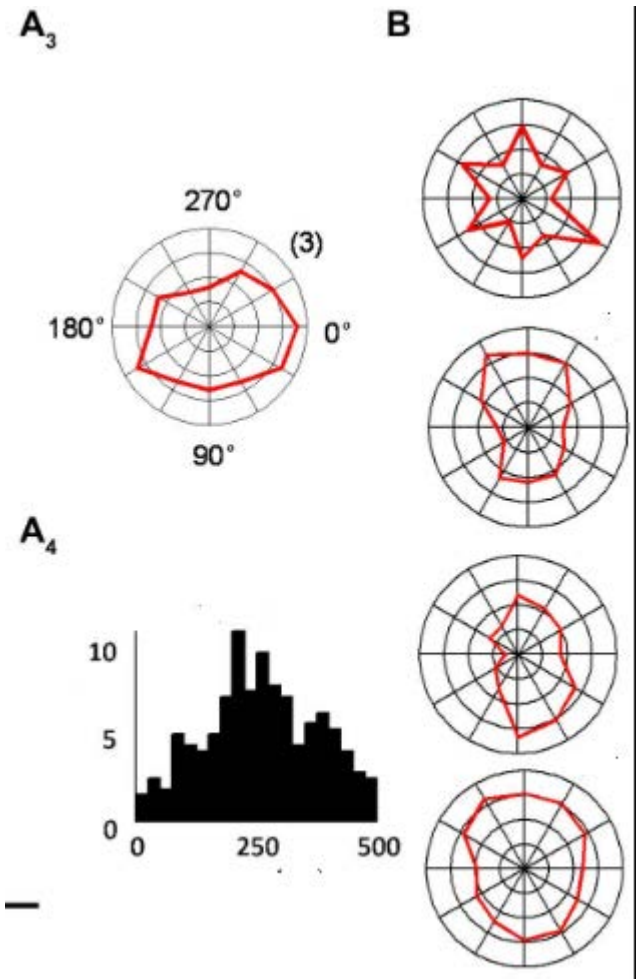
Tonya's Questions/Thoughts 5/31….



Example 1: Show the model before impacts so that we can show the EH/SV relationships

Example 2: The diagram could be reworked so that the focus is on the community level by making it larger like in the Saturn ring example. Saturn rings may also represent the interactions (gradations) that take place between layers – there are no hard fast lines of demarcation, depending on impacts, policies, area, etc.





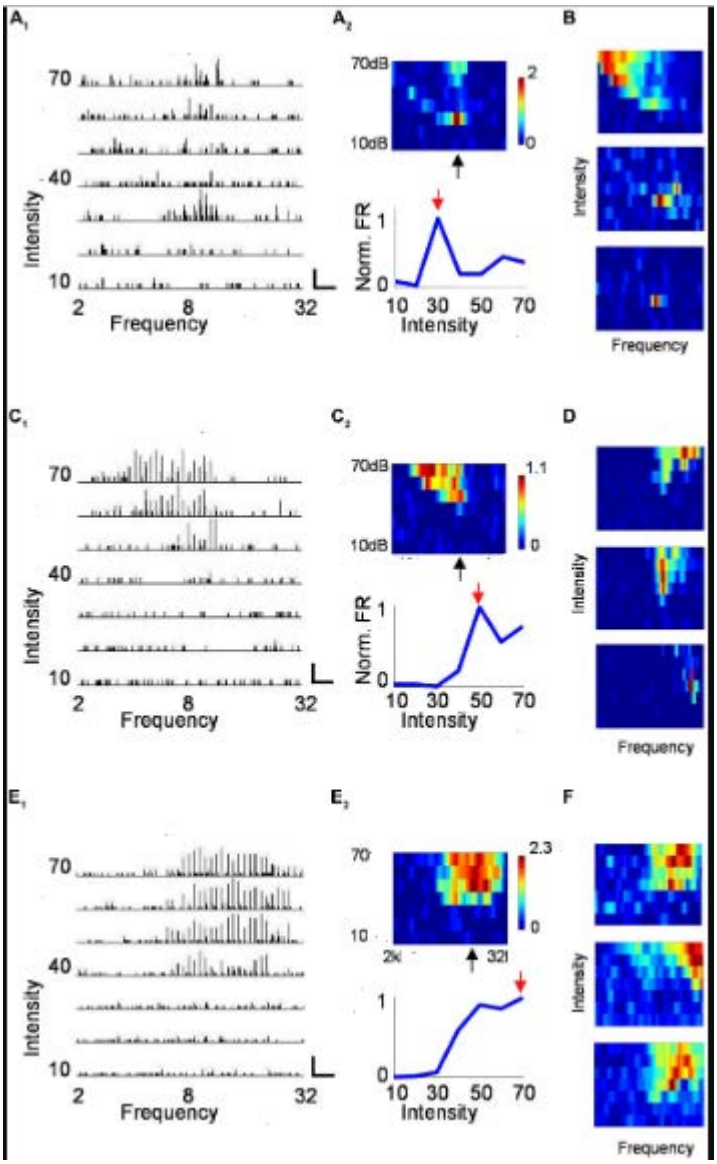
Example 3:

This is a radar chart or star plot, which consists of a sequence of spokes, called radii, with each spoke representing an event. The length of a spoke is proportional to the magnitude of the variable for the data point relative to the maximum magnitude of the variable across all data points. A line is drawn connecting the data values for the impacts that may occur between layers. This gives the plot a star-like appearance. The star plot can be used to answer which events are most similar, i.e., are there clusters of observations of secondary events? (Radar charts are used to examine the relative values for a single data point (e.g., point 3 is large for events 2 and 4, small for events 1, 3, 5, and 6) and to locate similar points or dissimilar points.)

Are there outliers?

Radar charts are a useful way to display multivariate observations with an arbitrary number of variables (impacts from events) Each star represents a single observation, or event.

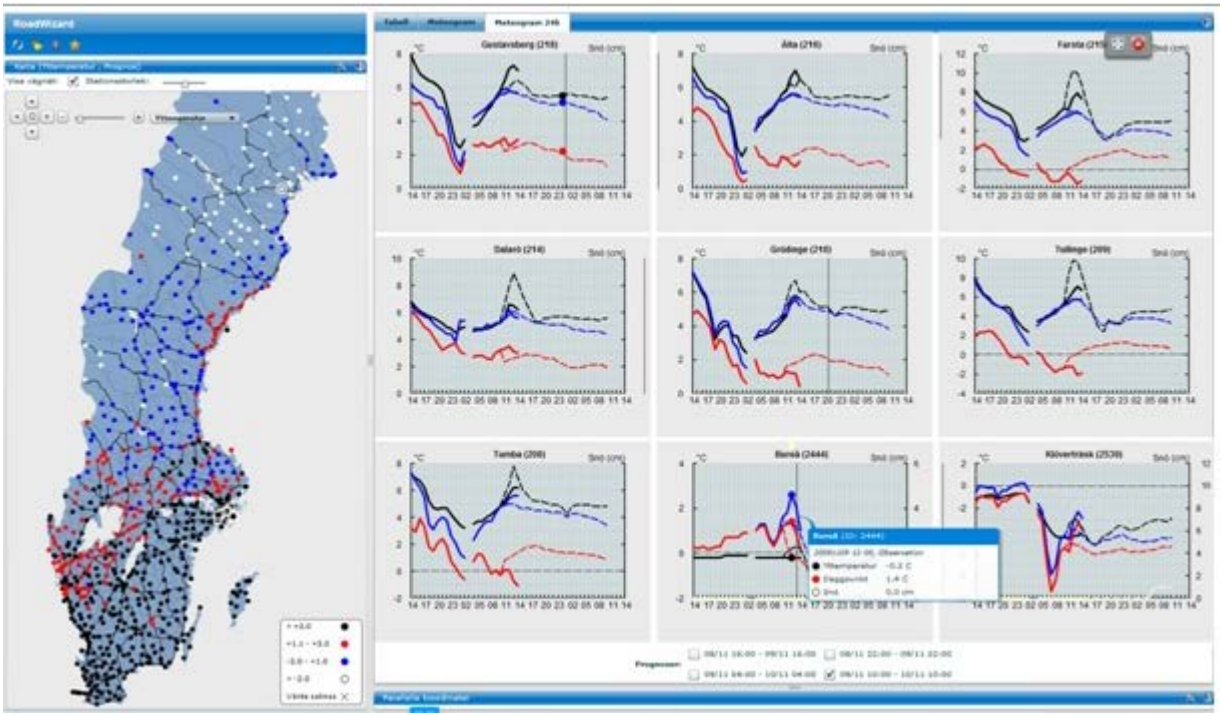
The shortcomings are: Artificial; neighboring wedges may be unrelated but may look like there is a connection; implies relationship cyclical; impacts better or worse but the degree of difference may be artificial…..



Example 4:

The mini distributions on the left represent various secondary impacts.

In the middle is a heatmap and line graph. Th red represents a large event, the blue secondary events. The line graph would highlight the intensity of the large event relative to the secondary events



Example 5:

This is an area with line graphs. The dot density on the graph are interpreted as values on the line graphs to the right. For example, there are more black and blue dots relatively and that reflected in the trend lines on the graph. In our model, the dot density could be observations of impacts.

Example 6: lastly, we could combine the visualizations representing the intensity of event, streamgraph representing the various impacts and a composite…….