

Earth
Volumetric
Studio™

compute thickness module

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WHAT IS THICKNESS IN EVS?

- As simple as the word thickness may seem to be, there are many nuances to what we mean by thickness in EVS.
- When dealing with an object with non-uniform thickness defined between two non-planar surfaces, *thickness* can be ambiguous.
 - We generally refer to the thickness at each node, as measured in the Z direction.
 - Though in some cases, we may compute thickness perpendicular to either the top or bottom of the object.
- For Stratigraphic layers, thickness is always defined in the Z direction regardless of layer slope(s).
 - For this case, the integral of the product of plan-area * thickness would equal the volume: $\text{volume} = \int \text{area} * \text{thickness}$

THICKNESS OF STRATIGRAPHIC LAYERS

- **Stratigraphic layers have layer-thickness as one of the default nodal data components.**
 - This thickness is always measured in the Z direction regardless of layer slopes.
 - We often use layer thickness to pinch-out (remove) thin regions.
- **For each stratigraphic layer, thickness is mapped to the entire volumetric layer, with values that are Z-invariant at any X-Y location.**
 - Be aware that if a layer is subset in any manner, the resultant thickness is not updated. In other words: Subsetting does not automatically recompute resultant layer thickness.

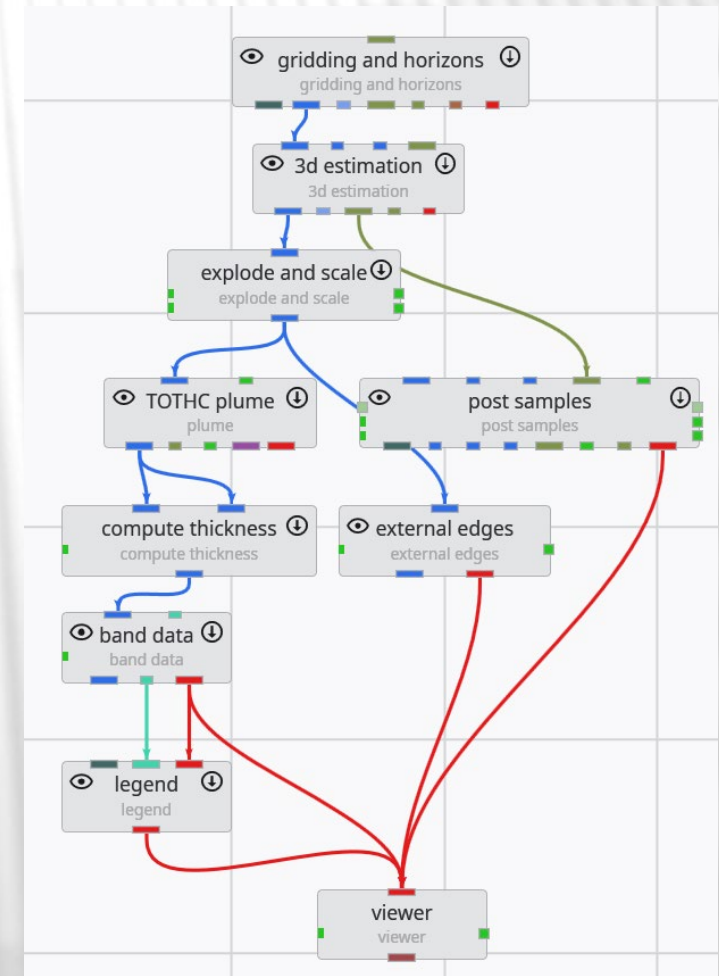
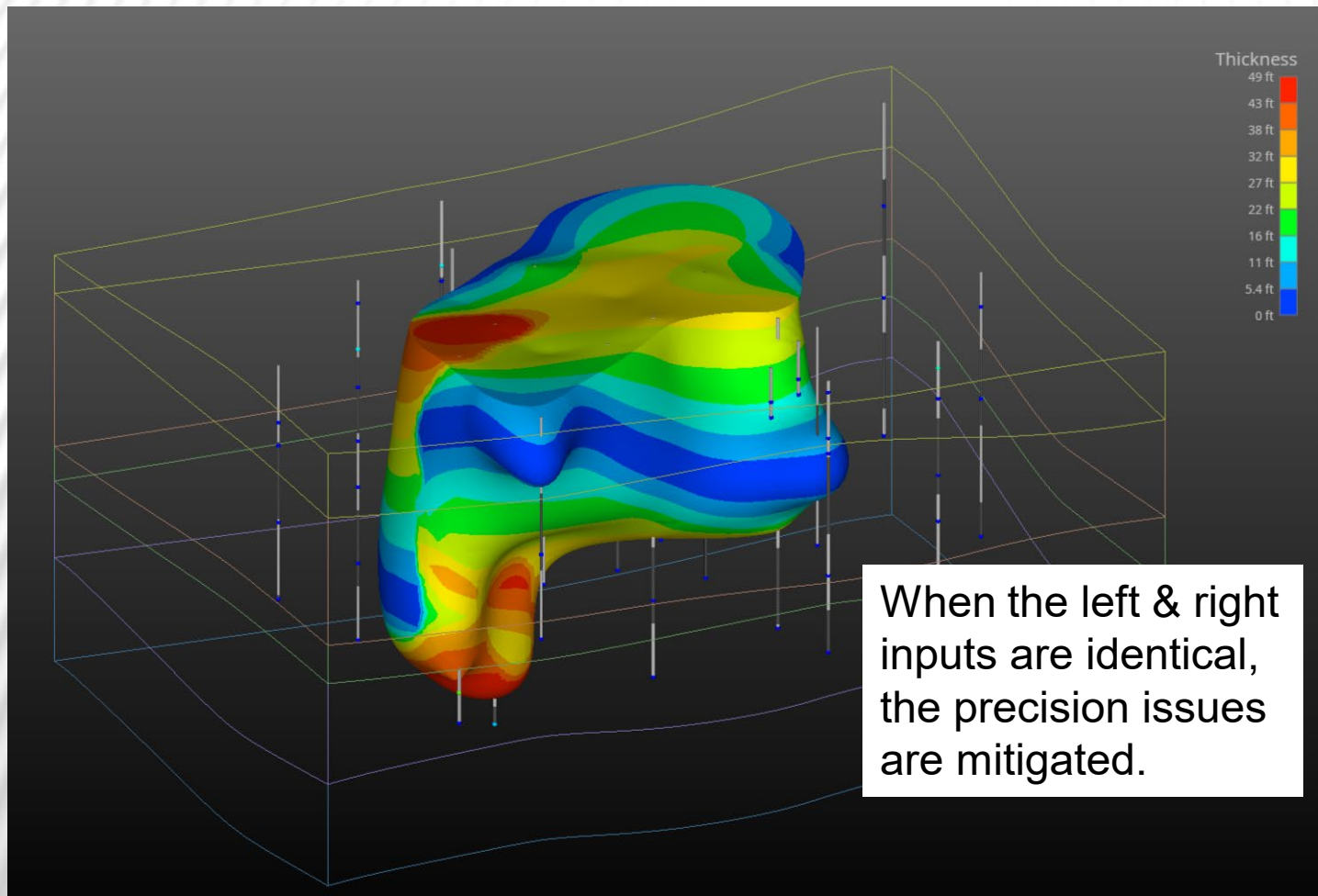
THICKNESS OF LITHOLOGIC MATERIALS (LAYERS?)

- Lithologic materials may seem to represent *layers* for your model, but since these materials can consist of multiple disjoint blobs, there is no concept of *layer-thickness*.
- The concept of thickness for each Lithologic material is ambiguous.
 - There may be multiple separate occurrences of a material at any X-Y location.
 - It may be appropriate for thickness to refer to:
 - The total thickness of a material at any X-Y location or
 - The independent thicknesses of each separately computed blob.
- Therefore, we don't compute thickness automatically for lithologic materials.

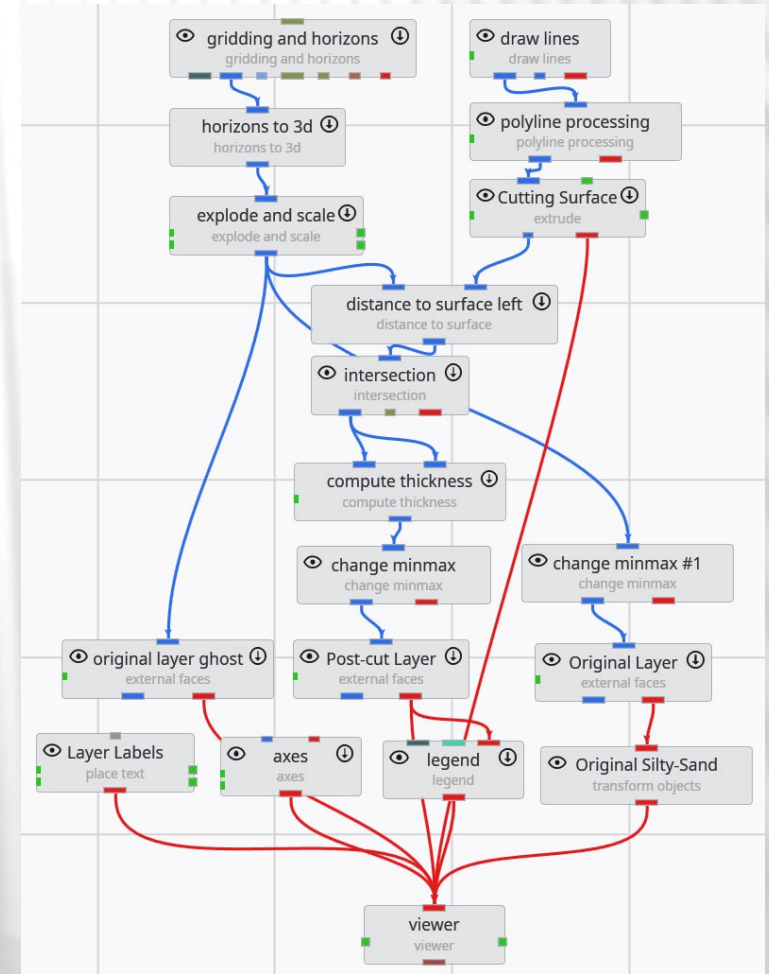
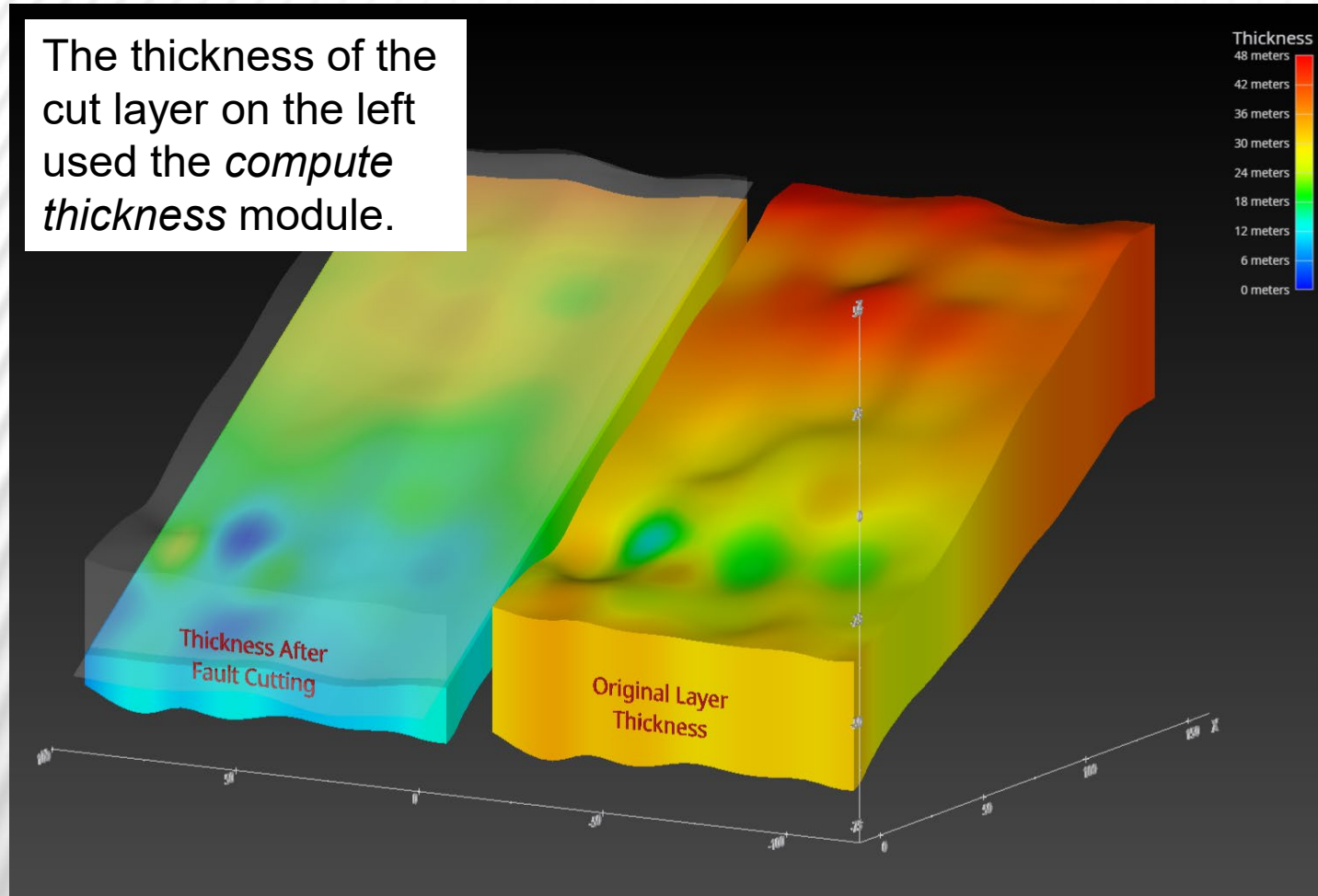
THE *COMPUTE THICKNESS* MODULE

- The *compute thickness* module computes total thickness of all objects passed to its right input port.
 - It maps the thickness onto the object(s) connected to its left input port.
- It uses a ray-tracing method to compute total thickness
 - To compute thickness of an individual region (blob), that region must be isolated using the *connectivity assessment* module.
 - Thickness is computed for every node of the object passed to the left input port.
 - Thickness computations are Z-invariant.
 - If the source object is not the same right-port object there is a possibility of precision errors along the edges, even if the X-Y extents appear identical. We recommend making the left-port object infinitesimally smaller in X-Y (e.g., fitting completely within its x-y extents) to avoid this issue.

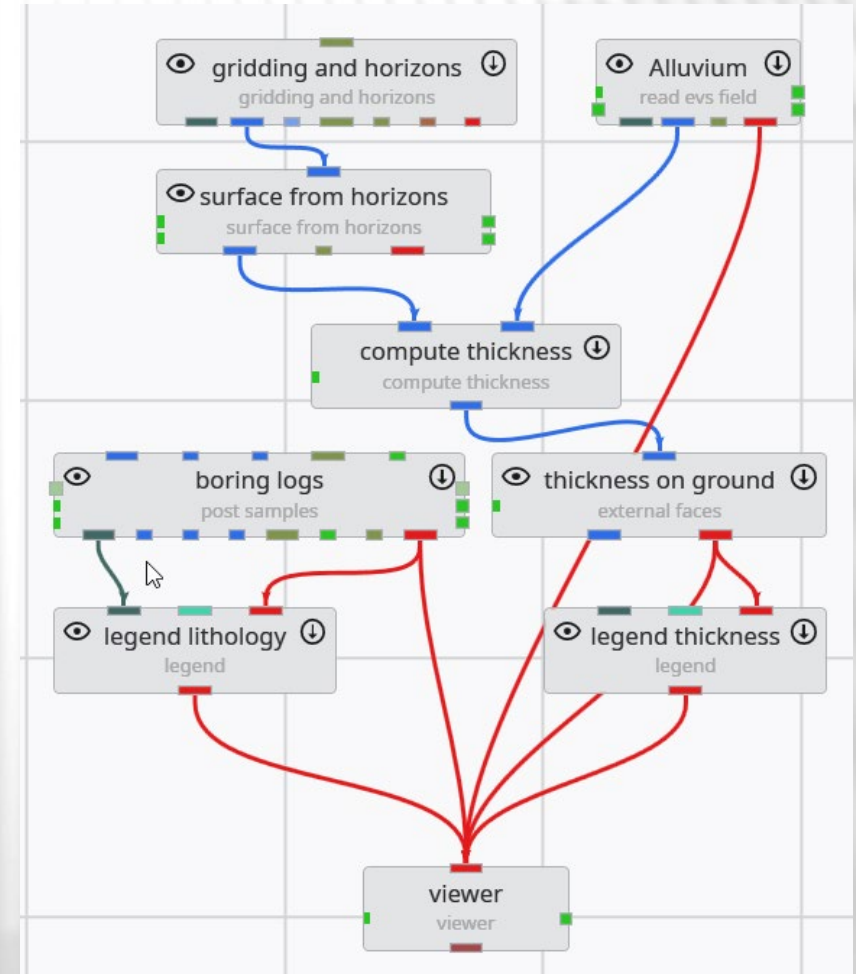
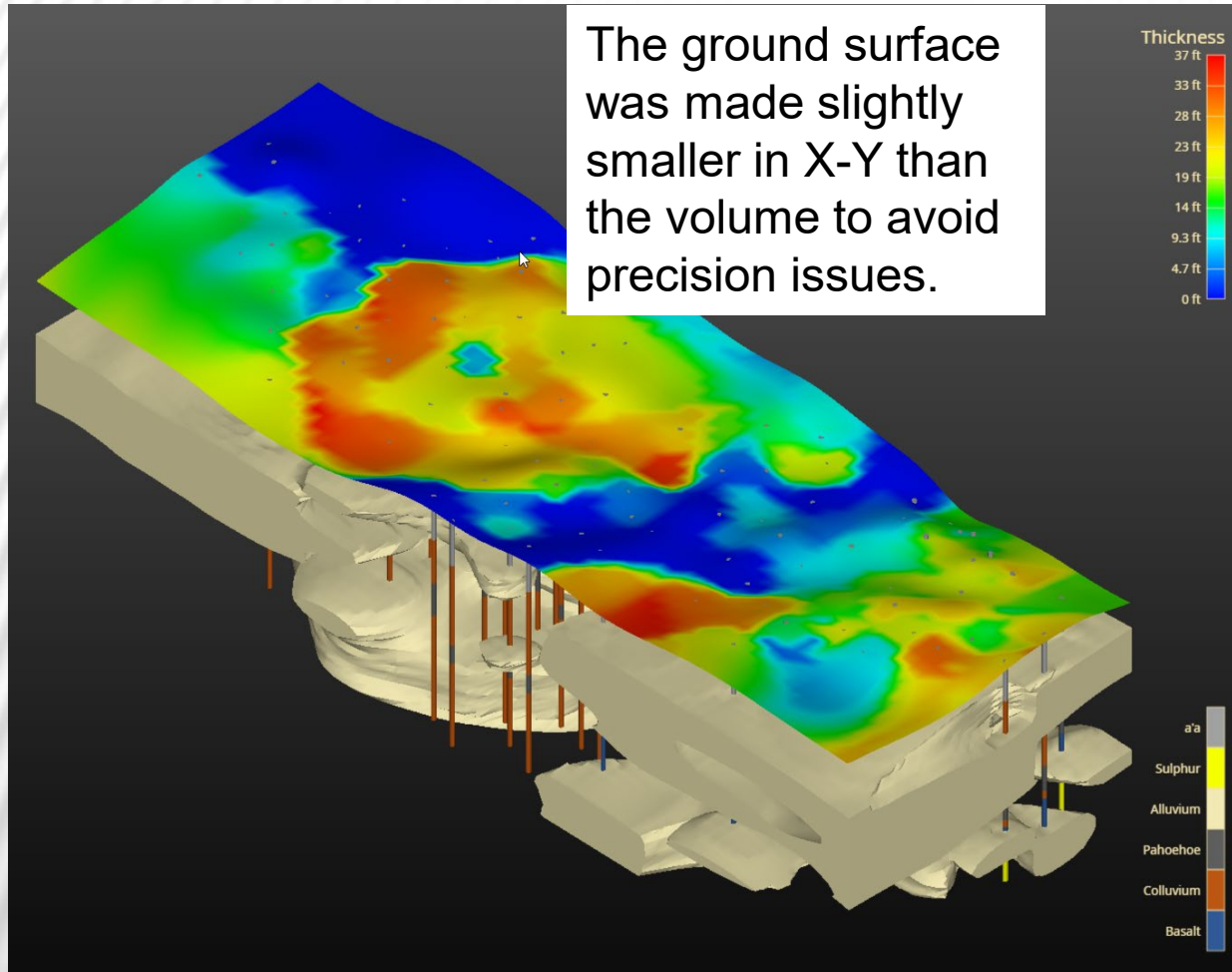
THICKNESS OF CONTAMINANT PLUME



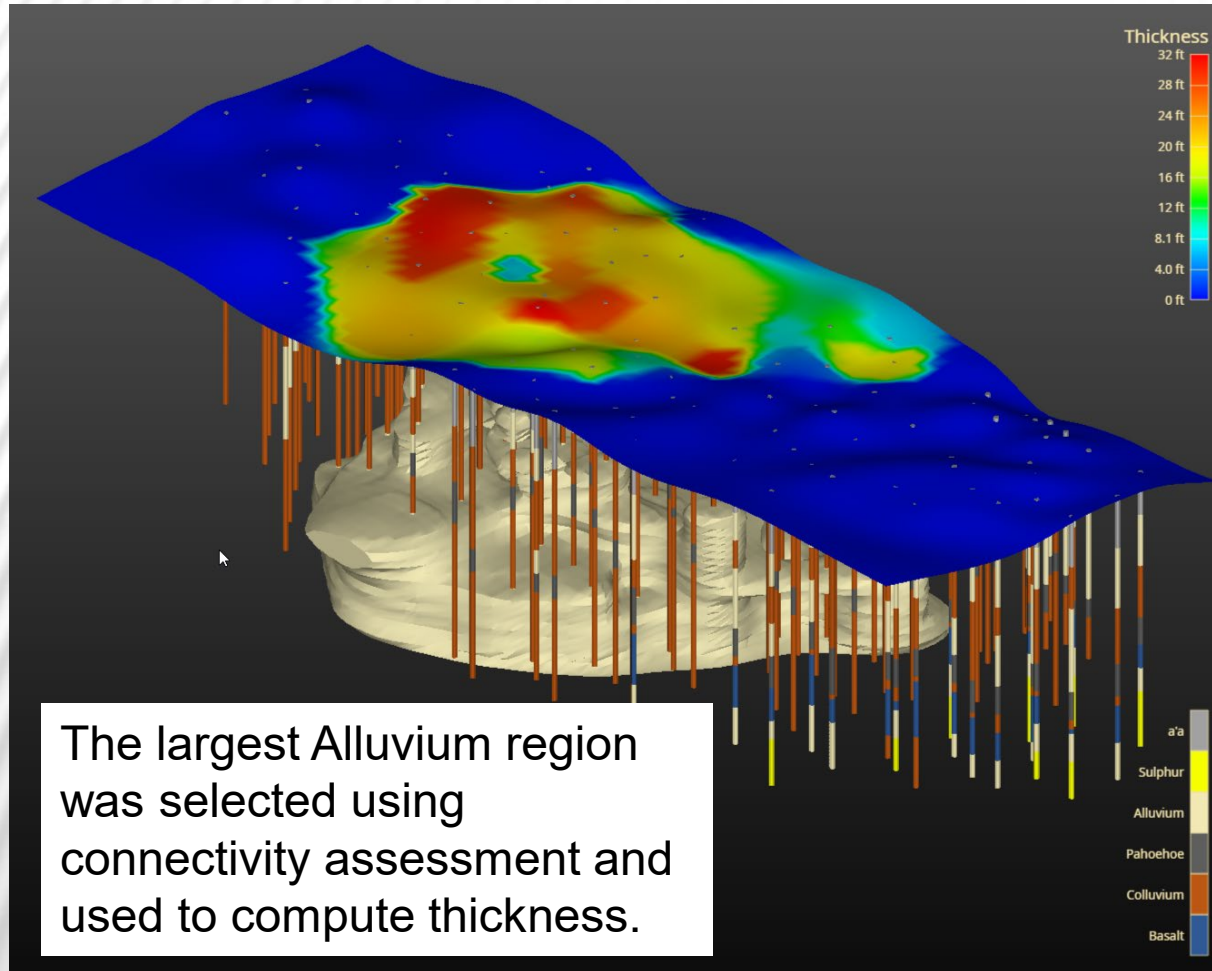
THICKNESS OF STRATIGRAPHIC LAYER AFTER CUT BY FAULT



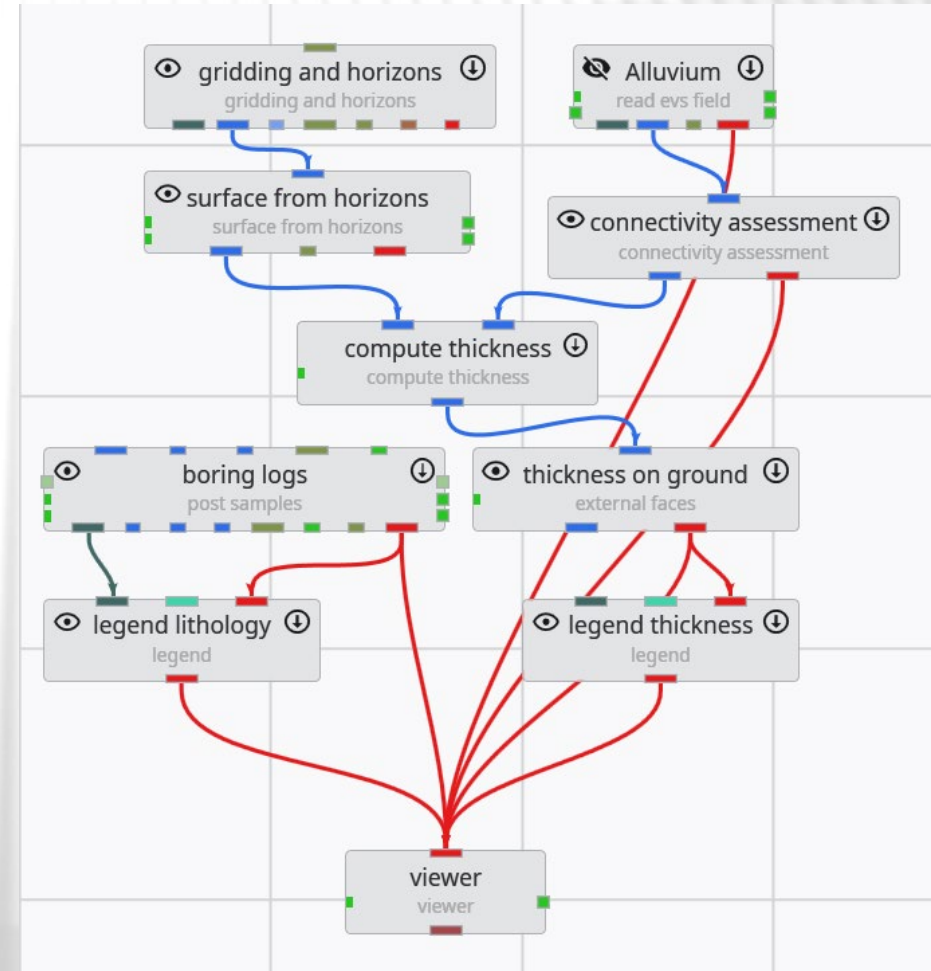
THICKNESS OF LITHOLOGIC MATERIAL ONTO SURFACE



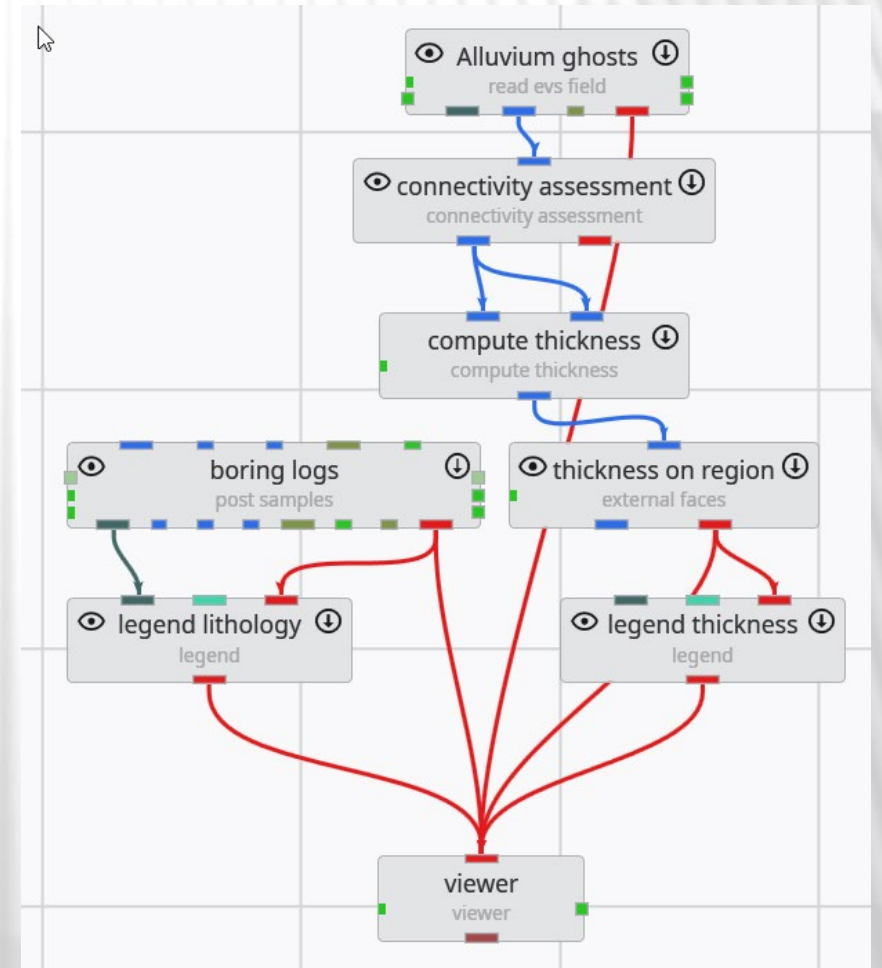
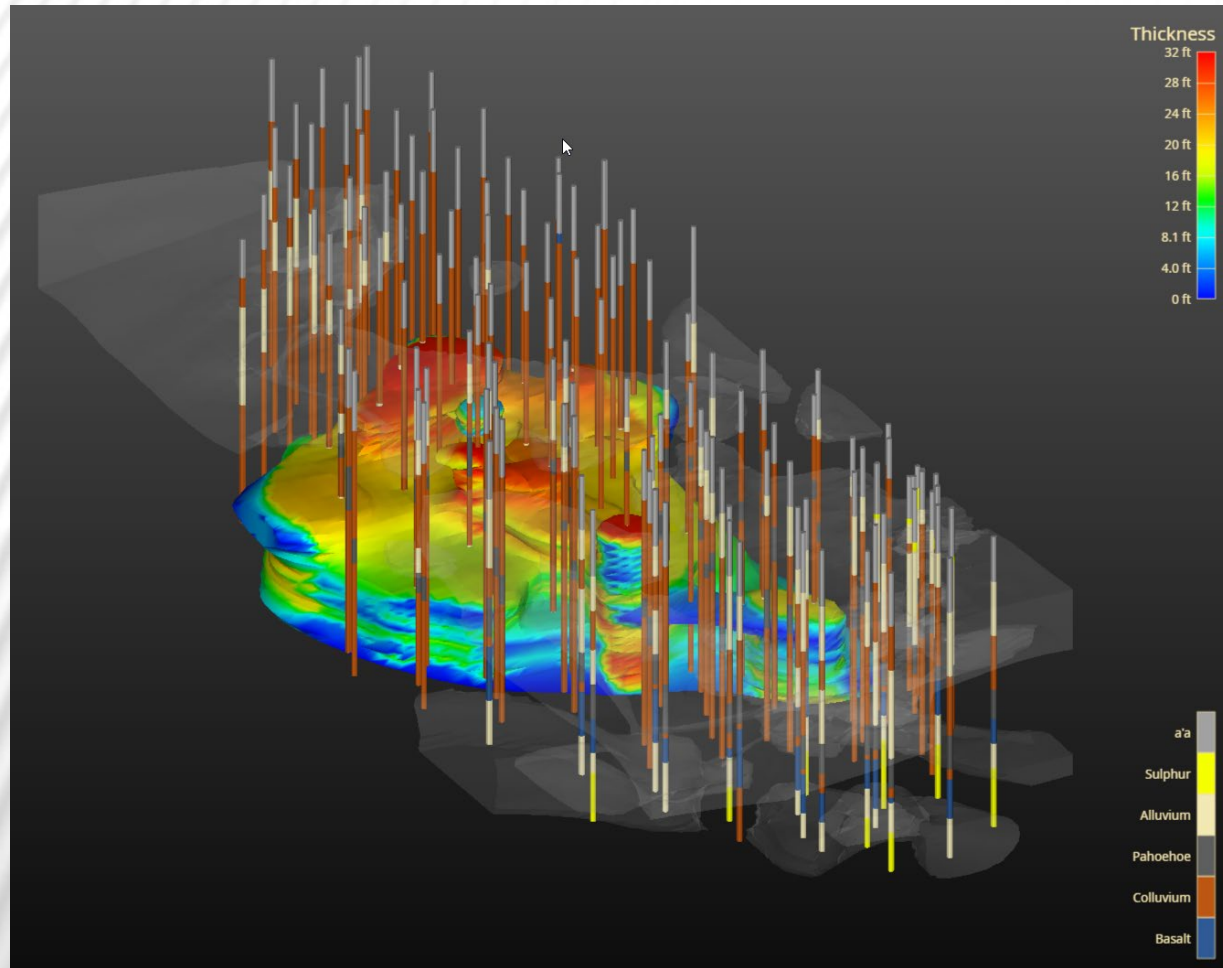
THICKNESS OF LARGEST ALLUVIUM REGION ONTO SURFACE



The largest Alluvium region was selected using connectivity assessment and used to compute thickness.



THICKNESS OF LARGEST ALLUVIUM REGION



Lithologic Geologic Modeling\volcanic-lithology-efb-largest-alluvium-region-thickness.intermediate.evs