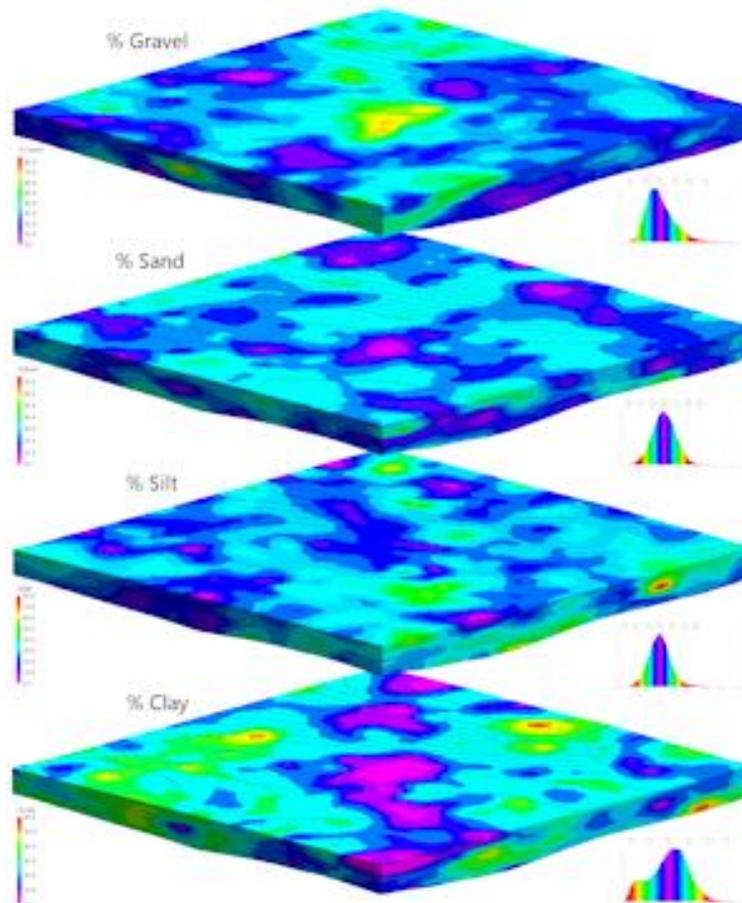# Multivariate Maps Based on Solids

This program will use two to six solid models to create five different types of multivariate maps (pie charts, starbursts, bar charts, spidergrams, and blended colors) in which the size of an individual slice, petal, bar, etc. represents the solid model voxel values that correspond to the extents of the diagram. In this way it is possible to show multiple parameters at the same time.   Hence the name "multivariate".

For example, consider a series of solid models that represent %gravel, %sand, %silt, and %clay.


The Solids -> Multivariate Map program provides a variety of options for simultaneously displaying all of these variables in plan view.   These options are described as follows:
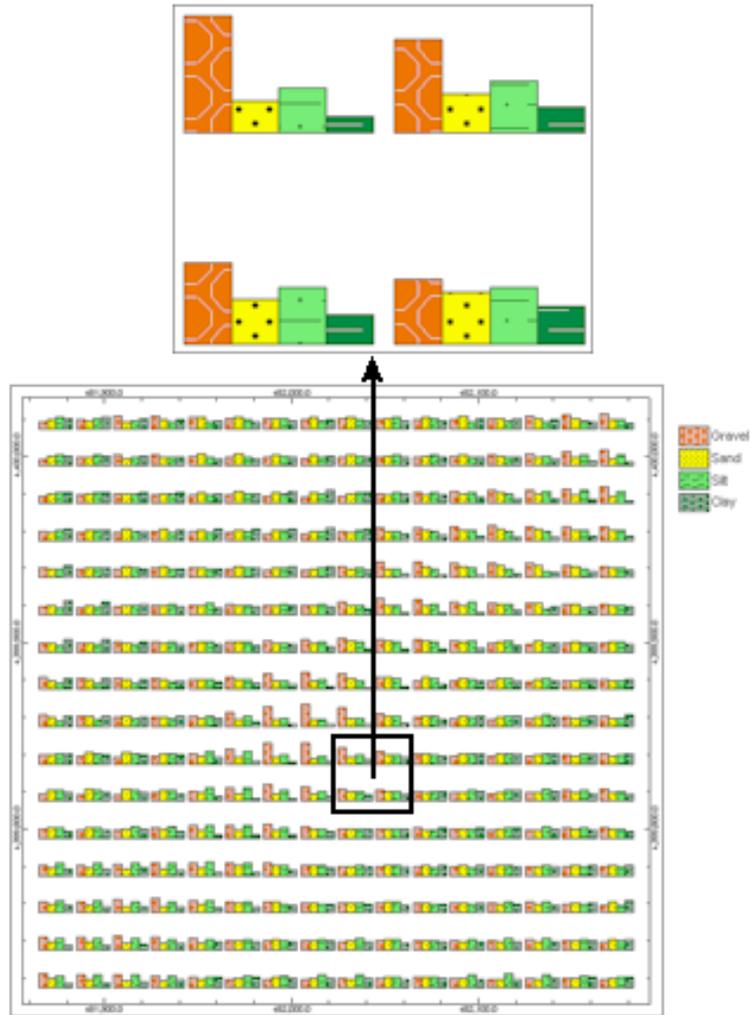
Pie Chart Maps: These maps depict the relative percentages as small pie chart diagrams.   The sampling area represented by each pie chart is determined by the Diagram Size setting.
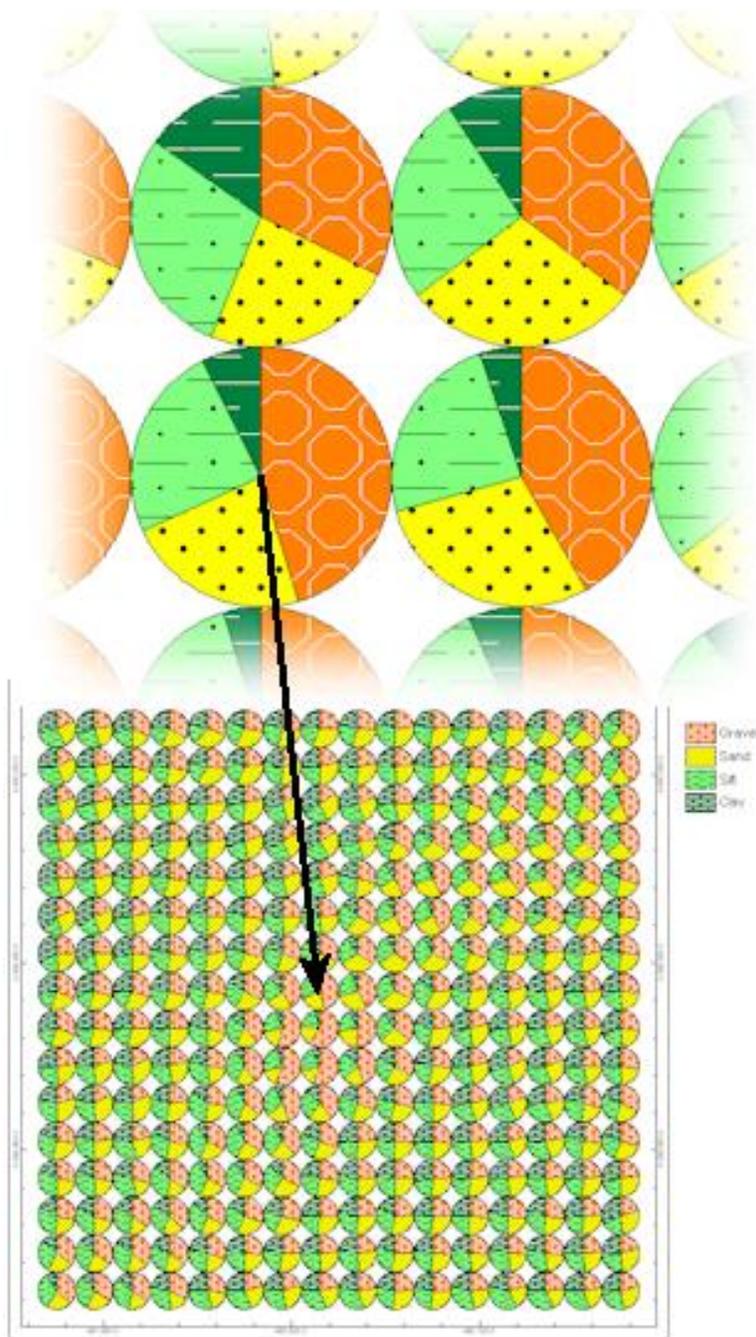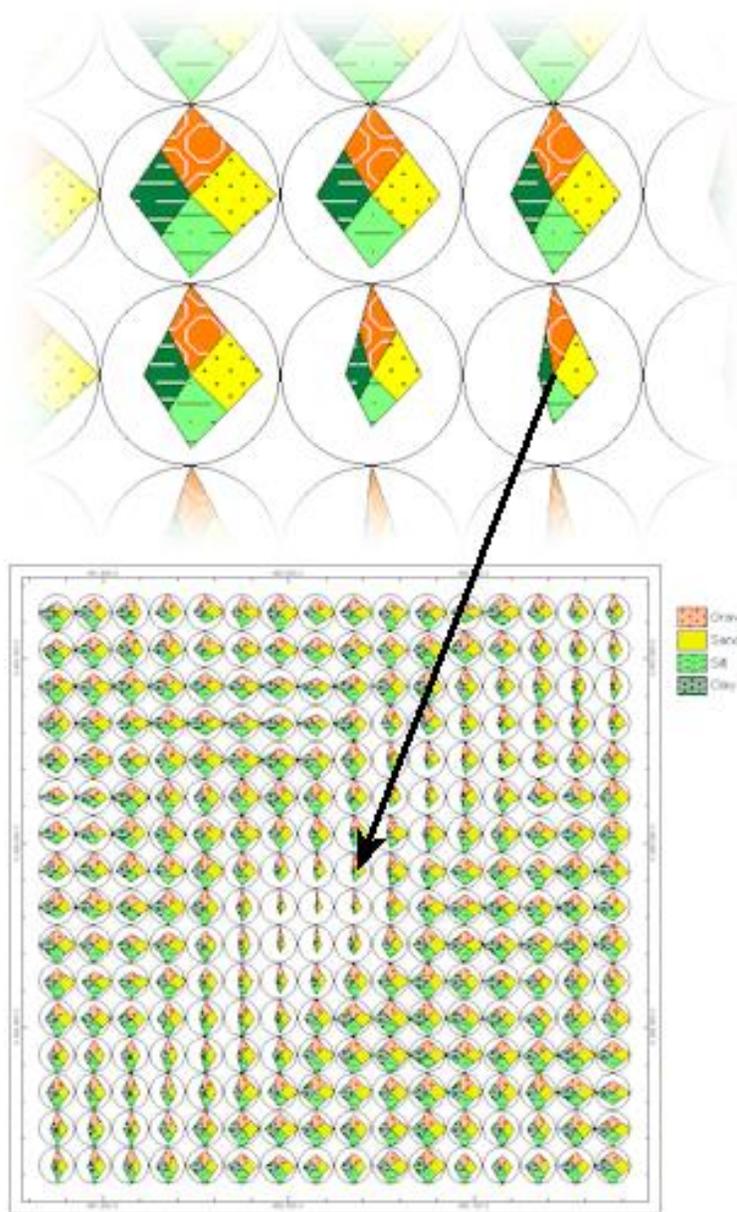
Starburst Maps: These maps depict the relative percentages as small starburst diagrams. Spidergrams are similar to pie charts however the petal angle is determined by the number of components while the radii are determined by the relative percentages. The sampling area represented by each starburst diagram is determined by the Diagram Size setting.
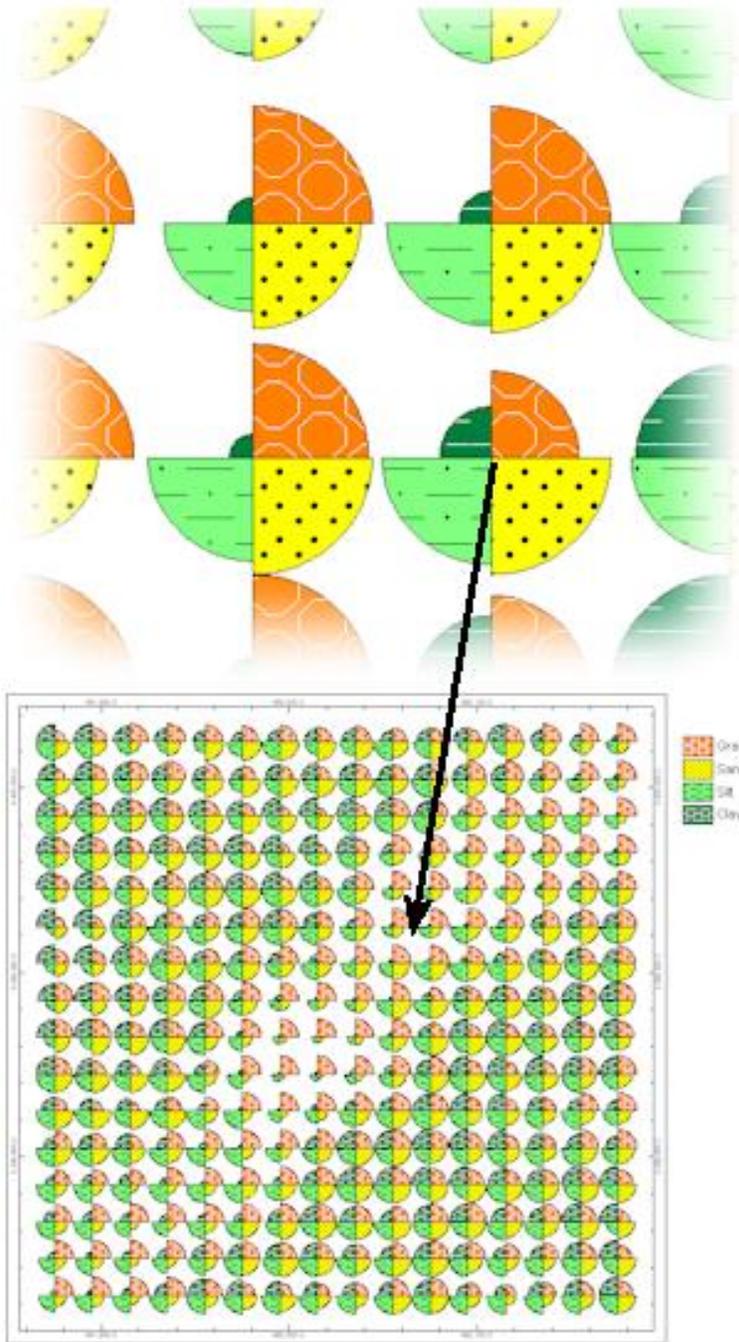
Multivariate Bar Chart Maps: These maps depict the relative percentages as small bar chart diagrams.   The sampling area represented by each bar chart is determined by the Diagram Size setting.

Spidergram Maps: These maps depict the relative percentages as small spidergrams. The sampling area represented by each spider diagram is determined by the Diagram Size setting.

Blended Color Maps: These maps depict the relative percentages as color maps in which the pattern background colors are proportionally mixed.   The sampling area represented by each pixel within the blended colors maps is determined by the Diagram Size setting.

Blended color maps are best suited when depicting two to three parameters (e.g., gravel, sand, silt, and clay) and require consideration when choosing the background colors.
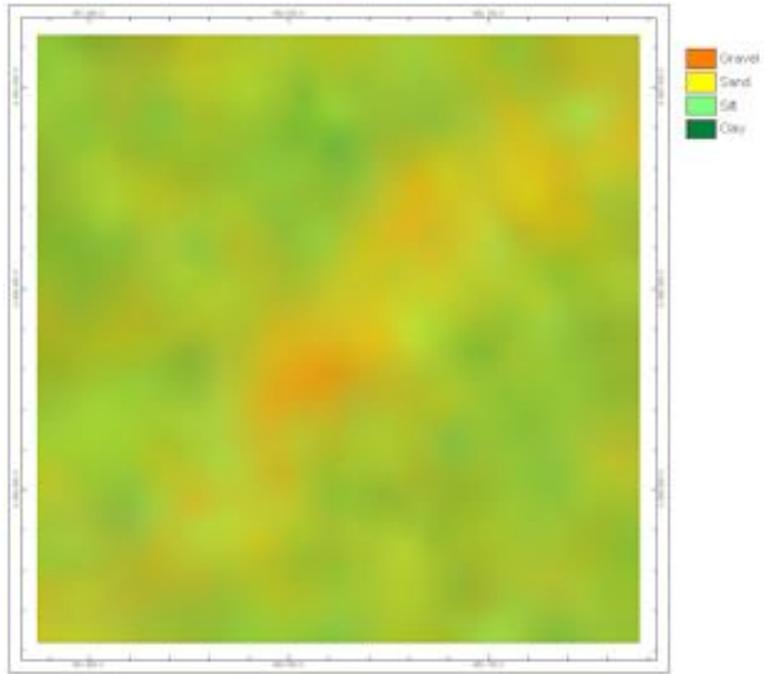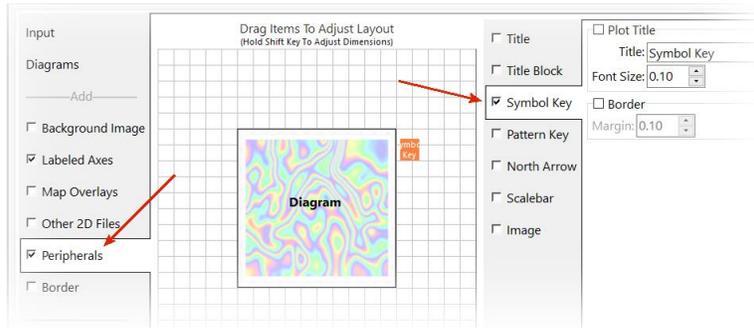
If the *Include Patterns* option is enabled, the program will superimpose the pattern associated with the highest value at that particular voxel within the input data.
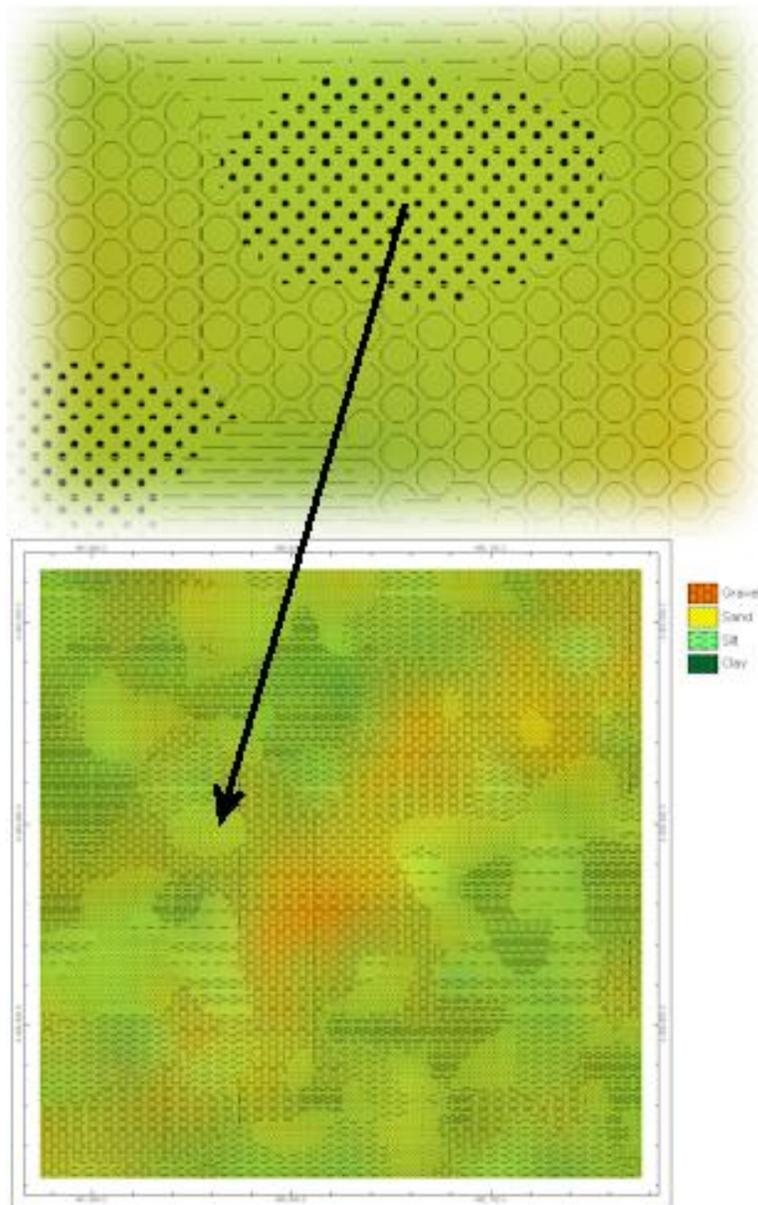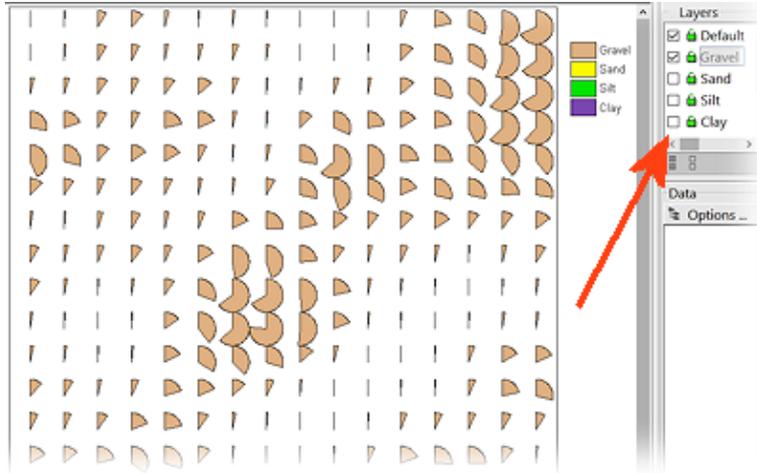
Titles: The entries within the Title column are used to label the colors/patterns if the Peripherals / Symbol option is enabled.
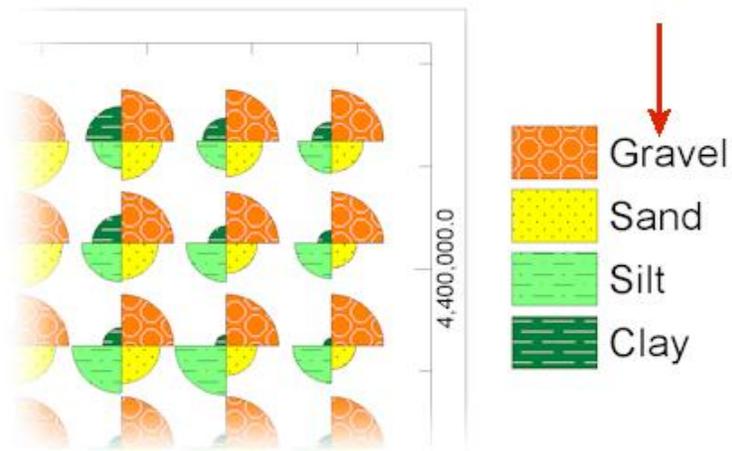
The titles are also used when defining the layers with the output file. This provides a means for showing just selected components within the diagrams.

Constraining Surfaces: The Constraining Surfaces options provide a way to limit the multivariate computations to specific zones that are confined by specified grid surfaces (e.g., top and base of a saturated zone).
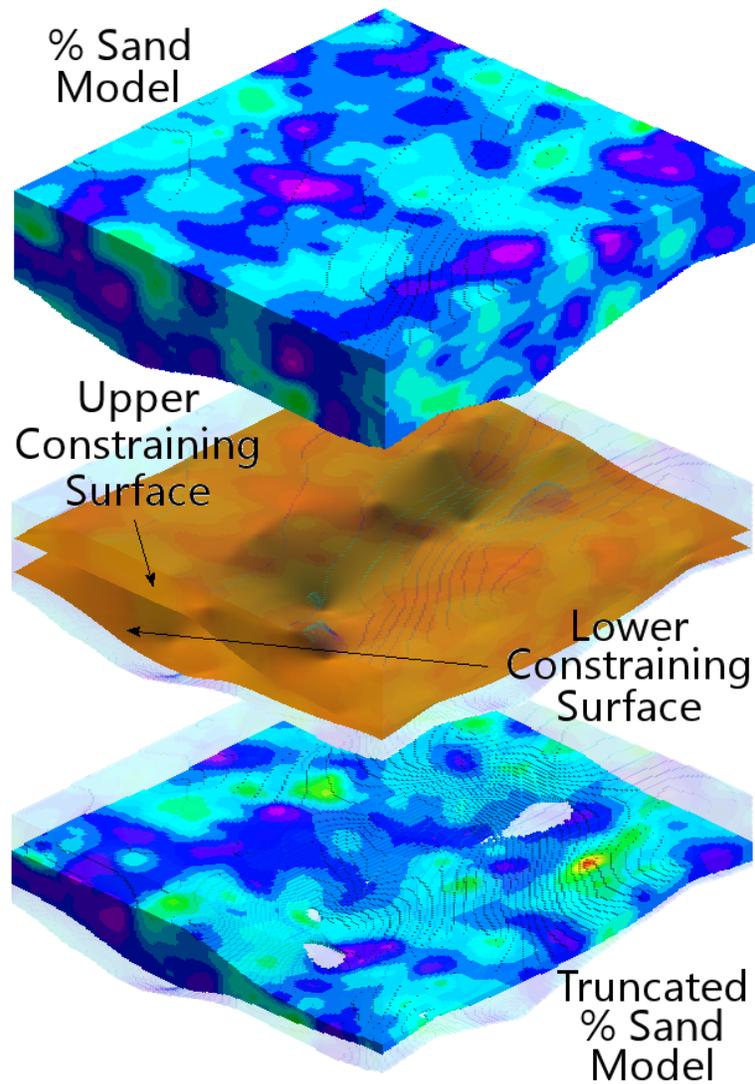
% Sand
Model

Upper
Constraining
Surface

Lower
Constraining
Surface

Truncated
% Sand
Model

Diagram Size: When creating the diagrams for a multivariate map, RockWorks samples all of the data (i.e., voxels) within a radius specified by the Diagram Size parameter.   The Diagram Size also determines the size of each individual diagram.   In other words, each diagram represents a summary of the data below that particular diagram.

The diagram size is specified in terms of voxels.   For example, if the X-Spacing within the Project Dimensions is set to 10 meters, and the Diagram Size is set 10, the size of each chart will be 100 meters.
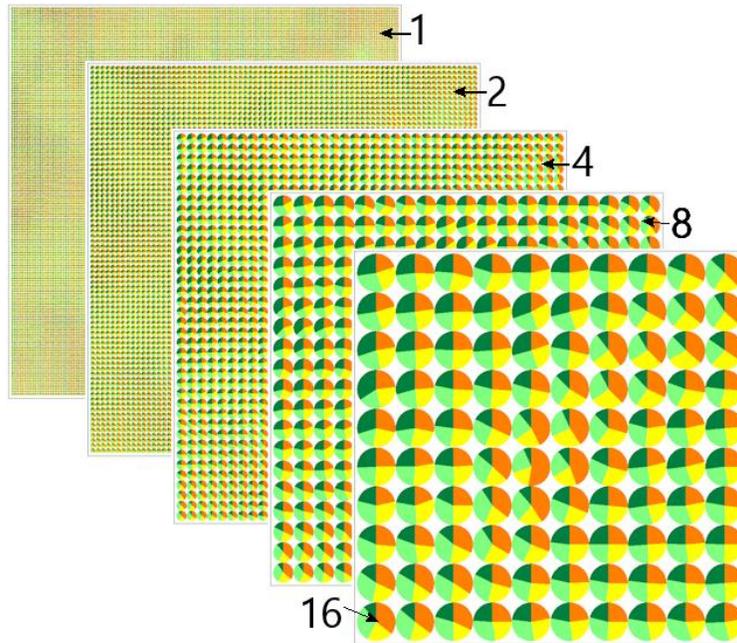
Normalization: If the Normalize option is checked, all of the data within the input models will be normalized between zero and 1.0. This provides a means for creating diagrams the show the concentrations of each component rather than a comparison with the other components. In other words, the normalize option is used to show the abundance of apples and oranges without regard to the relative abundance of apples compared to oranges.

Normalized data is best shown with the starburst, bar chart, and spidergram maps whereas pie chart and blended colors maps are nonsensical.

For example, consider three input models representing data that is measured in different units. Gamma is expressed in counts-per-second, calcium is expressed in percent, and lead is expressed in parts per million.
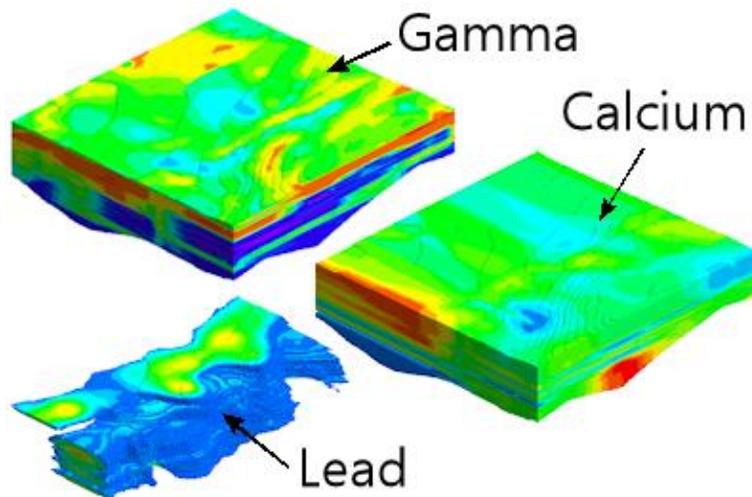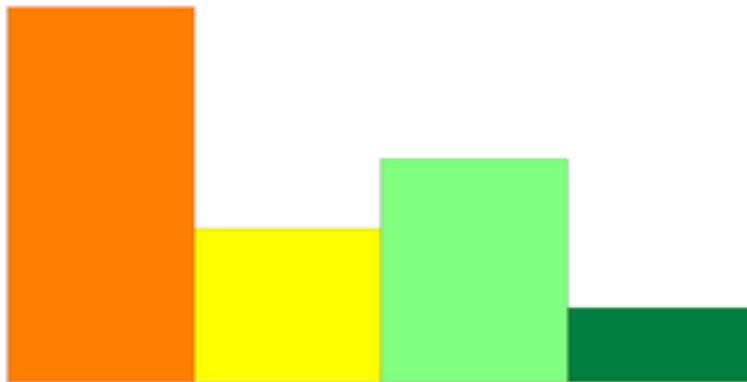

If the goal is to identify where the datasets are highest and lowest, and NOT to compare their relative concentrations, a normalized startburst map is ideal.
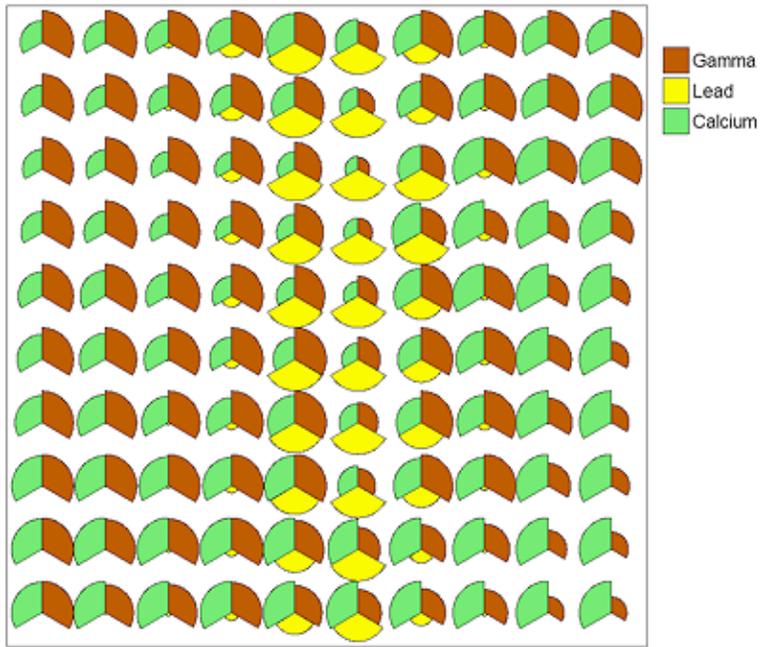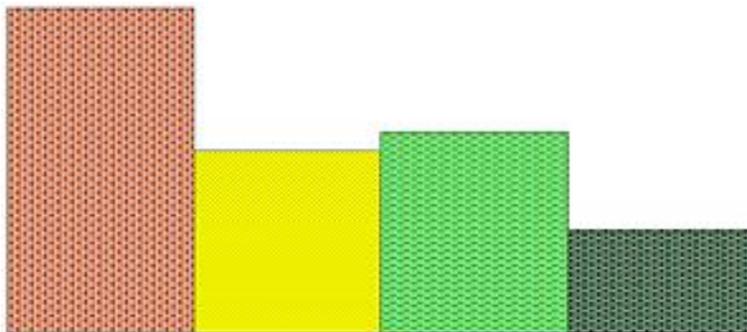
Patterns: If the *Patterns* option is unselected, only the pattern background colors will be used to fill the multivariate shapes.

Without patterns …

With patterns …

Borders: If selected, black lines will be used to surround the shapes (e.g., pie chart petals).

Without borders …

With borders …