New insight for model and drillhole data

Professionals who work extensively with model data know that the ability to analyze data quickly, with a wide variety of tools, is critical to identification, prediction, and validation of a model. As always, when deciding which tools to build, MineSight listens to the experts in the field who need the right tools for a challenging job. In response to high demand from experts around the globe, MineSight recently released the MineSight Data Analyst (MSDA) versions 2.5 and 2.6, which contained swath plots and contact plots, respectively. These two new tools provide new insight into your model and drillhole data. Swath plots allow us to plot grade means as a function of some defined direction. This can help us compare the results of different interpolation methods, or convey general grade trends for a given direction throughout the orebody. Contact plots compare the mean of a set of values as the distance increases to a lithographic contact in a set of drillholes. This can help identify how abruptly those values diverge, or inversely, how smoothly they transition.

Swath Plots

A swath plot is a graphical representation of grade distribution derived from a series of sectional zones or bands (swaths), generated in two-dimensional sections which are propagated by a given step size along the vector normal to the sectional data. In other words, your area of interest is divided into sections in a specified direction and the item values (usually grade or tonnage information) in those zones are recorded on a single representative graph.

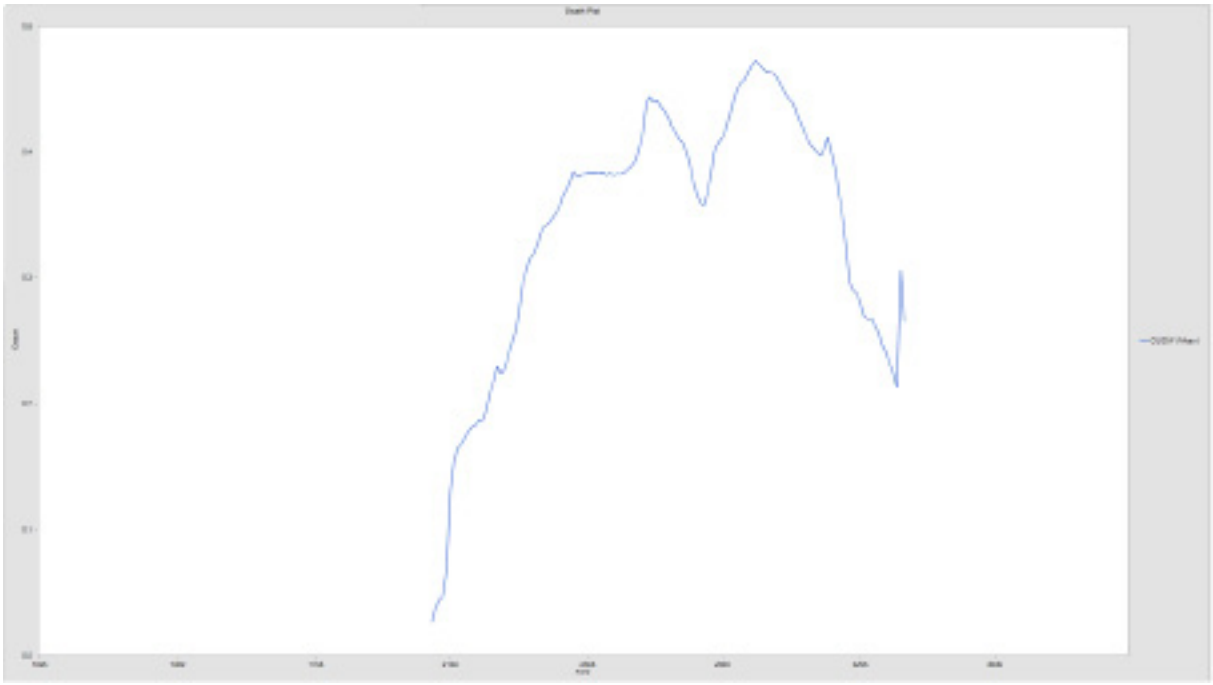

Figure 1: *A simple swath plot indicating change of Copper grade vs. change in Easting.*

Each point on the graph represents one swath of data. These graphs are created on planar or sectional intervals through a specified area of the deposit. These section distances are, by default, set to block width or height but can be modified to respect any step you desire. Within MineSight these plots can be created based on tonnage and any number of grade items.

Individually, swath plots are useful tools for analyzing grade distributions in order to identify similarities, differences, or unidirectional trends in block model data. As an example of a swath plot application, we could describe changes in Copper, Molybdenum, and tonnage, from East to West through our model.

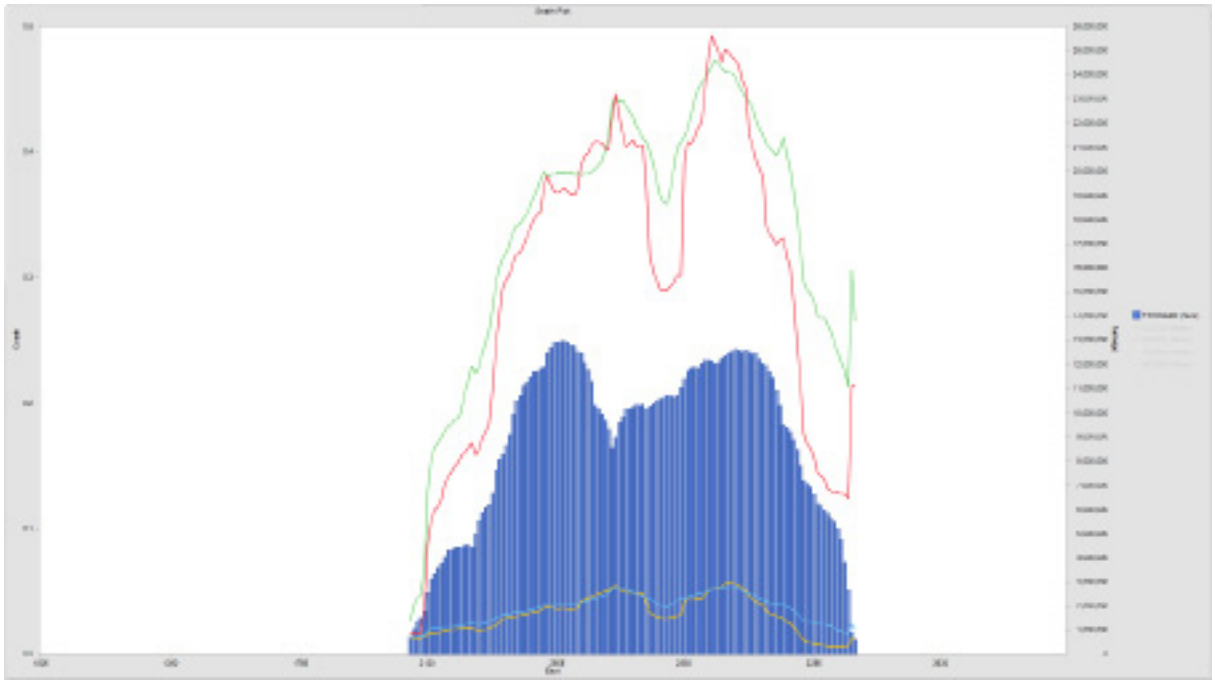

Figure 2: *A more complicated Swath Plot showing how tonnage and several grade items change with respect to easting.*

Taken one step further, association with other swath plots, created in different directions within the same model, might imply a more complex three-dimensional trend within the data in question. Applying our same example, if we then created plots from South to North and from our lowest to our highest elevation, we might further extrapolate a trend which is not orthogonal to our model direction.

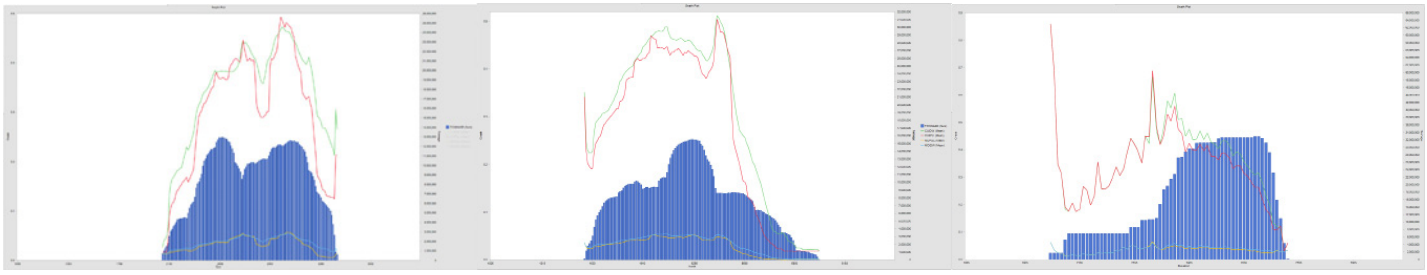

Figure 3: *Swath Plots showing the same grade items plotted against different orientations (East, North, Elevation in this example) can be instructive.*

Swath Plots can be used to compare models from the same target area that were built using different interpolation methods. Most commonly, a comparison between interpolated data and polygonally assessed data provides a quick check on the accuracy of your interpolated model.

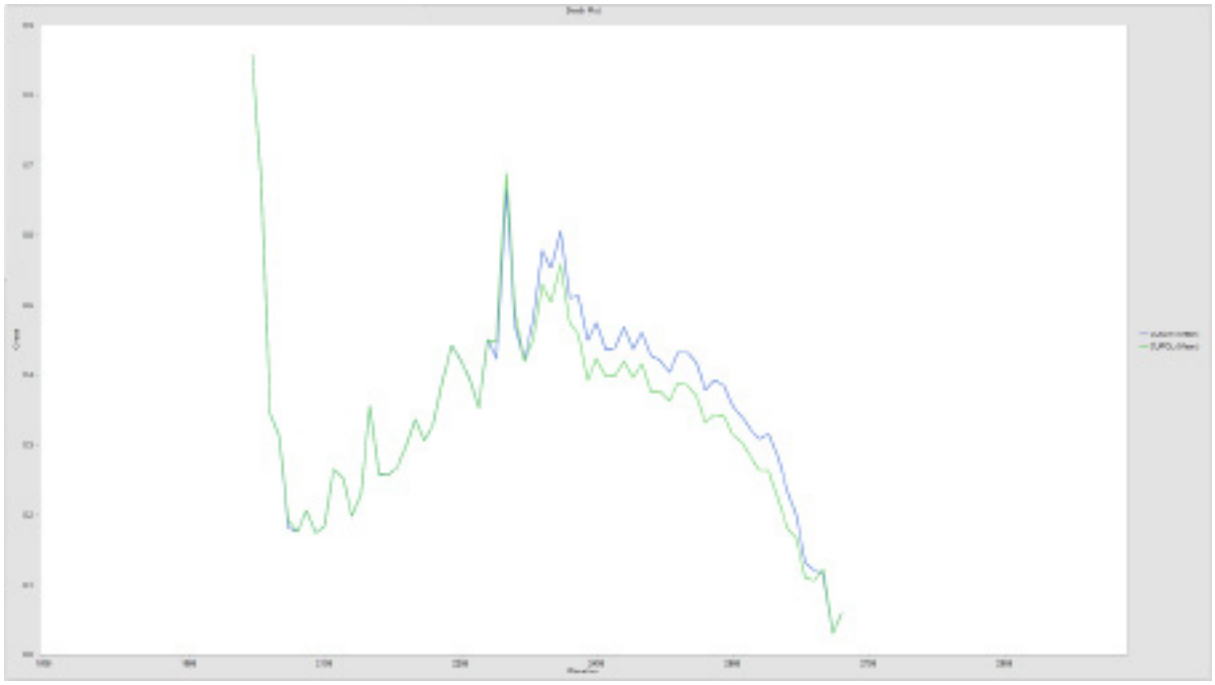

Figure 4: *A swath plot is used to compare results from a polygonal interpolation of CU grade to results from an IDW interpolation of CU grade.*

Configuration of swath plot options follows the same processes as most other MSDA charting operations. (See the MineSight Data Analyst help documentation for detailed project setup instructions.) To create a new swath plot, choose the Build Swath Plot option under the Tools menu and apply the desired chart options. Like all MSDA charts, labeling and file naming options are set on the first General tab. Filters can be applied in the same way as they are in any other chart. (Note: the new Swath plot tool respects the advanced filtering options for creation of multiple charts at once.)

Direction, step size, and area of interest are set on the Geometry tab. The step size is set by number of blocks or distance in the direction of projection of the graph. By default the step size is set to one block or the size of one block depending on your choice of divisor. The step size is divided into the area of interest to compute the number of steps. (Note: Any remainder in the step equation will be applied into a final additional step. This data point will be skewed based on sample population differences between swaths.)

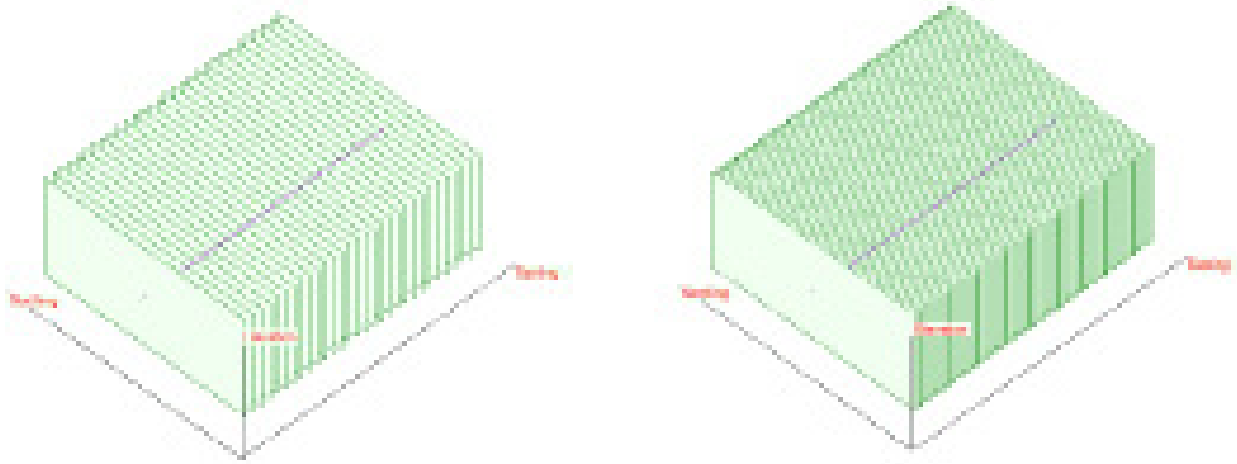

Figure 5: *The MSDA Swath Plot tool allows you to preview the sections to be analyzed.*

On the Items tab, indicate the items to be analyzed on the left and right axes of the plot. Along with your block model items, you will note a field for tonnage and an available 'expression' field. These allow you to add a calculation for a weighted grade item or tonnage by right-clicking on the item and modifying their values. The tonnage can be a model item or it can be specified by an equation on the "Tonnage" tab. By default the expression for tonnage is Volume * SG * Topo/100 but it can be modified as needed to account for special formatting, item names, and use of differing measurement units.

Like all statistical plots, after building the file, your final swath plot will be available in the selected folder in the folder manager on the left.

Contact Plots

Contact plots compare a set of drillhole values as distance increases to a lithologic contact. The contact is defined by adjacent code values within a specified geology item. Contact plots visually depict the mean value of a drillhole item, plotted against the normalized vertical distance below the contact within the same drillhole. This allows you to quickly see grade trends at the intersection of two rock types or zones. The most common use of such a plot is to better define the contact between different spatially related data, specifically how abruptly those values diverge, or inversely, how smoothly they transition.

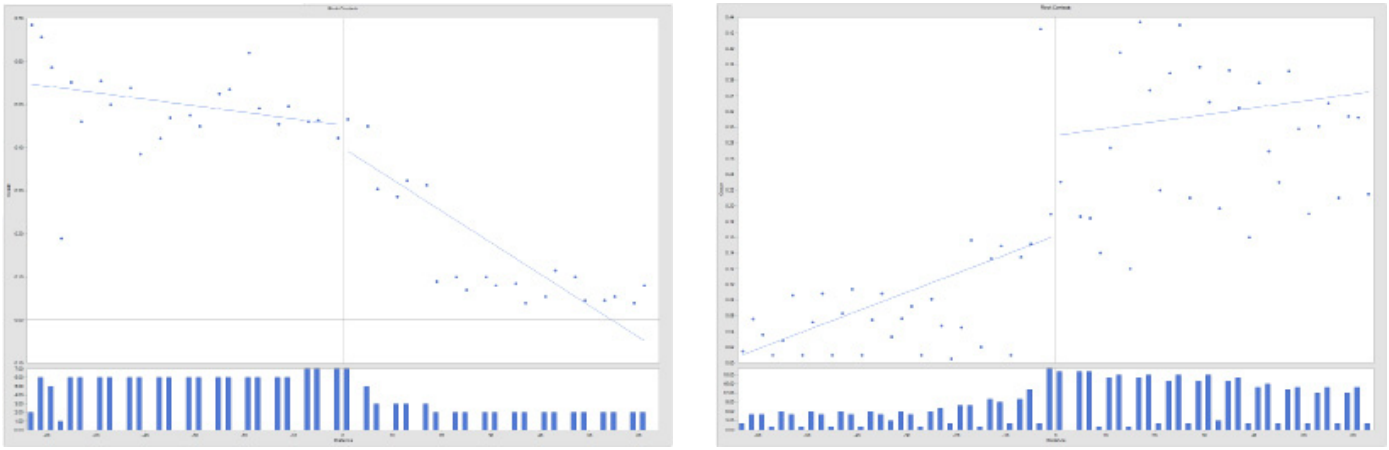

Figure 6: *Contact Plots produced using the MSDA Contact Plot tool.*

The plot is separated into two parts. The upper section of the plot provides the dot plot of grade as a function of distance. The bottom section of the plot provides a histogram of distance in the same scale against total data points. This histogram is essential for spotting results that are skewed by high or low data density.

The configuration of this type of plot requires specification of a lithology item, grades to analyze, and the lag or step distance to use in binning. These data items and bin sizes are selected on the "General" tab and the grades of interest are selected on the "Grade" tab. Along with these items, contacts to be compared must be defined in the lithology type input box by number. (Example: 1, 2, 3, 5)

All data evaluations are spatially related in the plot by occurrence in the drillhole. A contact plot of lithology type 3 and type 1 will analyze all contacts in the drillhole file where 3 are above 1. Therefore, a plot of type 1 and 3 will not only look very different, but will be considering a very different data set. A future version of MSDA will include an option to treat these contacts the same regardless of vertical position to account for folding and organically shaped ore bodies.

The Contact Plot tool also allows the creation of 'difference contact plots' on the "Options" tab. This is a representation of the difference of the values below the contact and the values the same distance above the contact. This is useful for several reasons, including identifying areas of predictable sequencing around the contact, identifying patterns in the rate grades change moving away from a contact, and assessing predictable events that relate to the contact

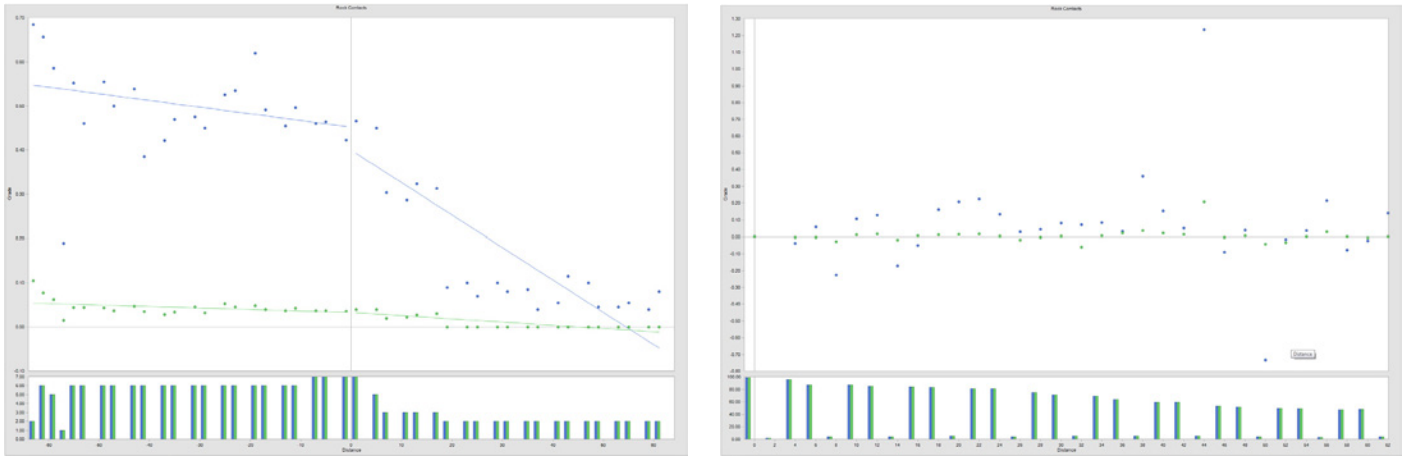

Figure 7: *At left, a standard contact plot produced in MSDA. At right, a difference contact plot for the same data produced in MSDA.*

Providing more tools grants a better chance of success to MineSight users when it comes to accurately understanding and predicting the properties of their deposit. These two new tools, released in response to high client demand, lend a new perspective into your model and drillhole data, giving you even more tools in your geologic modeling toolbox. For more information on these new developments or to request further enhancements, contact Mintec technical services.