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GEOVIA

TOP 5 TIPS IN GEOVIA SURPAC VOL 1

USEFUL TIPS TO HELP YOU GET THE MOST OUT OF YOUR SOFTWARE

INTRODUCTION

GEOVIA Surpac™ is the world's most popular geology and mine planning software, supporting open pit and underground operations and exploration projects in more than 120 countries.

As one of the leading geology and mine planning packages, Surpac is used by geologists, surveyors and engineers across the mining cycle for all types of commodity and orebody.

This eBook is a guide to help you get the most out of Surpac by consolidating the 5 useful hints and tips recently published on the **GEOVIA Blog**.

We hope that you not only find this guide helpful, but that you are also encouraged to submit your own tips to us at **GEOVIA.Info@3ds.com**.

TIP 1

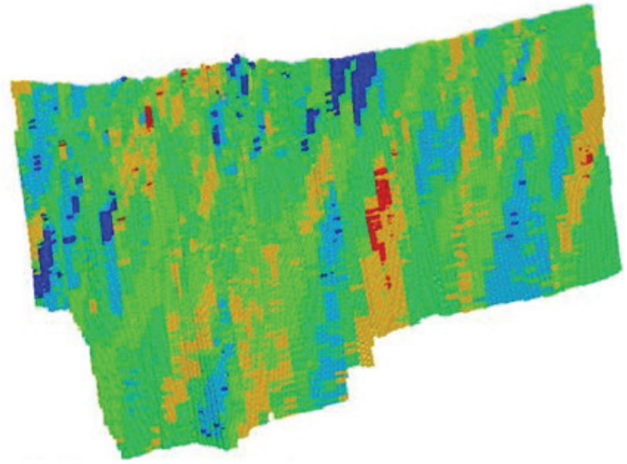
PERFORMING DYNAMIC ANISOTROPY

Grade estimation for undulating or folded deposits can often be challenging. A variety of solutions can be used to reduce the bias in the search parameters during block model estimation, one of which is dynamic anisotropy interpolation. Dynamic anisotropy interpolation is an estimation method which takes into consideration the local variation of the domain orientation into the block estimation.

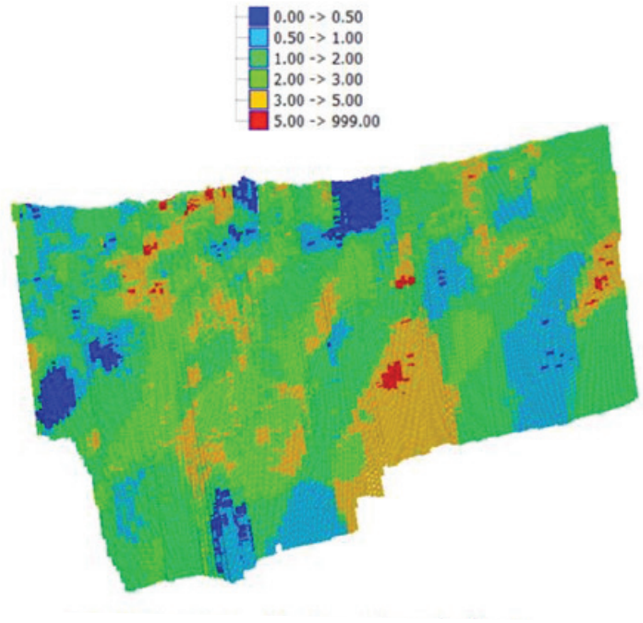
The traditional estimation process is to use a single search ellipsoid within a domain. But when this grade continuity within the domain is folded, the estimation can be biased by the misalignment of the search definition to the direction of the grade continuity.

In Surpac, you can perform dynamic anisotropy to define the search parameters for Inverse distance, Nearest Neighbour, Ordinary Kriging and Simple Kriging. Dynamic anisotropy should mainly be based on the structural geology rather than the artefact of the domain wireframe.

GEOVIA Surpac provides the effective tools to perform dynamic anisotropy in a conventional geostatistical framework.



Estimation without dynamic anisotropy

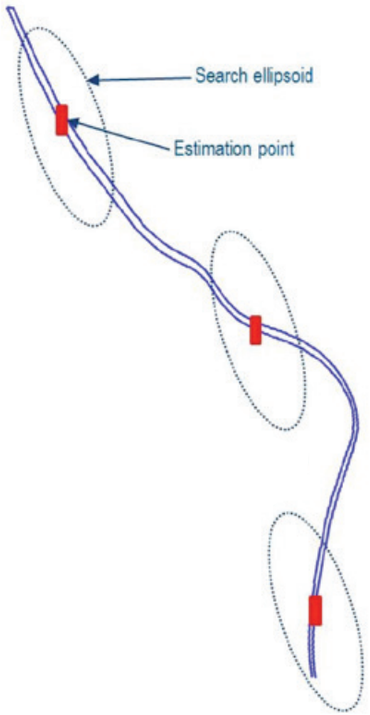


Estimation with dynamic anisotropy

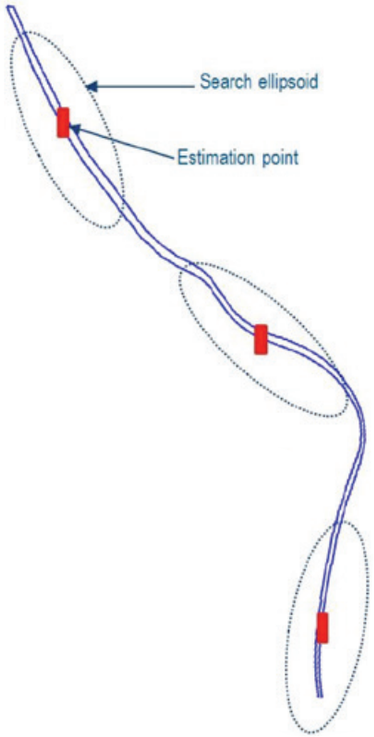
TIP 1

PERFORMING DYNAMIC ANISOTROPY

This process uses mainly block model attributes to store the orientation of the search ellipsoid and consider these parameters during the block value estimation.



Without dynamic anisotropy



With dynamic anisotropy

STEPS

1. Create a trend surface—this surface should honor the different variations in dip and dip direction (trend) of the mineralization.
2. Create the trend outlines—create a string file from the trend DTM surface. The output is a string file which will mimic each triangle as a polygon with dip in d1 and dip direction in d2.
3. Add block model attributes—add appropriate block model attributes to store values for dip and dip_dir. Make sure the direction selected honors your search ellipsoid definition. Next, assign value from the polygons to the block model.
4. Select attributes during block model estimation and set the ellipsoid exactly as per the values in the orientation attributes for each block.

To read the full step-by-step tutorial, visit the **GEOVIA blog**.

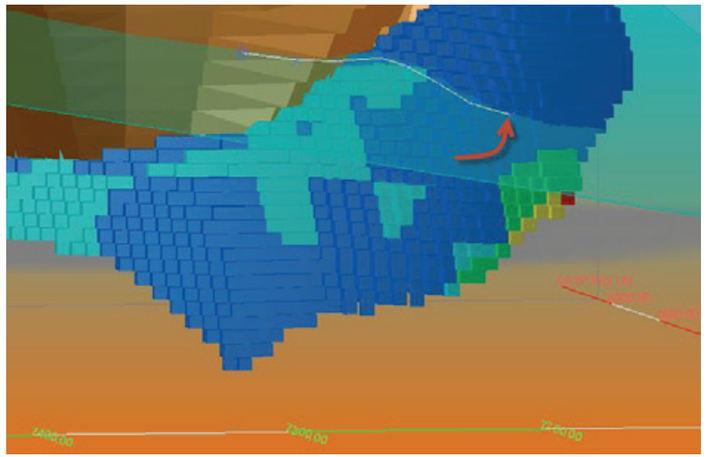
TIP 2

DIGITIZING ON A PLANE

Planes has many advantages over classic slicing, including the speed at which you can create and view slices, even with very large active block models.

Think of Planes as viewing corridors that can be invoked at any time. Planes only have to be defined once and can be stored on a network so that anyone can use them.

This tip is helpful for users who want to ensure that their newly digitized string is created on a plane. The plane we digitize on does not have to be vertical or horizontal, but can be in any orientation.



STEPS

1. Create a plane using three points on the pit, by selecting Planes > Inclined > Plane through 3 points. Pick any three points on your data and a place will be created.
2. Ensure that the Snap to Plane is active and invoke the digitizer to create points using your mouse.
3. If the digitized points need to be moved around on the plane, just ensure that the plane you created is saved and active. You can make the plane active by double clicking on it.
4. Drag the point around by using Edit > Point > Move. The point will stay constrained to the plane.

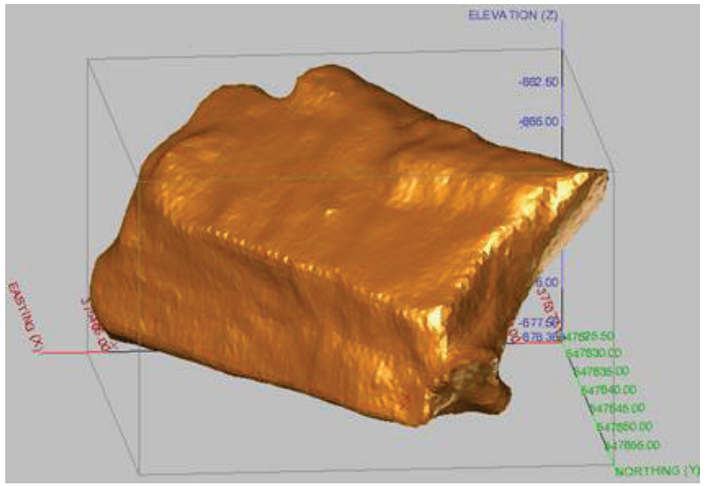
To read the full step-by-step tutorial, visit the **GEOVIA blog**.

TIP 3

ROTATING DATA ON A PLANE

It may come as a surprise that many Surpac users hide the Planes tab away and revert back to classic slicing, missing out on this great functionality.

To save time and effort in your daily tasks, you can rotate any data on a plane in Surpac, specifically to rotate a CMS pickup using a plane created by three points.



STEPS

1. Follow step 1 in the previous tutorial and follow the instructions on the status bar to create the plane. This is dynamic (not saved) and may not show unless you have done some work with planes during your current Surpac session.
2. Data may now be rotated along this plane. Turn on the markers that make up this object by selecting Display > Point > Marker. If you are rotating a DTM, do not drag the string file in to do this! You can access the strings from inside the DTM and when rotating the string, the DTM will also be rotated.
3. Select the pivot point to rotate about by going to Edit > Move string constrained by > Rotation. Select another point and drag the mouse to rotate the data; when you let go of the mouse a confirmation box will appear to alert you to the angle of shift. Hit Apply to accept the rotation.
4. You can also type ERM to erase the markers and show the final rotated DTM.

To read the full step-by-step tutorial, visit the **GEOVIA blog**.

TIP 4

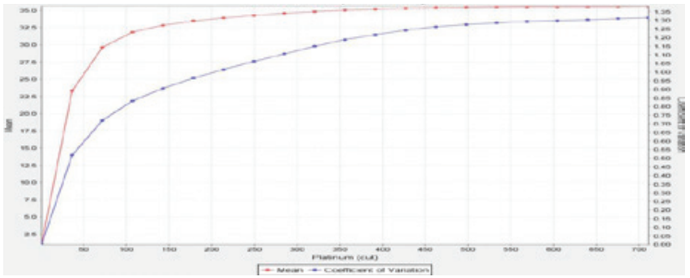
TOP CUT ANALYSIS

Geologists often face challenges when dealing with datasets that are severely positively skewed. In these situations many decisions need to be made, for instance to top cut or not to top cut? And if applied, what value should be used?

To help geologists in making these decisions, you can use the 'mean and variance top cut diagram' in Surpac located inside the **Basic Statistics** window.

The diagram plots the mean against the **Coefficient of Variation** (COV) at various grade cut offs, allowing the geologist to assess which cut off will yield an acceptable COV and its impact on the mean grade.

To generate this diagram, let's start with a string file containing the composited sample values from within a domain; this will need to be loaded into the Basic Statistics Window.



Platinum—
top cut analysis

STEPS

1 After opening the Basic Statistics Window, load data from string files. Select your string file and the appropriate d-field, then type the name of the element (e.g. Platinum). Click Apply.

2 A histogram and cumulative frequency curve will then be displayed for the element(s) selected above.

3 Generate the mean and variance top cut diagram by going to Display and selecting Mean and variance top cut diagram.

4 The top cut analysis diagram generated should show a blue and red line. The blue line represents the COV at various grade cutoffs and should be measured against the axis on the right hand side of the diagram. The red line represents the mean at various grade cut offs and should be measured against the axis on the left hand side of the diagram.

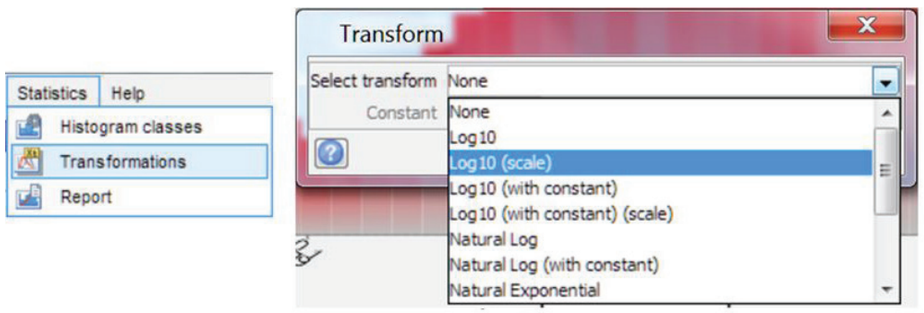
5 Generally, a dataset with a COV greater than 1.2 demonstrates a mixed population which may benefit from top cutting and a dataset with a COV less than 1 generally does not. The aim of top cutting is to reduce the COV while maintaining the characteristics and distribution of the original population (i.e the mean is maintained and the tail of the population is not unduly cut).

To read the full step-by-step tutorial, visit the **GEOVIA blog**.

TIP 4

ALTERNATIVE METHODS OF TOP CUT ANALYSIS

Here are some alternative methods to help geologists select and decide on the appropriate top cut value, such as percentiles and log-probability plots.



PERCENTILES

In the Basic Statistics Window, data can be reported by going to Statistics > Report where you can also edit the reported percentile ranges. To generate the report, hit Apply. The reported percentile grade values could then be assessed for top cut value.

LOG-PROBABILITY PLOTS

A Log-probability plot can be generated inside the Basic Statistics Window following loading of data from a string file. Once you have done this, apply a log transformation to the data by going to Statistics > Transformations. Next, display the Log-Probability Plot: Display > Probability Curve.

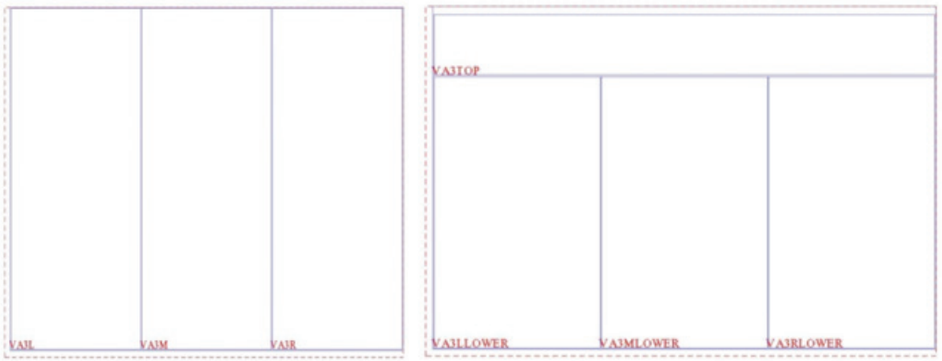
The inflection points in this curve may indicate the separation between different sample populations and/or high/low tails. For example the last inflection point could be used as a suitable value for top cutting the dataset.

For more information, visit the **GEOVIA blog**.

TIP 5

CREATING PLOT WITH MULTIPLE VIEWPORTS

A common question we often receive from users is regarding how to create plots with multiple drawing areas. Follow the steps to create a plot with four drawing areas—one for plane view and three for sections, with the title block in the bottom left corner, using Autoplot functions.

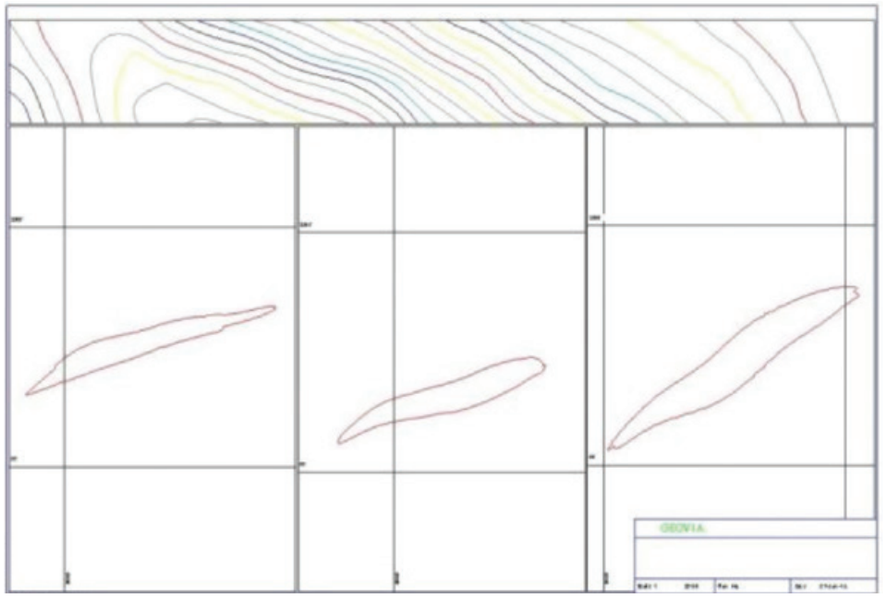


STEPS

1. Display your data and prepare planes for your sections in Surpac.
2. Then go to Plotting Sheet setup window to set up the necessary drawing areas. In the setup window, select existing Draw Areas for A3 paper. The result is a viewport divided vertically with into 3 drawing areas.
3. To make a copy of existing Drawing Areas, select Drawing Areas > Copy. Perform this for all 3 Drawing Areas.
4. Create a new Drawing Area that will be located at the top of the viewport by going to Drawing Areas > New.

TIP 5

CREATING PLOT WITH MULTIPLE VIEWPORTS



STEPS

1. For a visual check, add new Drawing Area to the existing viewport. Based on your previous Drawing Areas setup, enter the dimensions from sheet boundaries. To edit dimensions, select Drawing Areas > Properties. That will be applicable to displayed Drawing Areas.
2. Save and switch the view to section 2D and use Autoplot to create sections for 3 planes.
3. For the first section, use "Drawing area" as the name of first created area and no title block. For the second section, use the second area without selecting title block; and for the third section, use the third area and select title block.
4. In the same way you can also create a .dwf file for plane view (without title block).

To read the full step-by-step tutorial, visit the **GEOVIA blog**.

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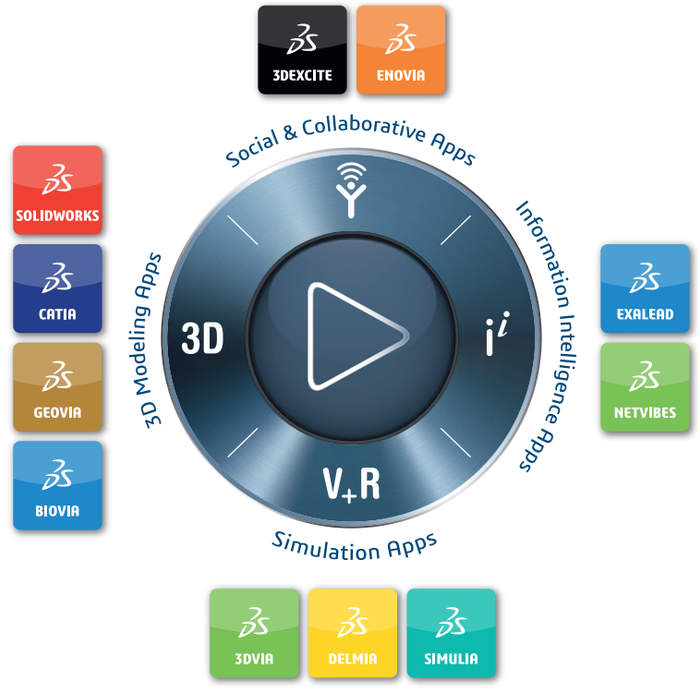

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