Block Model for Dipping Structures

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Problem:
After running a series of variograms you find that the data shows a strong anisotropy in a particular azimuth and dip. This is estimated into a block model and you are not satisfied the results represent the deposit. The critics are complaining that your results are "smearing" the values so that it may not be a minable model.

How can TECHBASE be used to create a block model that is representative of the structural behavior of a vein type deposit?

Solution:
Create a dipping block model and estimate into it is as follows:

Step 1:

Using DEFINE, create a block model. The block model should have cell sizes that are proportional to the anisotropy found using geostatistics.

In this example case, the anisotropy is 20 in the minor axis, 300 in the major axis and 200 in the orthogonal axis. The major axis is 200, but it is roughly 100 meters between bore holes so 30 will be used for the major axis block size. Since the smallest axis is 20, this and a factor of 10 for the largest blocks. then 2 will be used as the smallest unit. The dip of the formation is 52 degrees from horizontal and the strike azimuth is 151.5 degrees. The direction of the dip is to the north so the plunge azimuth (dip azimuth) is 151.5 - 90 = 61.5 degrees.

The example block model is defined with a baseline azimuth of 161.5 degrees, 50 columns of 30 meters, 700 rows of 2.5380 meters [2/(sin 52). results in 2 meter thick blocks], and 24 levels of 23.64 meters [30 * SIN(52) = 23.64].

Step 2.

Create the usual real actual fields for analytical data to be estimated into the model. Next, create a calculated field containing the azimuth direction of the plunge (plunge_azimuth: enter a single value into the formula, in this case 61.5) and another calculated field containing the dip angle (dip angle is also a single value formula, in this case 52.0)

Finally create two real calculated fields called newcrd_xc and new_crd_yc the following equations should be used for these fields:

newcrd_xc (real, calculated, no limits):
blocktable_xc blocktable_lev 1- blocktable_lsz * b_plunge sin / b_plunge cos * b_plunge_azi sin * +

newcrd_yc (real, calculated, no limits):
blocktable_yc blocktable_lev 1 - blocktable_lsz * b_plunge sin / b_plunge cos * b_plunge_azi cos * +

Step 3:

Perform TBEDIT procedures to populate the model as normal. All estimations using the modeling routines can be performed by using newcrd_xc, as the x coordinate field, newcrd_yc as the y coordinate field and blocktable_zc as the z coordinate field.

Section and plan view can be plotted using the points menu and connect options. The line width is modified with graphics set up where the line width should be set proportional to the blocks. Figure 1 shows the resulting model blocks for level 15 with overlaying topography. Figure 2 shows the cross section through the center of the model along the southwest to northeast line.

Figure 1: Plan view of level 15 with topography overlay

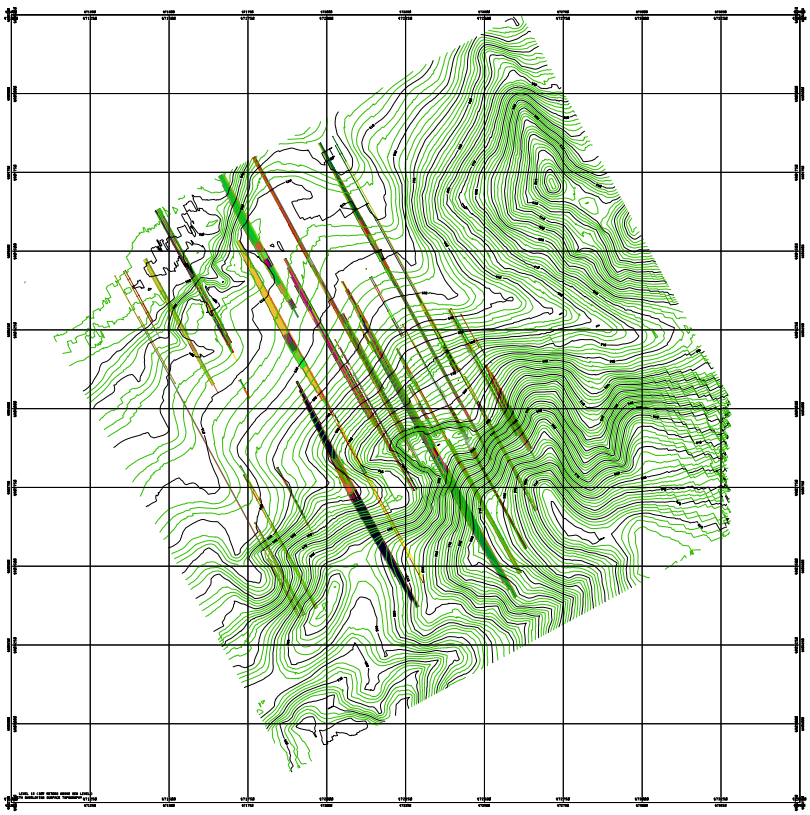

Figure 2: Cross section of data