

**Window 2-666:** Boreholes:Create:FromDialog

This option allows the user to add geological profiles at boreholes, and then to project materials from boreholes to the real 3D continuum mesh. This way one may create a uniform 3D mesh avoiding strict generation of all 3D complex geological strata.

The 'Parameters' dialog box is titled 'Parameters' and contains the following elements:

- Borehole position (x,z) and elevation (y):**
  - X: 40 [m]
  - Y: 0 [m]
  - Z: 0 [m]
- Material Profile Table:**

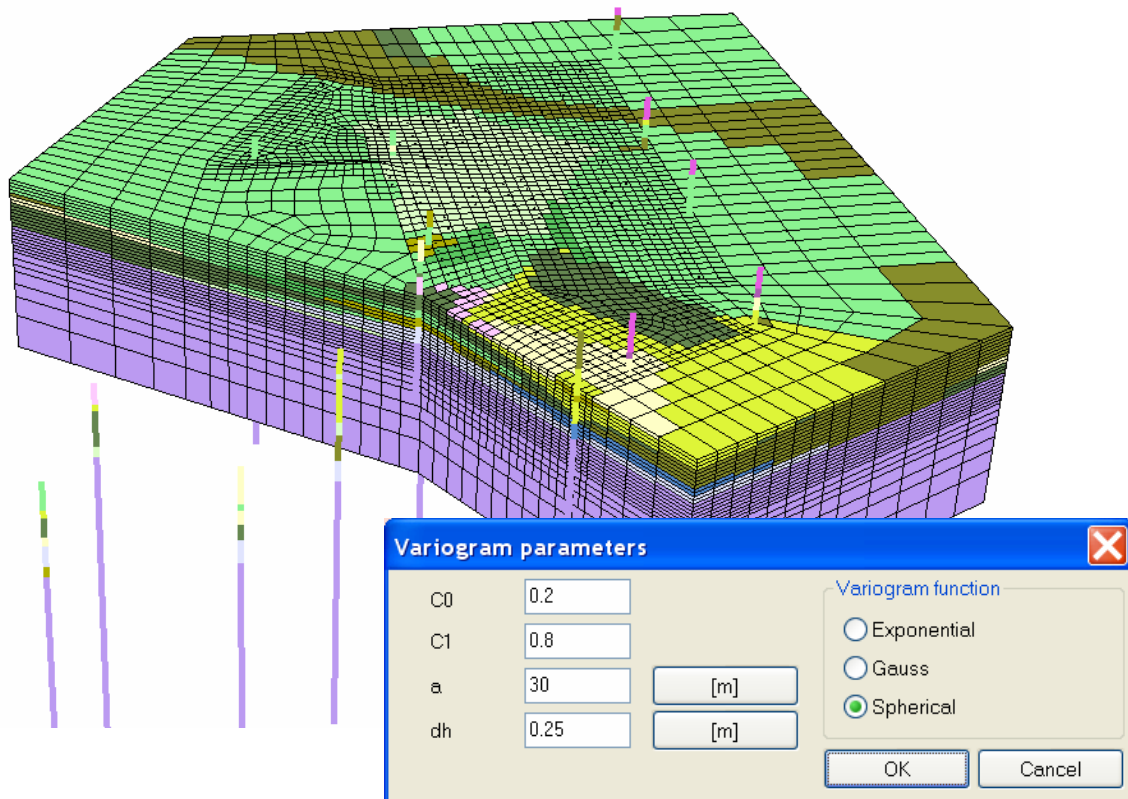
	Depth	Material number	Material name
1	0	1	sand
2	5	2	clay
3	12	3	tertiary clay
4			
- Label:** CPT-2
- Buttons:** OK, Cancel

**Remarks:**

- So far this option is valid for boreholes oriented exclusively towards the vertical (y) axis
- To edit the profile a list of predefined materials must be set up first at the material level
- Location of the borehole in the x-z plane is defined by the two coordinates **X [ ]** and **Z [ ]** while its elevation (y coordinate of the ground surface) is defined in **Y [ ]** edit field
- Minimum 3 boreholes are needed
- In v2010 kriging procedure is used for mapping of the materials from boreholes to the real mesh (see Win.(2-667) and Win.(2-668))
- Depths are assumed to be positive numbers with zero value at the top of the borehole
- Number of material layers in the borehole can be any
- In v2010 to avoid nonunique mapping of materials on 3D mesh, boreholes should be of the same depth

**Window 2-667:** Boreholes:Update:Map on selected elements

This option performs mapping of geological strata, extrapolated from the set of boreholes, on the real continuum 3D mesh but exclusively for selected set of elements. By using this operation only Initial material is updated for selected element. If we consider a set of several boreholes then the result of material mapping will be as shown in the next figure. It has to be mentioned that this result may strongly depend on the type and parameters of the variogram that is used in the kriging procedure.



**Remarks:**

1. If some of the boreholes are outside current computational domain it is recommended to include them in the kriging routine

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**Window 2-668:** Boreholes:Update:Map on visible elements

This option works in the same manner as the one given in Win.(2-667) but on all currently visible continuum 3D elements.

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Window 2-669: Boreholes:Update:Kriging

The main difficulty in the kriging procedure is to set up the proper shape of the variogram. In the current version one may choose the three types of the variograms

- Radial (spherical)

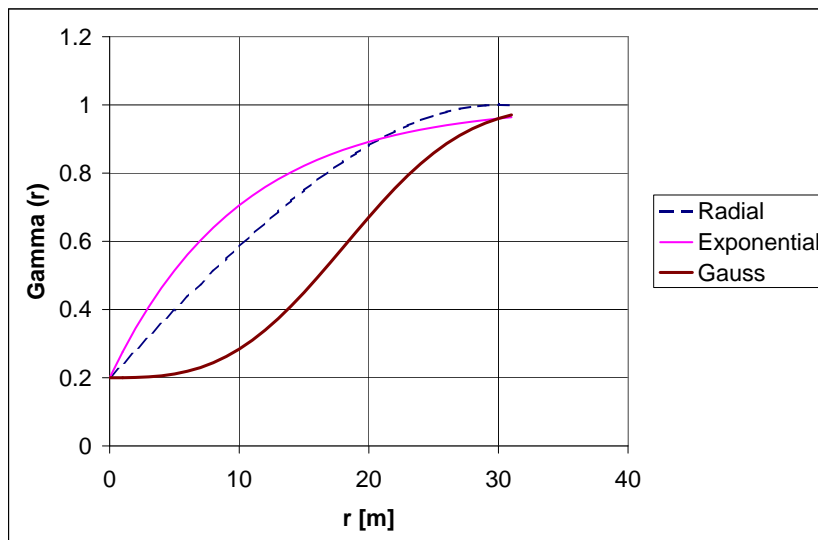
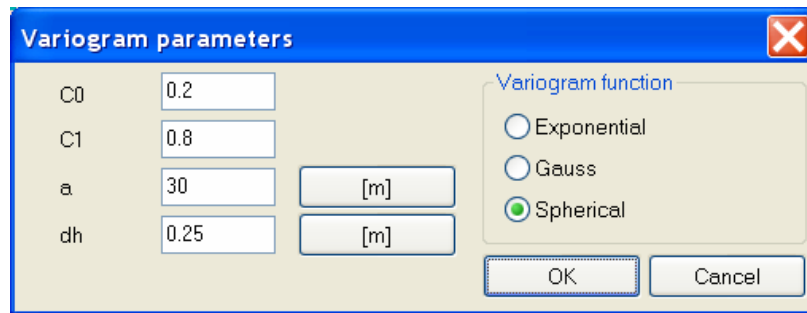
$$\tilde{\gamma}(r) = C0 + C1 \left( \frac{3r}{2a} - \frac{1}{2} \frac{r^3}{a^3} \right) \text{ for } r < a$$

- Gauss

$$\tilde{\gamma}(r) = C0 + C1 \left( 1 - \exp - \frac{3r^2}{a^2} \right)$$

- Exponential

$$\tilde{\gamma}(r) = C0 + C1 \left( 1 - \exp - \frac{3\|r\|}{a} \right)$$



Remarks:

1. The  $a$  parameter defines at which distance variogram reaches plateau
2. The  $C0$  and  $C1$  define the shape of the variogram
3. The  $dh$  parameter cancels thin layers in the subsoil that are thinner than the given value