



Visualization and dissemination of 3D geological property models of the Netherlands

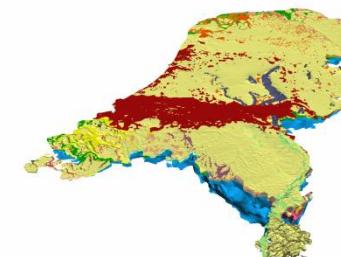
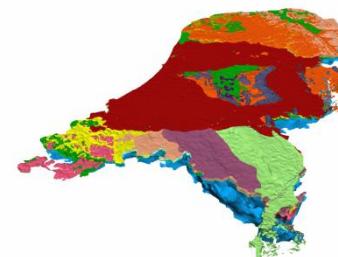
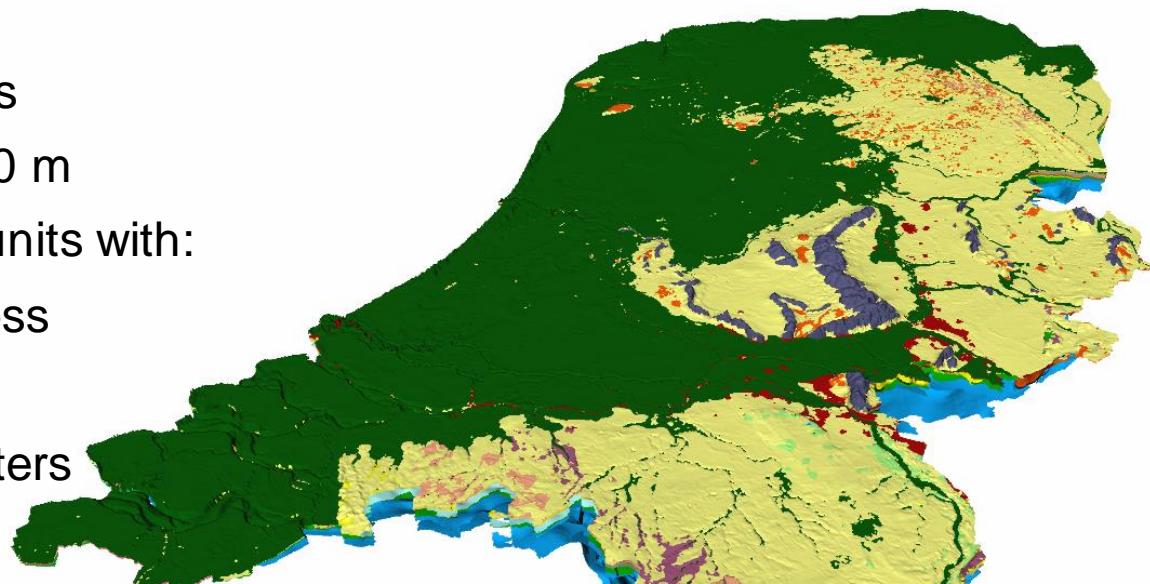
Jan Stafleu, Hans-Georg Sobisch, Denise Maljers, Jan Hummelman,
Roula Dambrink and Jan L. Gunnink





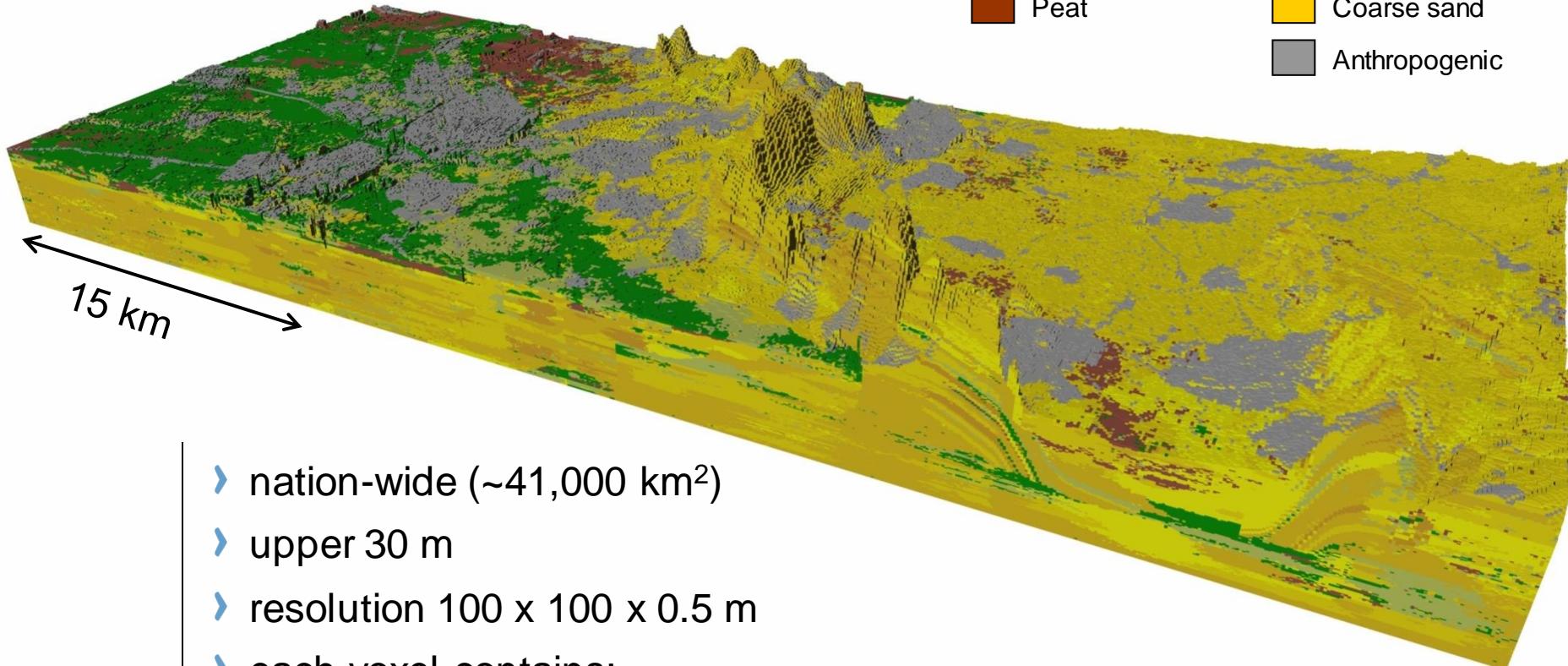
Layer-based models

- › nation-wide (~41,000 km²)
- › upper 500 m
- › ArcGIS raster layers
- › resolution 100 x 100 m
- › (hydro) geological units with:
 - › top, base, thickness
 - › uncertainties
 - › hydraulic parameters

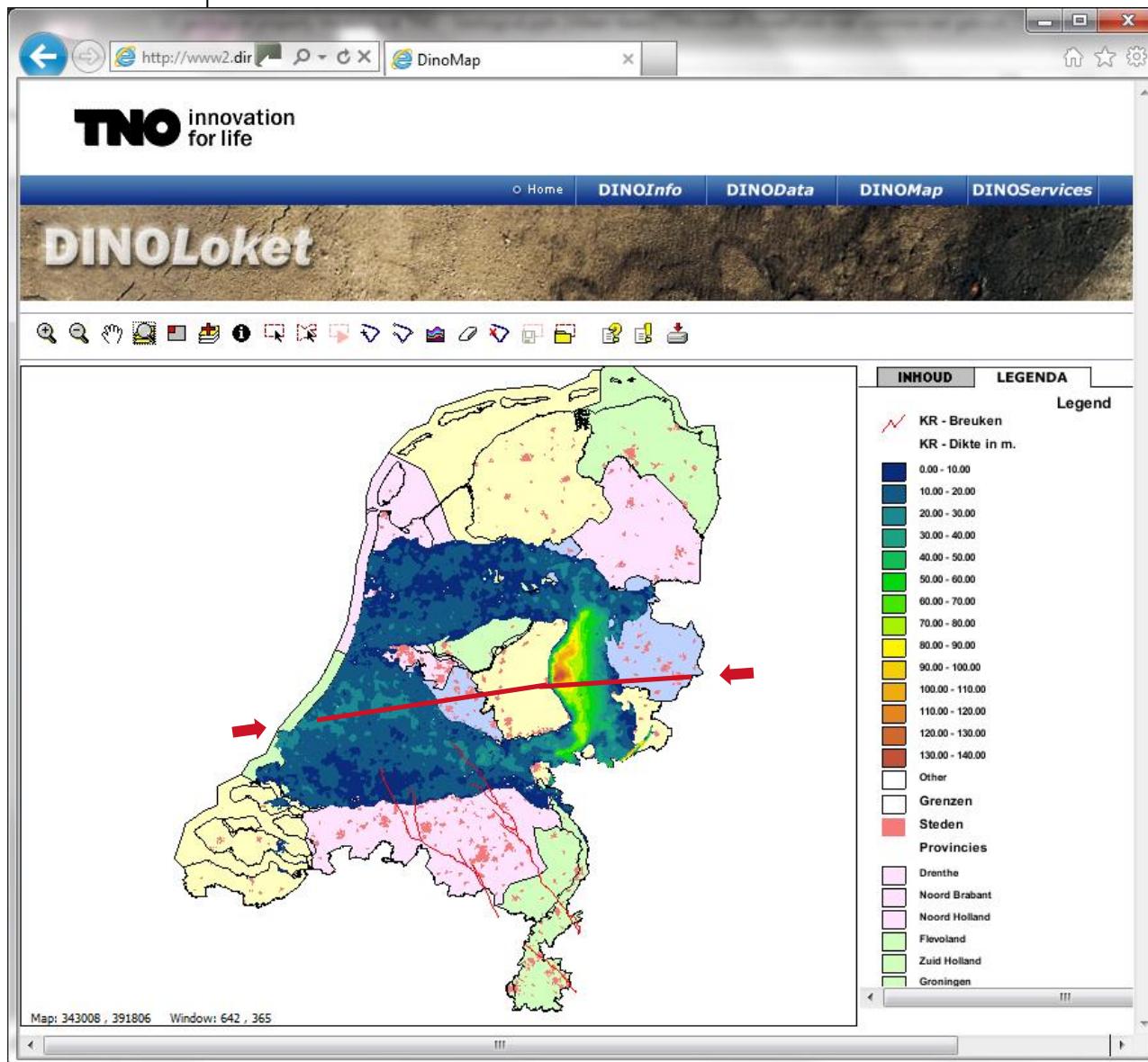




Voxel models



- › nation-wide (~41,000 km²)
- › upper 30 m
- › resolution 100 x 100 x 0.5 m
- › each voxel contains:
 - › geological unit + uncertainty
 - › lithology (sand, clay, peat) + uncertainty



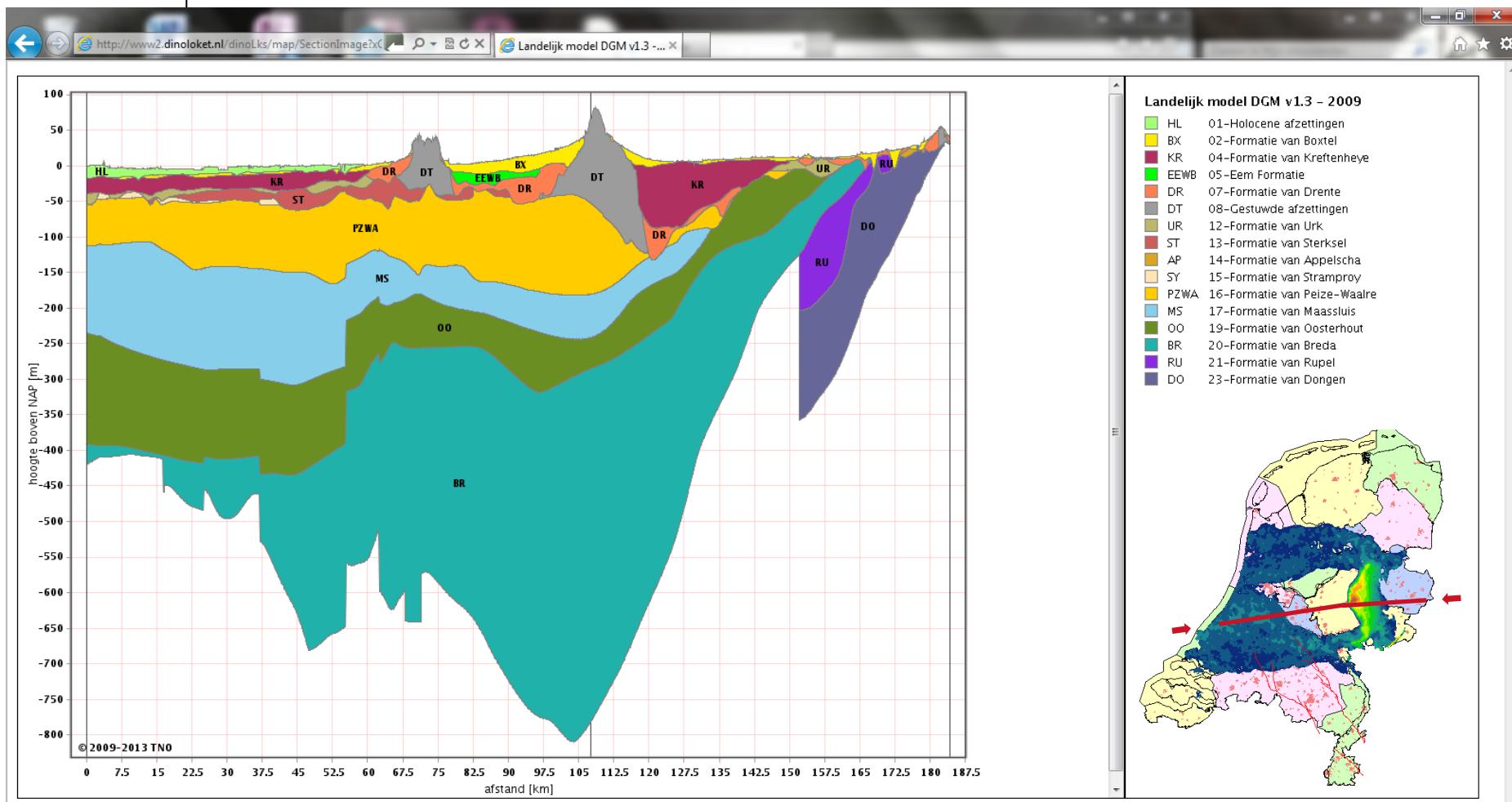
Web portal: interactive map

- › Layers with:
 - › top
 - › base
 - › thickness
 - › standard deviations
 - › hydraulic parameters

www2.dinoloket.nl

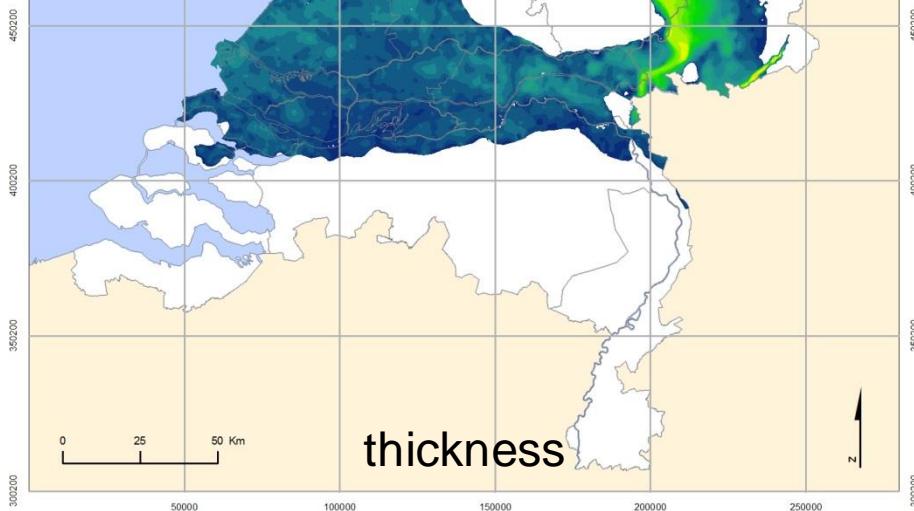
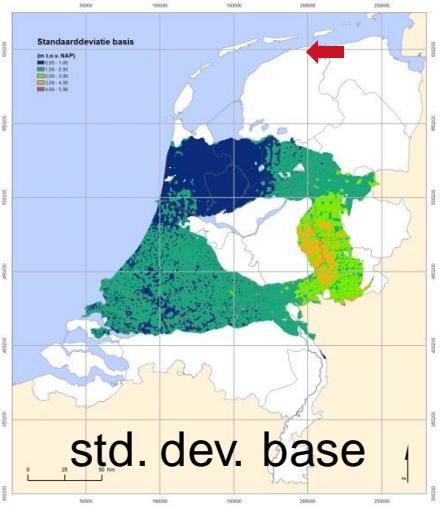
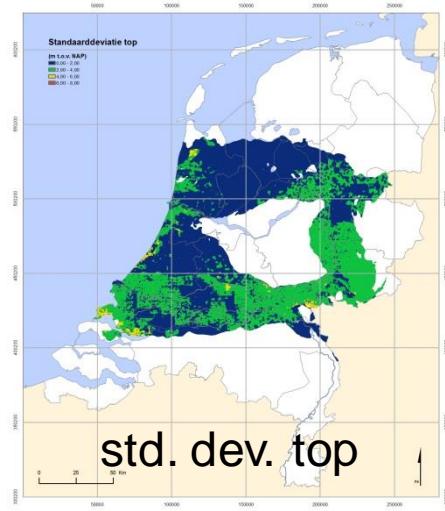
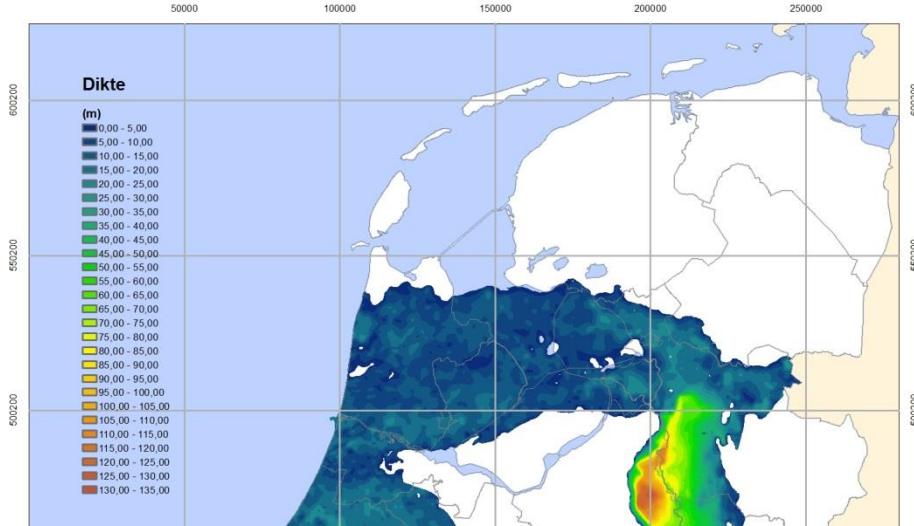
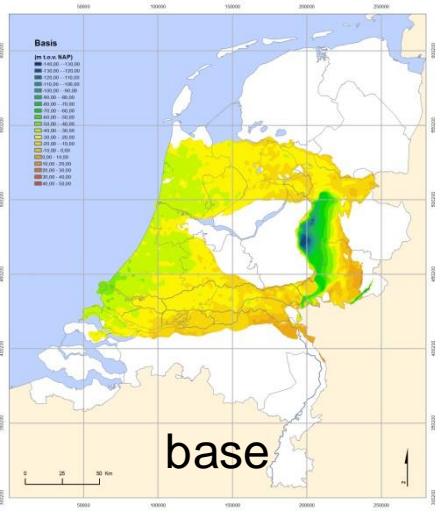
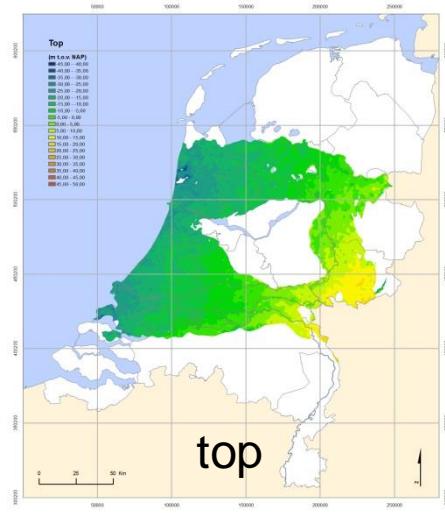


Web portal: cross-sections through the model



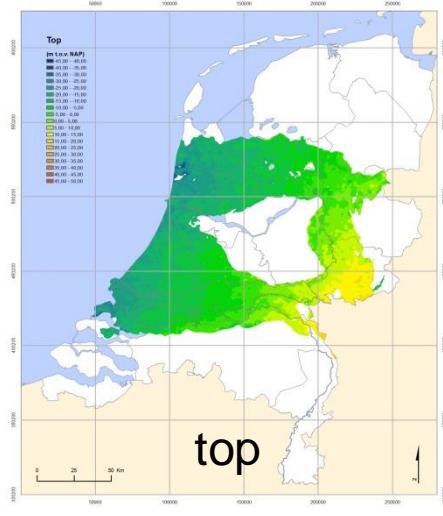


Web portal: download ArcGIS datasets

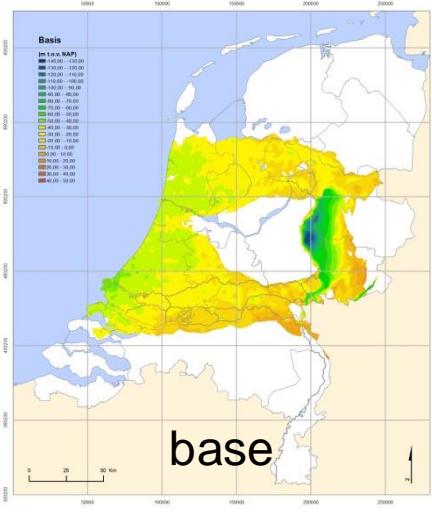




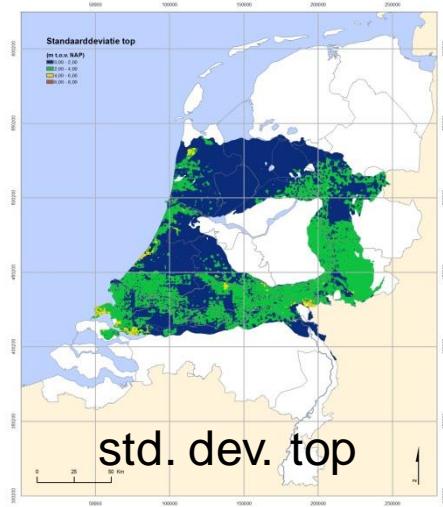
Web portal: download ArcGIS datasets



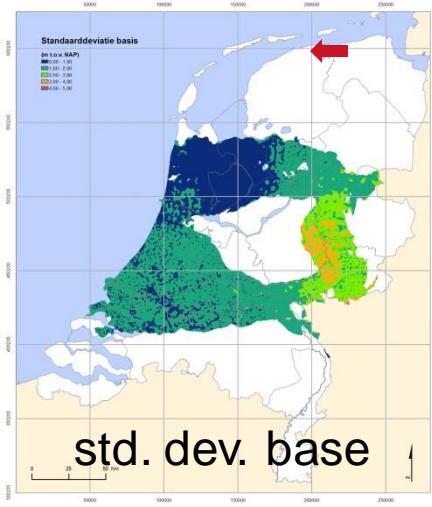
top



base



std. dev. top



std. dev. base

- Framework model:
 - 33 geological units
 - 6 attributes
 - 198 raster layers

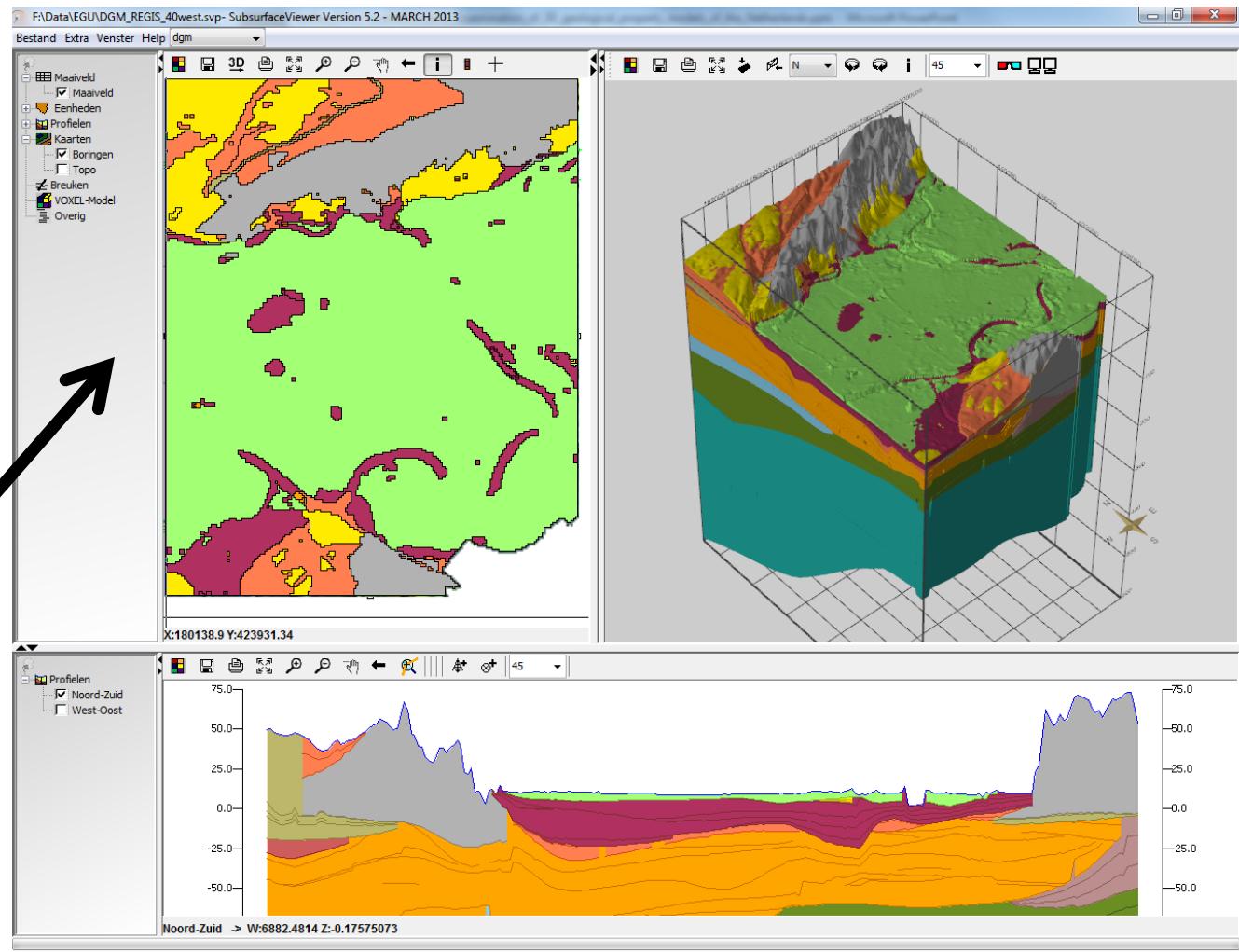
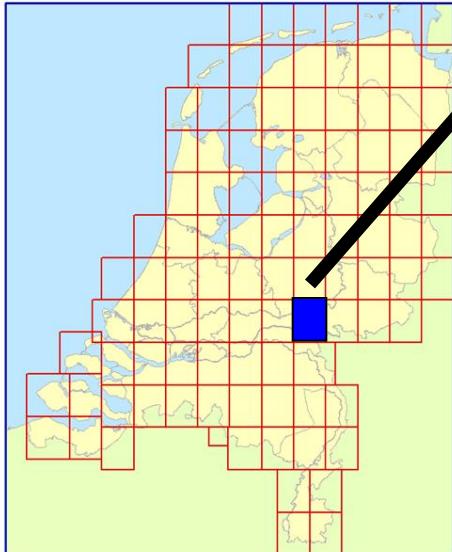
- Hydrogeological model:
 - 128 aquifers and aquitards
 - 750 raster layers including hydraulic properties

- Large amount of data
- 2D maps, lack 3D insight



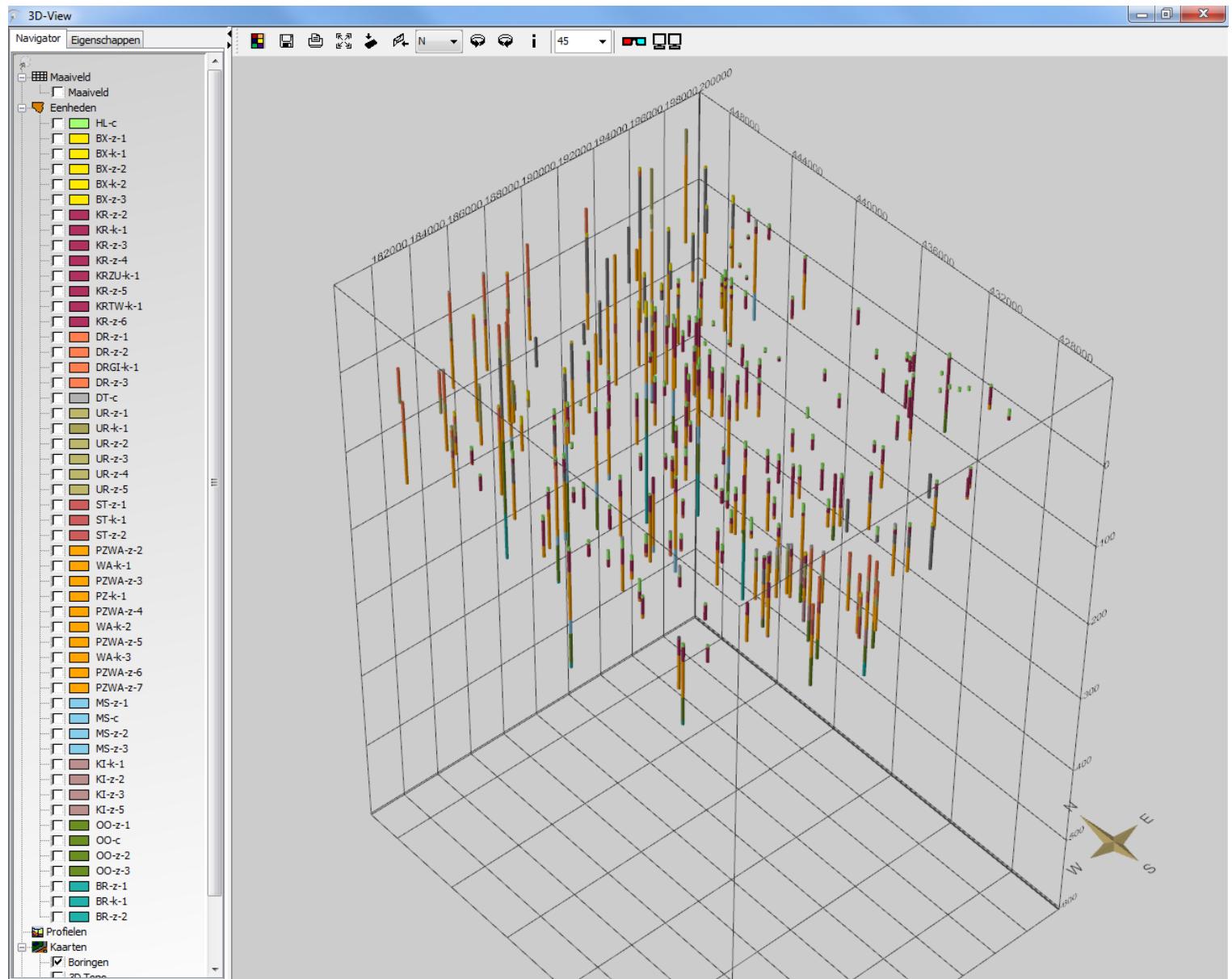
SubsurfaceViewer (free download on www2.dinoloket.nl)

- › viewer software
 - › map sheets
- 1:50,000
- 20 x 25 km



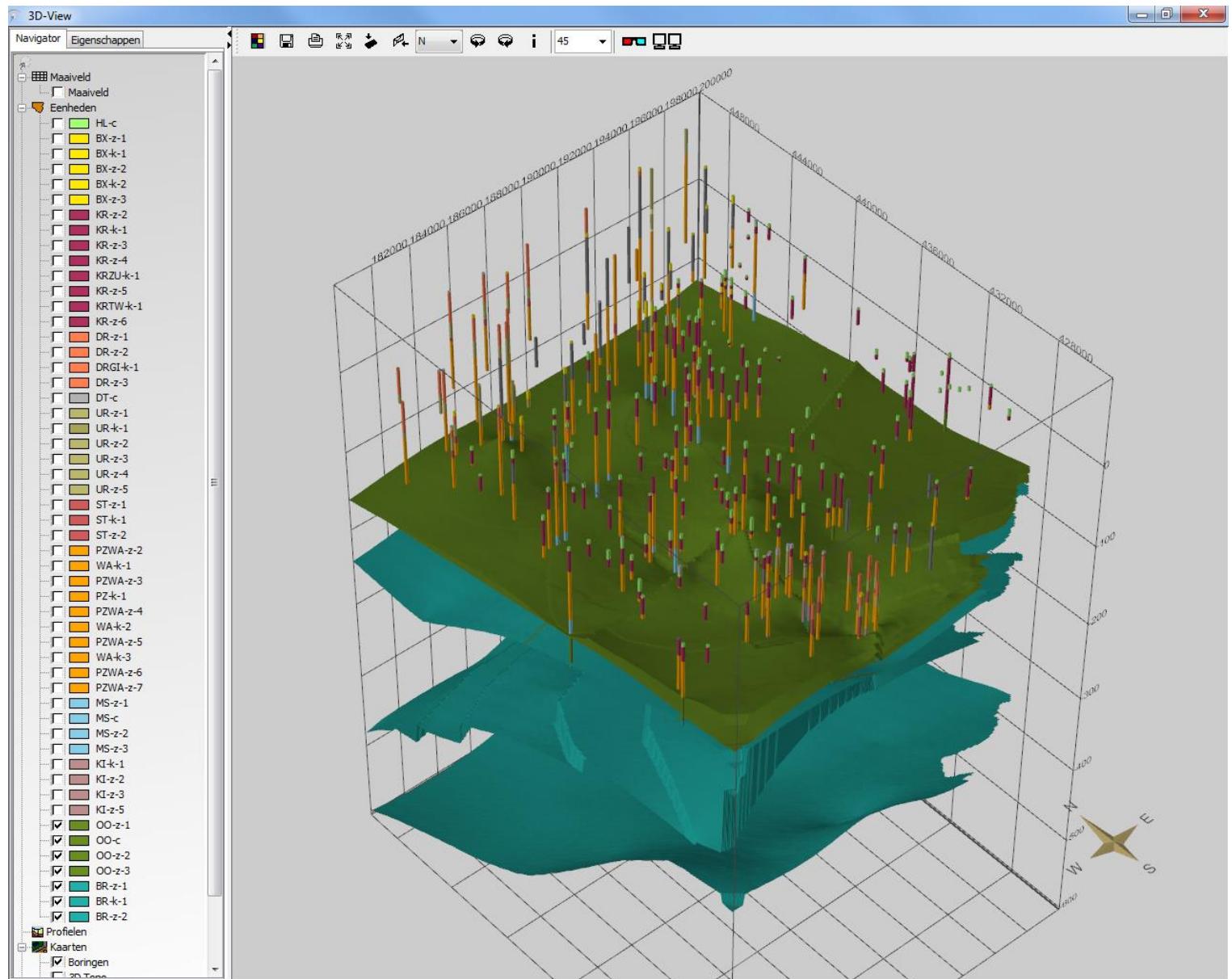


› boreholes



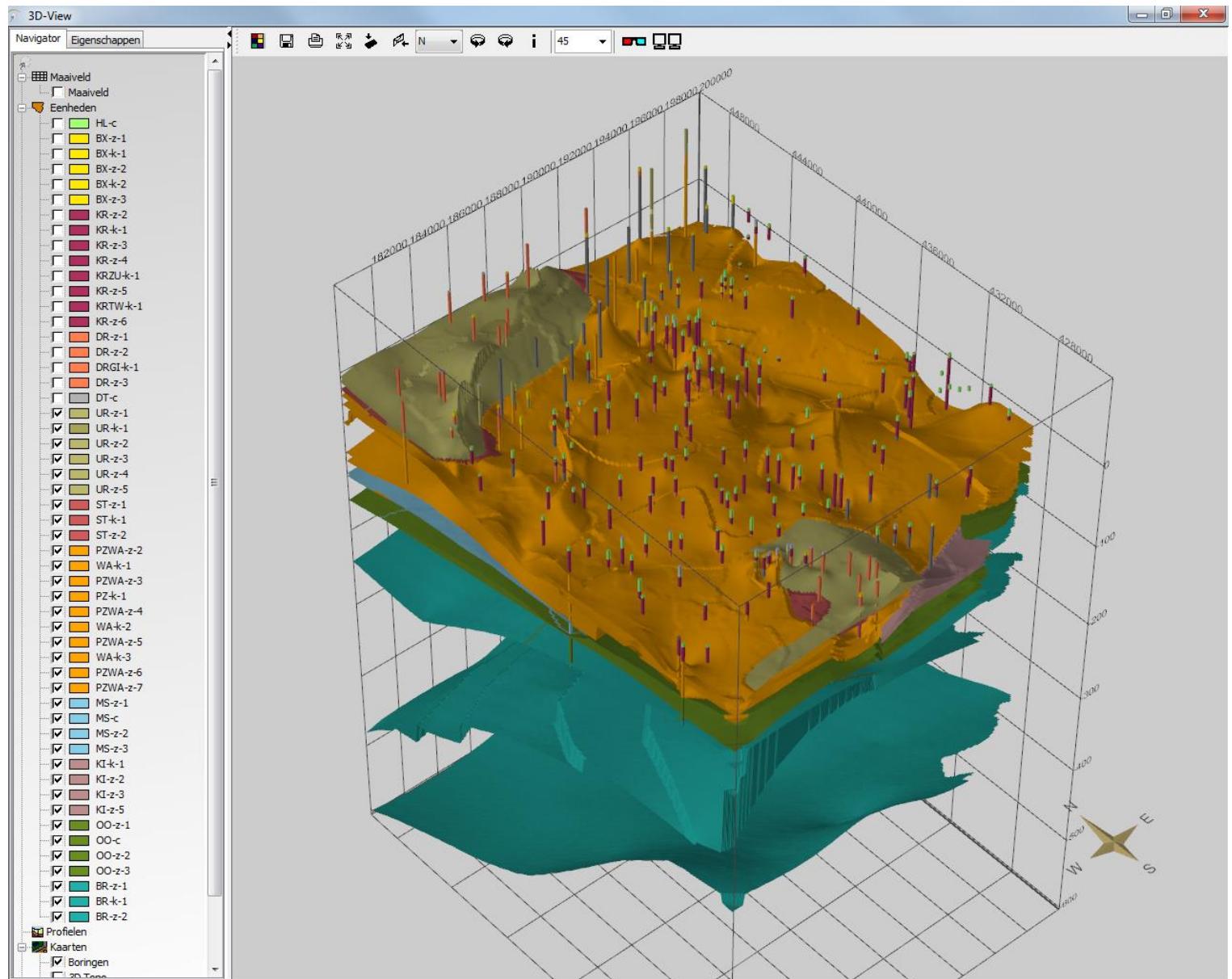


- › boreholes
- › layers



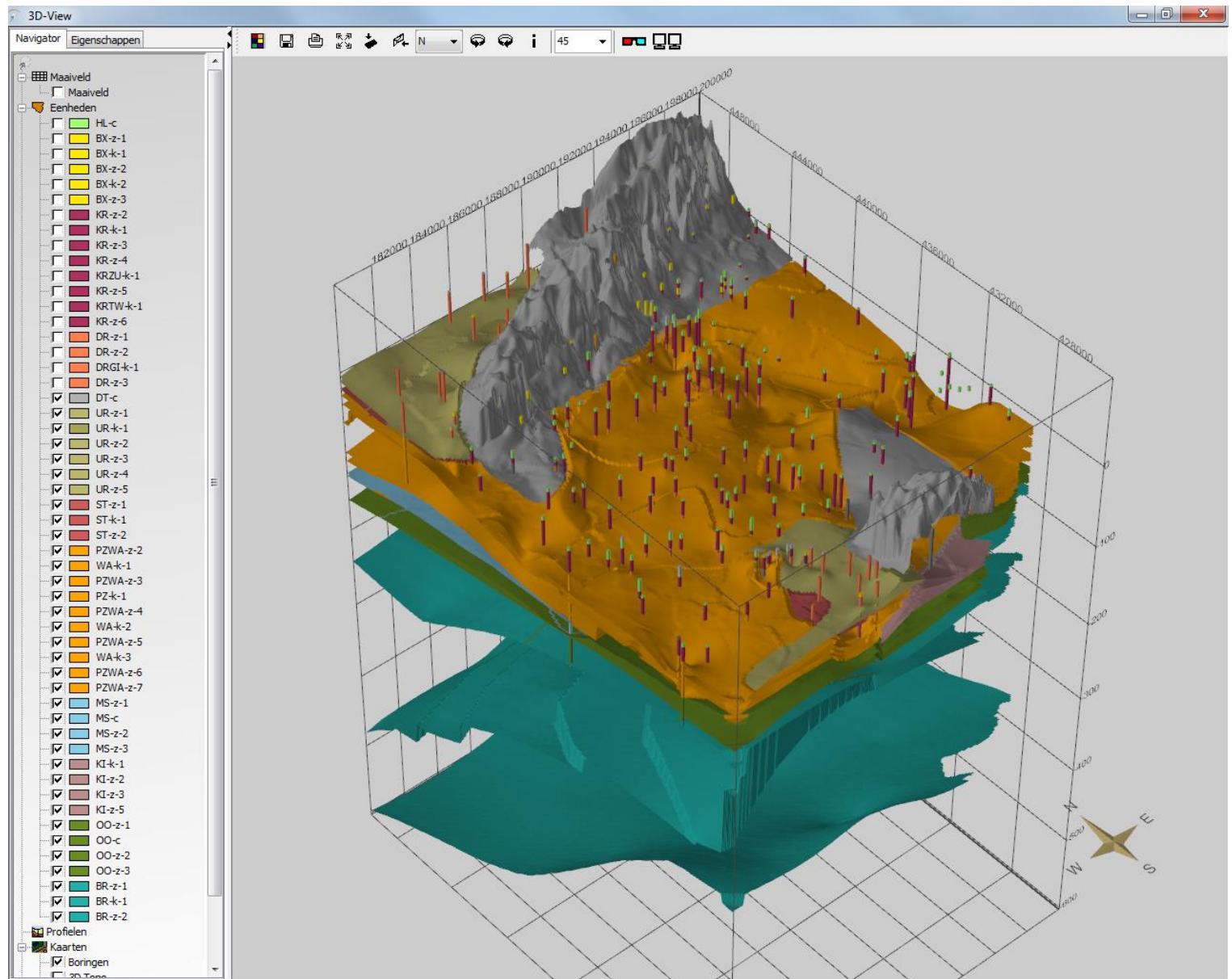


- › boreholes
- › layers



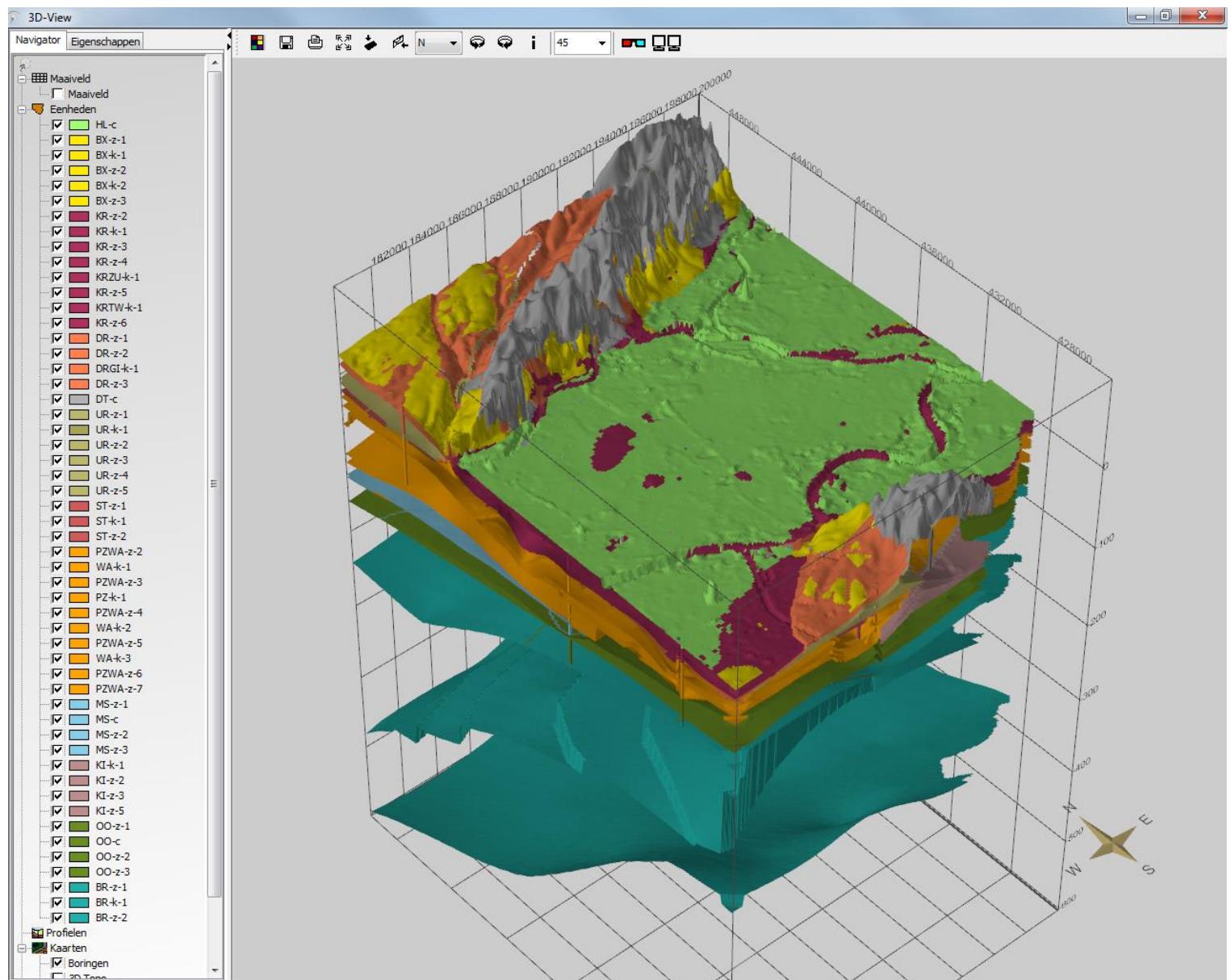


- › boreholes
- › layers



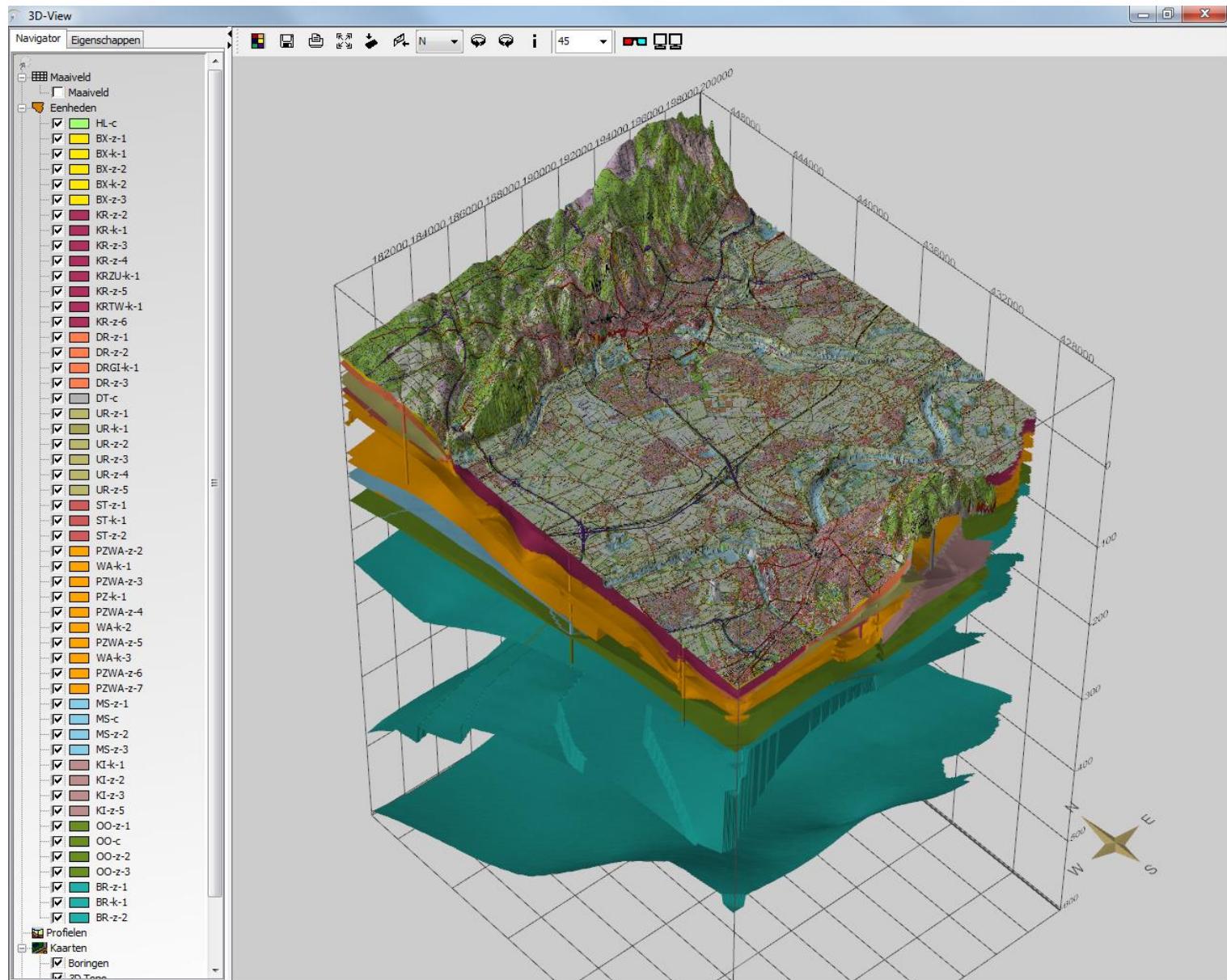


- › boreholes
- › layers



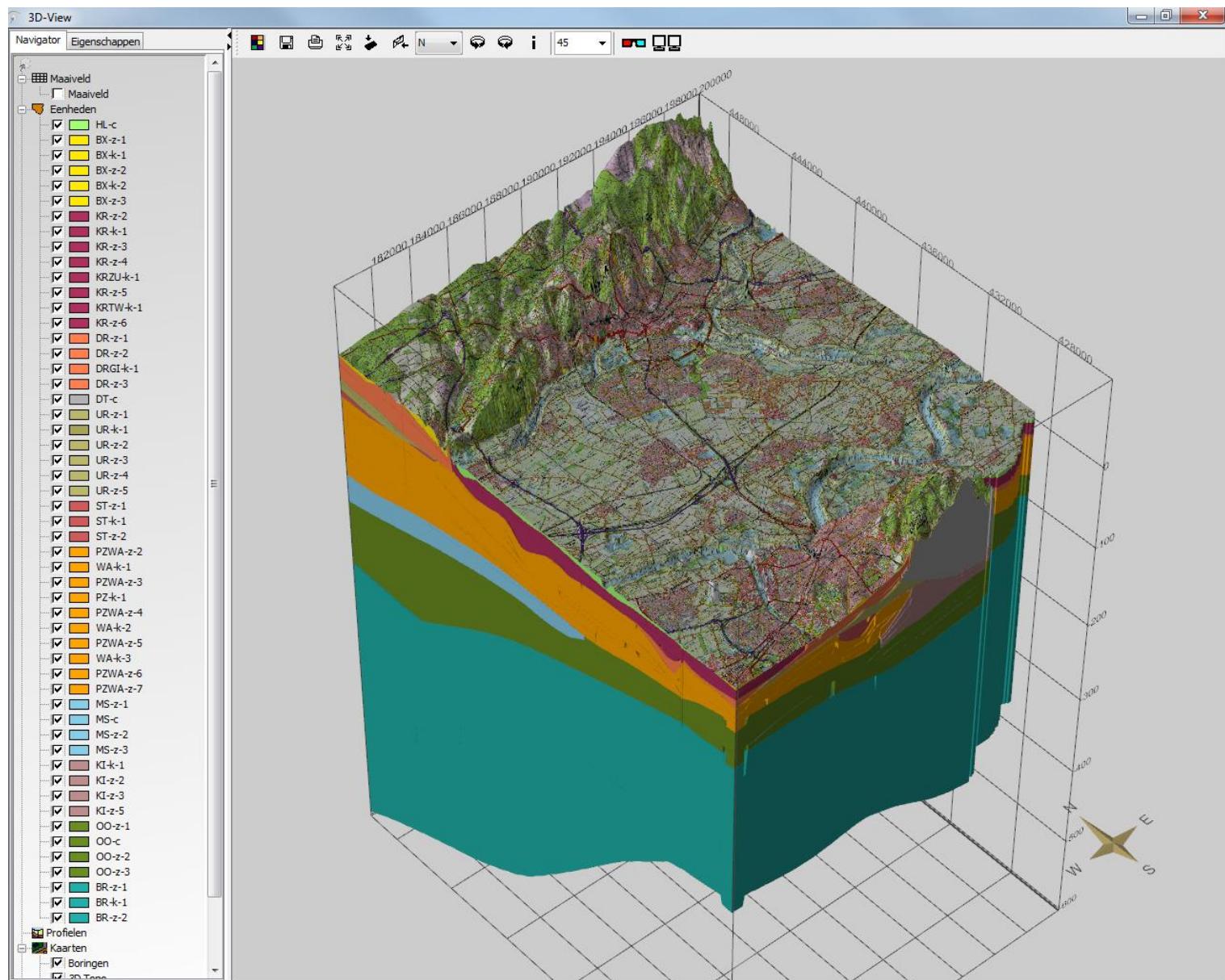


- › boreholes
- › layers
- › topography





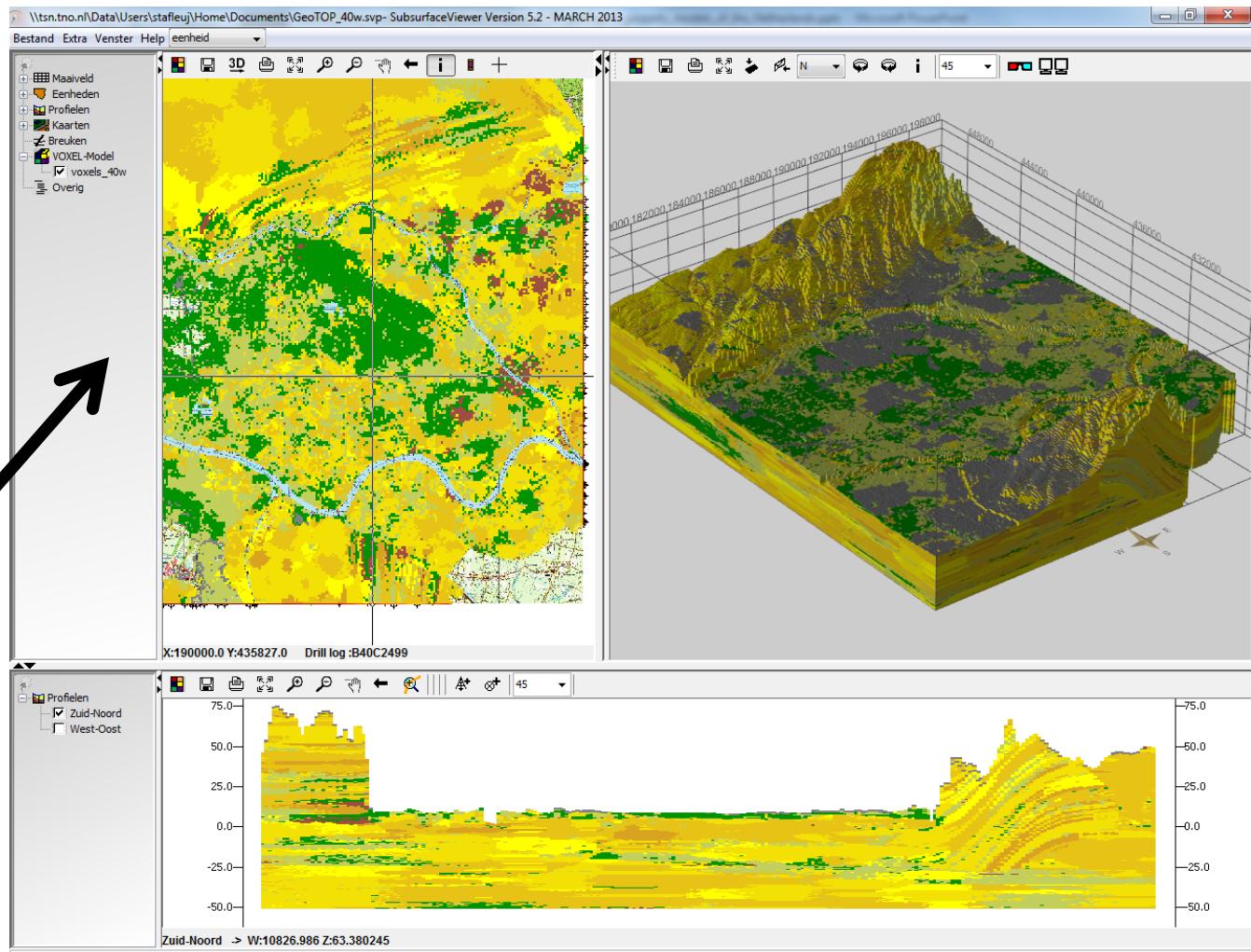
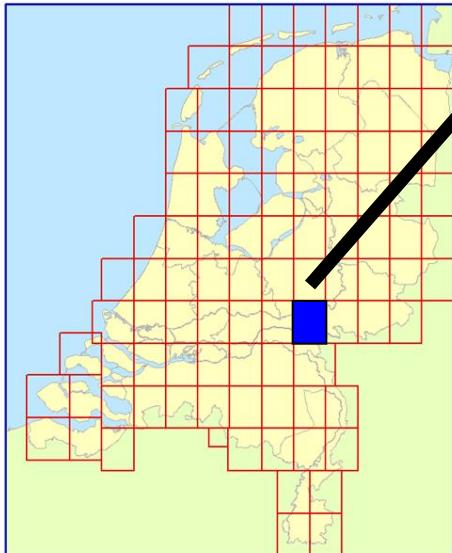
- › boreholes
- › layers
- › topography
- › closed model





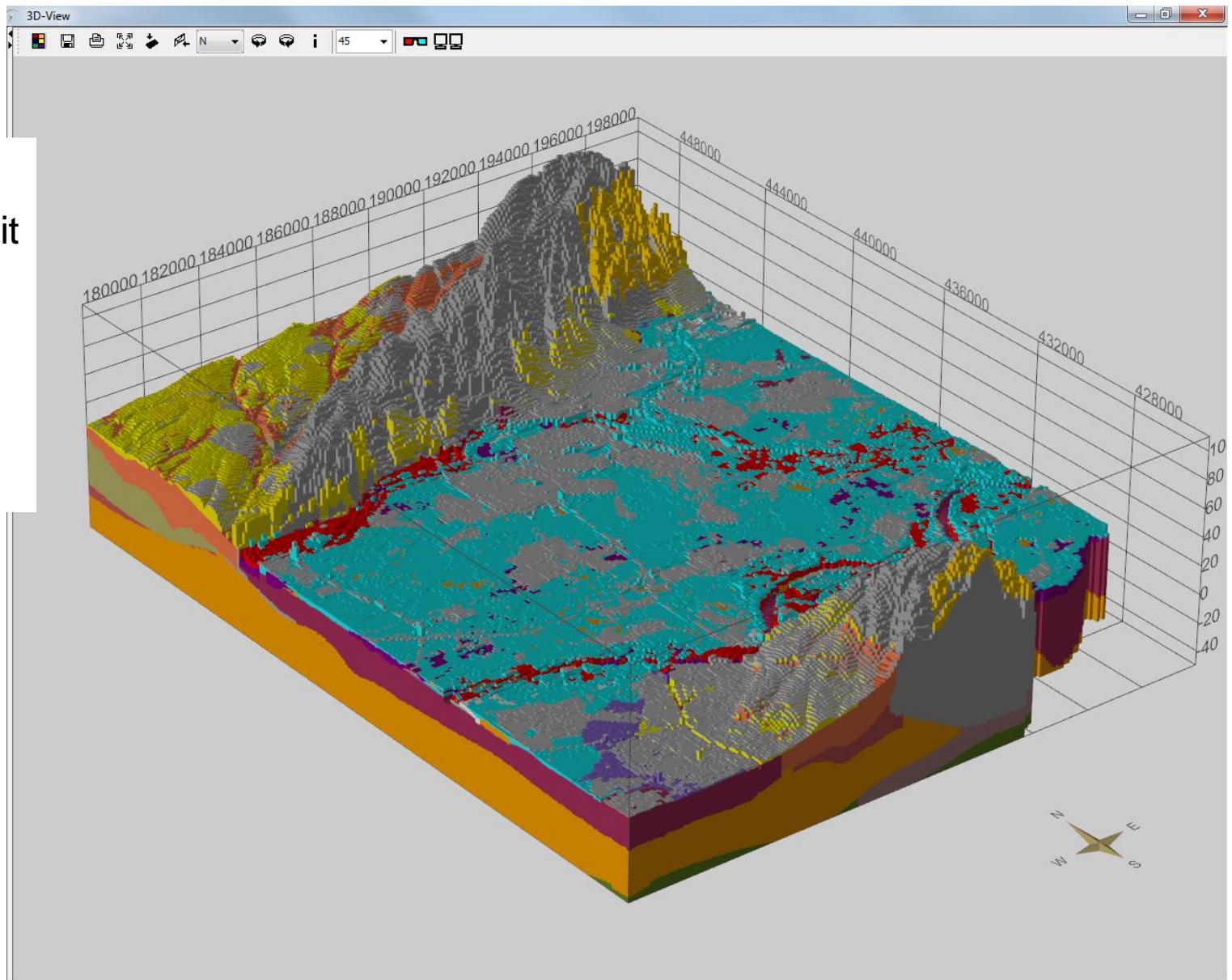
SubsurfaceViewer: voxel models in 3D

- › voxels with:
 - › geological unit
 - › lithology
 - › probabilities



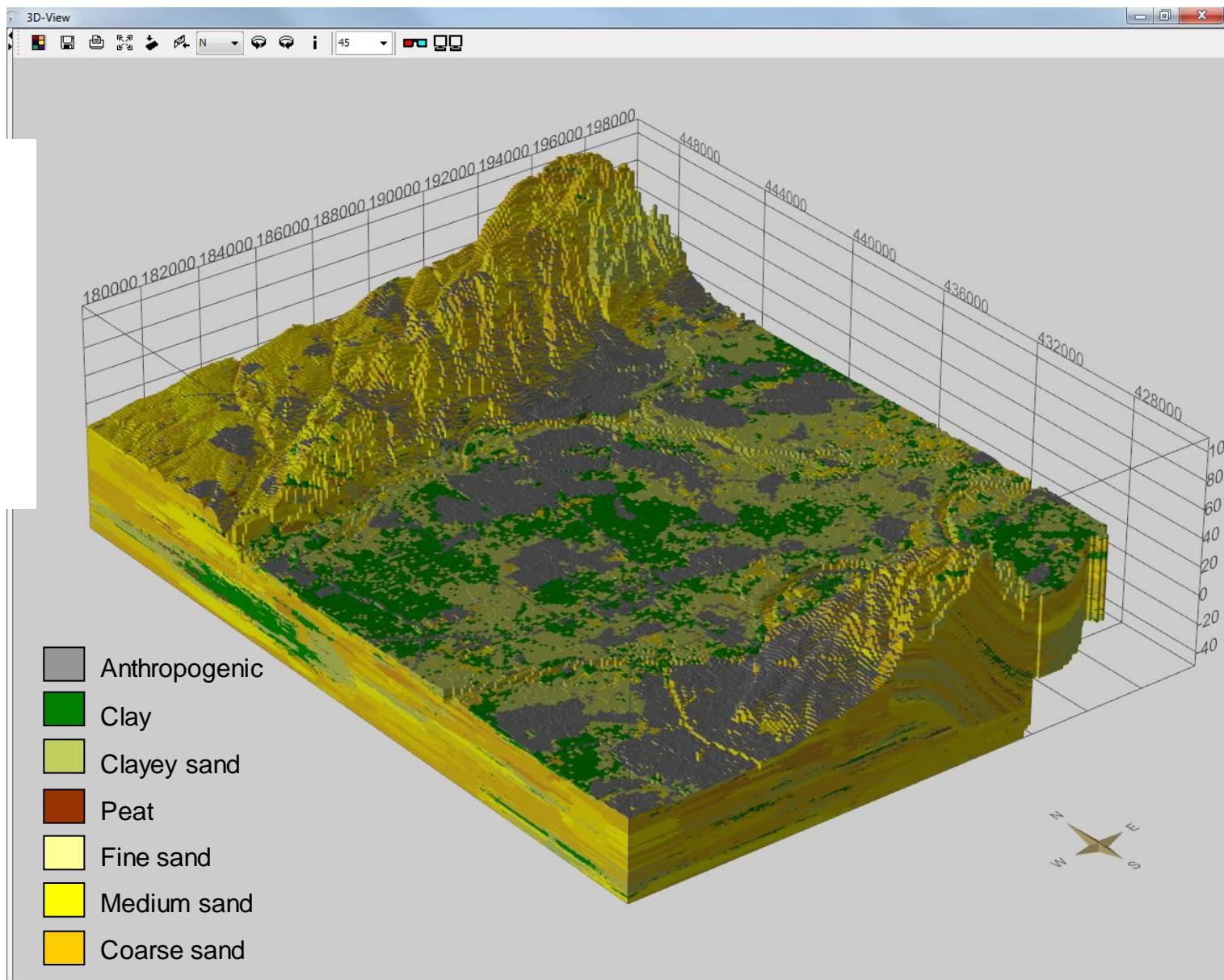


- › color:
geological unit
- › selection:
all voxels





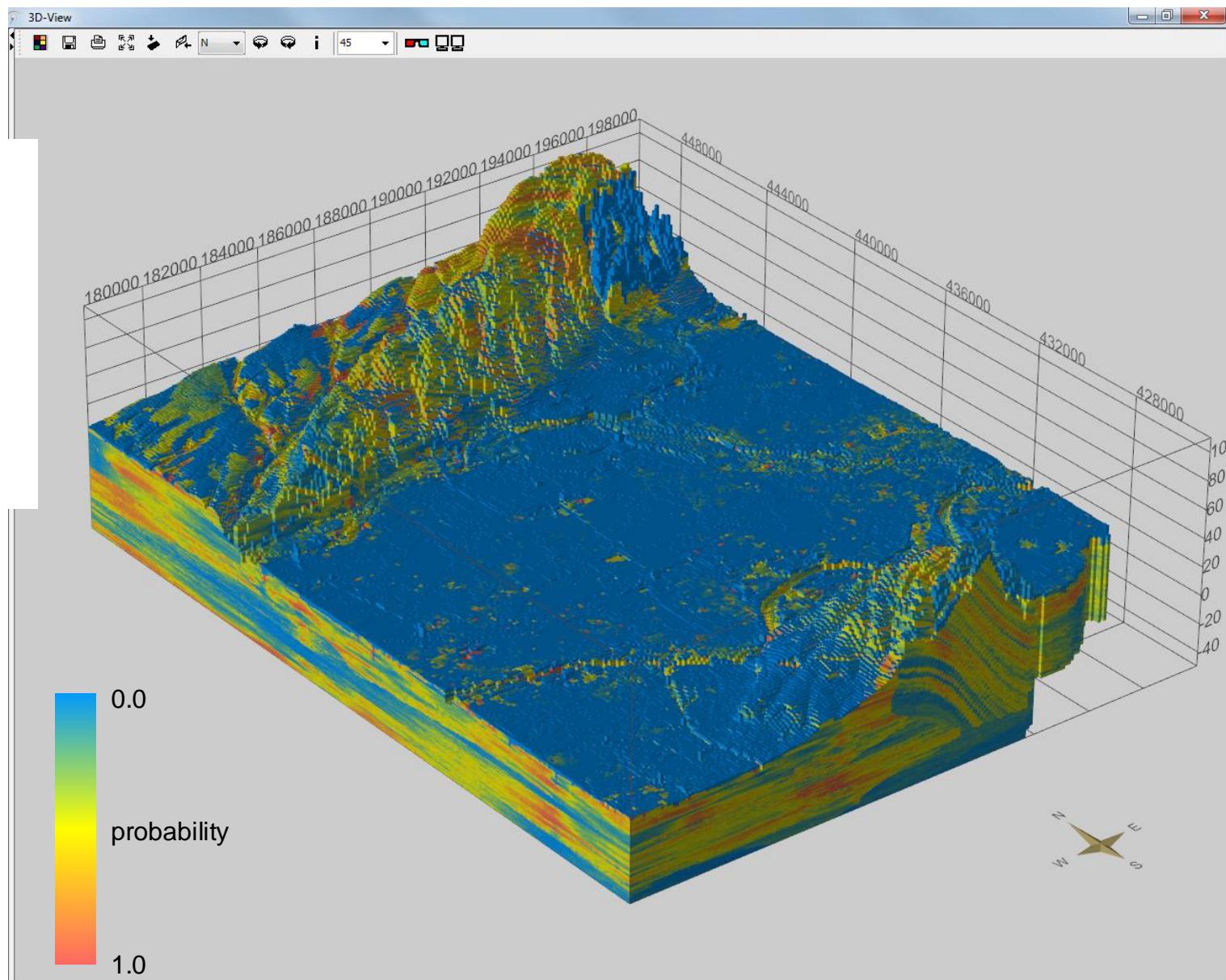
- › color:
lithology
(sand, clay,
peat)
- › selection:
all voxels





- › color:
probability of
coarse sand

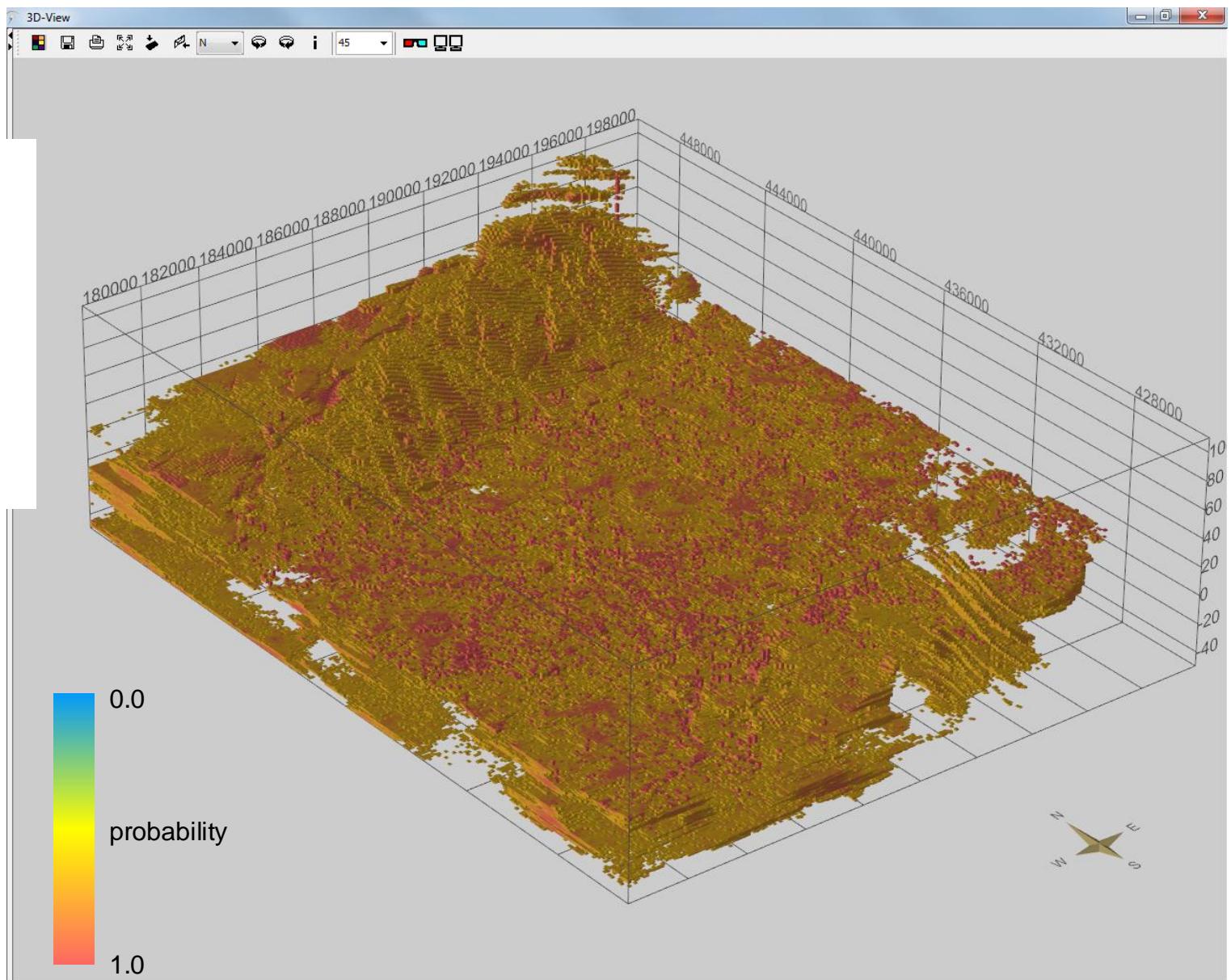
- › selection:
all voxels





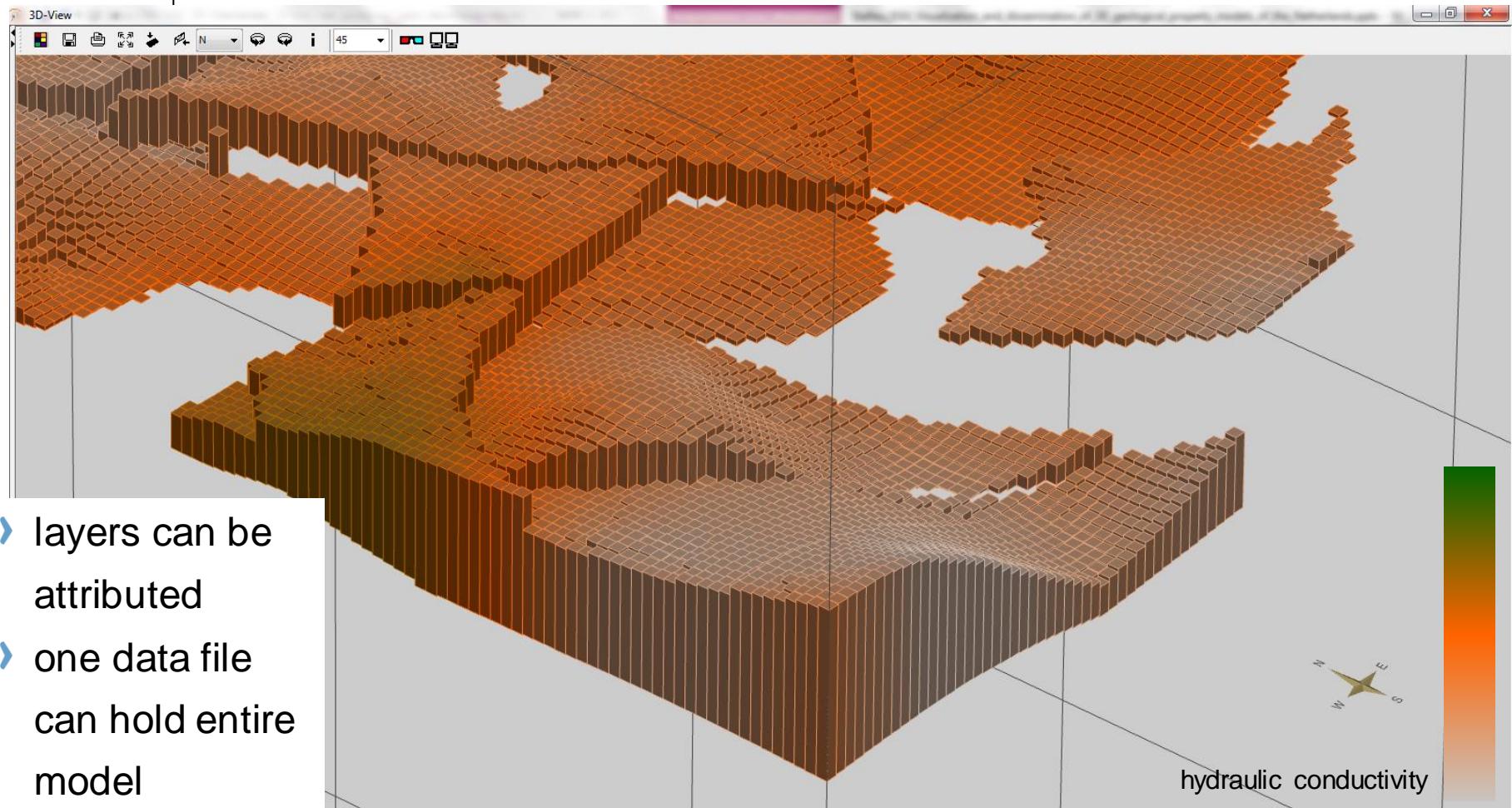
- › color:
probability of
coarse sand

- › selection:
 $P > 0.67$





Irregular voxels applied in layer-based models





Conclusions

- › Interactive web portal delivers maps and vertical cross-sections
- › SubsurfaceViewer offers full 3D visualization
- › Irregular voxels allow for efficient storage and attribution of layer-based models



Thank you for your attention

