# GEOLOGICAL 3D MODELLING IN URBAN AREAS – A WORKFLOW FOR UTILIZING LARGE GROUND INVESTIGATION DATASETS

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In recent years, Geological Survey of Finland (GTK) has developed different tools to convert and exploit geotechnical investigation datasets in different modelling platforms to enable local and regional scale bedrock surface and superficial deposits 3D modelling in urban areas. While working with third parties' (cities), it is often the case that large and heterogeneous datasets cannot be individually checked. For this reason, it has been essential to create workflows to harmonize, possible reclassify and simplify lithology according to purpose-built conceptual models.
In this presentation we are going to demonstrate the results of years of development work highlighting the latest achievements in the SEISMIC RISK -project. The project studies on how to mitigate induced seismic risk associated with deep geothermal power stations in the Helsinki capital region, Finland. In this project we have focused on generating harmonized large datasets of geological, geotechnical and crystalline bedrock structural properties of the subsurface environment for the capital region area and building a 3D geological model covering the continuous onshore-offshore area of the Helsinki capital region in total of 770 km2 (cities Helsinki, Espoo, Vantaa). In the project, significant attention has been put into the reliability of the geological models starting from bedrock surface topography modelling development by structural geology studies. Reducing the uncertainty of the bedrock surface modelling will lead on attaining reliable sediment properties and thicknesses.

One of the main aims of the 3D model deliverables is to be utilized as test platforms for assessing induced seismic risk in Helsinki capitol region. This will be tested with thematic 2D maps, that will be made based on subsurface sediment parameters and thicknesses (seismic classification) with multivariate analysis in GIS environment based on dense synthetic borehole generation from the numerical 3D data. The units' characteristics and boundaries were chosen for the possible inverted use of geotechnical purposes for city planners and other end-users.

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