

Geological Surveying and Investigation in 3D: 3D information systems for urban areas

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Systematic geological surveys in the past decades more or less excluded the subsurface of urban areas from the investigations, as information of the subsurface are limited and the geo-environment has often been largely modified by anthropogenic-landscaping since pre-historic times. Nevertheless is a detailed geo-scientific knowledge of the shallow and medium deep subsurface in highly populated areas essential for a sustainable urban management and strategic planning, in terms of e.g. revitalisation of contaminated (mega-)locations, groundwater protection, engineering conditions, unstable ground, mining resources, preservation of archaeological sites and brownfield regeneration. 2D geological and geographical information in urban areas is usually given in a wide variety of respective systematic maps and 3D information is restricted to borehole log descriptions taken and interpreted during individual drilling campaigns. These heterogeneous data collections are not a straightforward information pool for decision makers and other end-users, as they have to be re-interpreted by experts for each single purpose.

The GSI3D (Geological Surveying and Investigation in 3D) methodology and software-tool enables to integrate and visualise all available 2D and 3D geo-scientific data, as historical and thematic maps, archaeological records, drill-log information, geo-chemical and engineering numerical point data and geophysical measurements. The homogeneous data set is used to construct a consistent and detailed subsurface model of the geological setting and technogenic modifications.

The GSI3D methodology and software-tool enable the:

- management of geospatial data
- 3D mapping and modelling of the subsurface
- detailed visualisation and 3D stereo imaging of complex subsurface environments
- environmental monitoring and system analysis
- development of 3D information systems

Customised outputs of 3D subsurface information systems guarantee a time and cost efficient planning of future investigation campaigns and inform decision making and planning on necessary strategies, by providing easy to use analytical functions to explore even complex geological settings. Consequently, these urban geological 3D e information systems provide decision and planning support for the sustainable management of natural resources, as well as to protect and improve the natural and build environment.