



Quantification of anthropogenic impacts on groundwater level in urban territories

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Bridging a gap between need for preserving of unique historic European cities and requirement for modern infrastructure development in those cities is one of the major challenges for sustainability of urban areas. Hydrogeological aspects for cities sustainability and safety will be considered in this paper.

A lot of European cities are known for complicated ground conditions. Those ground conditions are presented by weak soils (e.g. water saturated unstable sandy silt with organic peat) and high ground water table. Typical ancient buildings foundations built on weak soils consist of wooden pails or logs and stones situated right on those logs. Wooden logs and pails of old foundations are very well preserved in anaerobic conditions formed by clean water and high groundwater level. Unfavourable impacts on those logs could be made by organic contaminants in the groundwater (e.g. leakages from sewers and infiltration of above-ground contaminants) and lowering of groundwater level. Aeration of the wooden logs leads to their biocorrosion and the foundation basing destruction which eventually leads to an uneven settlements of valuable historic buildings. Conduits and underground structures could also be affected by above described processes.

The paper will discuss an integrated evaluation program for assessment of causes and consequences of hydrogeological parameters variation for urban environments. An analytical quantitative method based on hierarchies structures implementation is used for the program. Some examples of assessment program usage in Hamburg and St.Petersburg will be given.