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REPORT

RISK ASSESSMENT FOR URBAN AREAS PRONE TO FLOODING AND SUBSIDENCE

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ABSTRACT

One of the goals for the JPI Water funded project INovations for eXtreme Climatic Events (INXCES) is to provide risk assessment tools for urban hydro-climatic events. Combining disciplines increases the capacity to manage and improve the mitigation of the infrastructure for stormwater in urban areas. INXCES is an European collaboration among the cites Bergen, NO, Groningen, NL, Bucharest, RO, and Luleå, SE.

In urban areas infrastructure, such as sewage and drainage systems, is installed in the subsurface to cope with surface water and stormwater runoff. However, the natural patterns are preferred hence human effort. A flood model using Digital Elevation Model (DEM) show the flow patterns of stormwater and areas exposed to flooding. Combining mapping of natural flow paths and flood modelling, areas prone to flooding is accentuated. The subsurface infrastructure in these prone areas are exposed to larger quantities of water during heavy rainfall events, which is becoming more frequent due to climate change. Results from this interdisciplinary study, will give the water and wastewater authority a risk assessment to pinpoint areas where water infrastructure is more exposed to failure, clogging and damages.

Furthermore, we argue that areas that are prone to repeated flooding are more exposed for subsidence in the ground. Larger movement in the ground will cause damage to the infrastructure, such as cracking of pipelines and damage to buildings, roads etc. By combining results mentioned above with subsidence data (InSAR date collected from Satellites), a risk assessment map can show areas to prioritize. Subsurface measures such as SUDS (Sustainable Urban Drainage Systems) can be a resilient solution to a recurrent problem in an urban area, as a remediation to flooding (and drought) and as stabilisation of ground conditions.

Keywords: Flood model; Subsidence; Natural flow path; Risk assessment; Flood resilience; INXCES