**Abstract**

National modelling seminar 28.11.2022 at 10:00-16:00

Aalto University, Otaniemi/Espoo (Dipoli’s Metso conference room)

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**Demonstrating the possibilities of high-detailed 3D point clouds for urban block hydrology applications**

Water sensitive urban design and modern rainwater management could potentially benefit from modern high-detailed 3D geoinformation. This applies especially on accurate laser scanning and photogrammetry measures that could be utilized for surface modeling in urban blocks. In the poster, we will demonstrate the possibilities of novel 3D mapping datasets for 3D modeling of built and natural surfaces within urban blocks. For this, we will evaluate the capabilities of both high-detailed terrestrial laser scanning (TLS) and unmanned aerial vehicle (UAV) photogrammetry-based 3D point clouds for visualizing urban blocks and compare the capabilities of highly detailed 3D point clouds with more traditional open citywide 3D datasets for this purpose. We collected precise 3D mapping data sets in Malminkartano area, Helsinki. Data sources included photogrammetric measurements from UAV imagery and terrestrial laser scanning (TLS) using Leica RTC360 scanner. In addition, an open airborne laser scanning dataset from the Helsinki Map Service was applied as an example of a typical city-level 3D data set. Results indicate that 3D point cloud data provides opportunities for hydrologic applications by providing accurate geometric data about built and natural surfaces within the urban block. The resolution, point density, geometric quality, measurement range and angle of 3D measurements play a key role in studying surface elevation differences and water runoff and surface water accumulation. The study shows that by using close-range measurement distances (UAV and TLS), it is possible to measure high details not feasible with the currently available typical open city-level 3D data. This opens various possibilities for different applications. Data acquisition can be further customized to meet the needs of modern rainwater management applications. Future research could apply 3D measuring with additional information such as land cover classification and permeability of the surface to better support the needs of hydrological modeling.