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## **PONDS DELINEATION IN VARIOUS URBAN LANDFORMS. CASE STUDY FOR CLUJ-NAPOCA, ROMANIA**

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### **Abstract**

Urbanization and industrialization have led to the increase in impervious surfaces, the reduction of water seepage into soil and the increase of runoff discharges in urban areas. The overland flow may be carried over long distances along the streets and sidewalks depending on the land slope and morphology, while in lowland, water tends to accumulate in ponds. In this research, we aim to identify these ponds in the floodplain, slope and urbanized interfluves in Cluj-Napoca. The ponds outline the locations that are most prone to urban floods. The preferential flowpathways were identified based on the flow direction and flow accumulation determined using the D8 method, while the ponds were automatically extracted using an algorithm developed based on the Contour Polygon Screening method. Based on four digital elevation models (DEM) of different resolutions (DEM 5 m, DEM 20 m, ASTER DEM 30 m and STRM 90 m) and one Digital Surface Model (DSM) incorporating urban buildings, we highlighted the effect of the spatial resolution and buildings on the water flow delineation in urban areas. Our results revealed an increase in the number of flow pathways and ponds with the increase in DEM resolution and a more realistic outline of flow pathways and ponds delineated based on the DSM. In the urbanized floodplain, the ponds have distinctive features, while on the urbanized slope and interfluves these are temporary. The identification of ponds in a varied and urbanized relief provides useful information to support local authorities in the overland flow management and flash flooding in urban areas.

*Key words:* Digital Surface Model, flowpathways, ponds, various urban landforms

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