# Analysis of water accumulation in urban street based on DEM generated from LiDAR data

Chengcai Zhang[a], He Huang[a], Ying Li[b,c],*

[a]School of Water Conservancy and Environment, Zhengzhou University, Zhengzhou 450001, China,
Tel. +86 0371-67781852; emails: zhangcc2000@163.com (C. Zhang), 553223347@qq.com (H. Huang)
[b]CMA·Henan Key Laboratory of Agrometeorological Support and Applied Technique, Zhengzhou 450003, China,
Tel. +86 0371-65963596; email: walnutclip@163.com (Y. Li)
[c]Henan Institute of Meteorological Sciences, Zhengzhou 450003, China

**ABSTRACT**

Aiming at the problem of submergence analysis in microscale scene of urban street, this paper takes an inundate area in Zhengzhou city as an example, the high-precision digital elevation model (DEM) of urban street inundate area is constructed from light detection and ranging (LiDAR) for land vehicles, and the overflow quantity of the waterlogged point is stimulated by the storm water model in Zhengzhou. The submerged area is computed by seed spread algorithm, and the submerged depth distribution is acquired by using the method of dichotomy to realize rapid approximation between submerged water level and overflow quantity. The application of the example shows that the stimulation results of urban storm water model can be quickly and accurately converted to corresponding submerged features by the suggested submergence analysis methods, which are based on the high-precision DEM constructed from LiDAR data. The submergence analysis methods satisfy computational efficiency and precision, which are suitable for water accumulation stimulation in inundate area of urban street.

*Keywords:* Submergence analysis; Vehicle-borne LiDAR; High-precision DEM; Storm water model; Urban water accumulation