

## **Parameter estimation of IDF models in urban flood-control planning and design**

**BAOHONG LU<sup>1</sup>, SU DAI<sup>2</sup>, TINGTING SUN<sup>1</sup>, XIANGLIN ZHOU<sup>1</sup> & YEYOU-KOUNG TUNG<sup>3</sup>**

*1 State Key Laboratory of Hydrology, Water Resources and Hydraulic Engineering, Hohai Univ., Nanjing 210098, China  
lubaohong@126.com; lubaohong@hotmail.com*

*2 Flood-control Division, Taihu Basin Authority of MWR, Shanghai 200434, China*

*3 Department of Civil Engineering, Hong Kong University of Science & Technology, Kowloon, Hong Kong, China*

**Abstract** Intensity–duration–frequency (IDF) models have been extensively used in urban flood-control planning and design. The choice of a suitable model for the proper data range and accurate estimation of the model parameters are essential for sound design. Because IDF models involve return periods, they are probabilistic models. It was found that an inherent lower bound exists for any IDF model. To overcome these shortcomings, a new approach is proposed by which observed annual maximum rainfall data are directly utilized in conjunction with several commonly-used goodness-of-fit criteria for estimating the IDF model parameters. Numerical results indicate that the proposed approach produces a far better fit than the conventional approach, and the optimal parameters obtained from the conventional approach without considering the lower bound constraint could result in negative probability for some observed data. Furthermore, satisfactory result can be achieved in a piece-wise fashion because the rainfall quantity and return period have a nearly linear relationship in log-log space.

**Key words** IDF model; conventional approach; proposed approach

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