

## High-Resolution Flood Hazard Mapping Using Two-Dimensional Hydrodynamic Model Anuga: Case Study of Jakarta, Indonesia

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**Abstract :** Catastrophe risk management can only be done if we are able to calculate the exposed risks. Jakarta is an important city economically, socially, and politically and in the same time exposed to severe floods. On the other hand, flood risk calculation is still very limited in the area. This study has calculated the risk of flooding for Jakarta using 2-Dimensional Model ANUGA. 2-Dimensional model ANUGA and 1-Dimensional Model HEC-RAS are used to calculate the risk of flooding from 13 major rivers in Jakarta. ANUGA can simulate physical and dynamical processes between the streamflow against river geometry and land cover to produce a 1-meter resolution inundation map. The value of streamflow as an input for the model obtained from hydrological analysis on rainfall data using hydrologic model HEC-HMS. The probabilistic streamflow derived from probabilistic rainfall using statistical distribution Log-Pearson III, Normal and Gumbel, through compatibility test using Chi Square and Smirnov-Kolmogorov. Flood event on 2007 is used as a comparison to evaluate the accuracy of model output. Property damage estimations were calculated based on flood depth for 1, 5, 10, 25, 50, and 100 years return period against housing value data from the BPS-Statistics Indonesia, Centre for Research and Development of Housing and Settlements, Ministry of Public Work Indonesia. The vulnerability factor was derived from flood insurance claim. Jakarta's flood loss estimation for the return period of 1, 5, 10, 25, 50, and 100 years, respectively are Rp 1.30 t; Rp 16.18 t; Rp 16.85 t; Rp 21.21 t; Rp 24.32 t; and Rp 24.67 t of the total value of building Rp 434.43 t.

**Keywords :** 2D hydrodynamic model, ANUGA, flood, flood modeling

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