

EGU22-10940

<https://doi.org/10.5194/egusphere-egu22-10940>

EGU General Assembly 2022

© Author(s) 2022. This work is distributed under the Creative Commons Attribution 4.0 License.



An Improved Micro Scale Average Annual Flood Loss Implementation Approach

Md Adilur Rahim, Ehab S Gnan, Carol J Friedland, Rubayet Bin Mostafiz, and Robert V Rohli
Louisiana State University, Baton Rouge, United States

Average annual loss (AAL) is used as the basis for the evaluation of risk mitigation measures. However, the current AAL implementations in flood risk assessment have several shortcomings. For instance, results generated using Riemann trapezoids for the available return periods of a site are typically gross approximations, especially when damage changes rapidly with depth. Monte Carlo simulations offer improvements in precision but at the expense of being computationally intensive. The log-linear method that extrapolates losses to higher return periods and performs piece-wise Riemann sum with these limited return periods can fail to capture the non-linear flood behavior. This paper presents an improved implementation that quantifies AAL at the micro-scale level including the full range of loss-exceedance probabilities. To demonstrate the methodology, the financial benefit of increasing the lowest floor elevation for a one-story single-family residence is assessed. Several depth-damage functions (DDFs) are selected and compared to examine the variability in AAL results related to the DDF choice. Results demonstrate the need for an AAL estimate that includes the full loss-exceedance probabilities. Results also highlight the need to assess flood risk at the micro-scale level for a more localized and accurate assessment, whereupon the estimate can be expanded to broader-scale risk estimations with a higher degree of accuracy. The more realistic AAL estimates results could encourage homeowners and communities to take action and support government decision-makers by investing in flood mitigation and considering building code changes.