

EGU2020-9253

<https://doi.org/10.5194/egusphere-egu2020-9253>

EGU General Assembly 2020

© Author(s) 2021. This work is distributed under the Creative Commons Attribution 4.0 License.



Correlating surface water flood damages in three Indonesia cities

Matthew Farnham, Vivian Camacho-Suarez, Alistair Milne, **John Hillier**, Dapeng Yu, Louise Slater, Laura Whyte, and Avinoam Baruch

Previsico, United Kingdom of Great Britain and Northern Ireland (matthew.farnham@previsico.com)

Despite a high growth rate of over 5%, the insurance penetration rate in Indonesia is low, at roughly 2.77 percent and is one of the least developed insurance market among ASEAN economies. A primary explanation for the lack of motivation for taking up insurance is due to the lack of understanding of the multitude of risks from natural hazards the Indonesian market faces, principally of flooding. The purpose of this research is to assess the flood correlation between three of the major cities (Jakarta, Semarang, and Solo) on the island of Java. These highly populated and financial centres of Indonesia are most prone to the rainfall extremes during the Monsoon Season (November – March), many of which causes flooding. All the historical rainfall events were extracted from ECMWF's ERA-5 hourly rainfall dataset (1979 – 2018). The top 10 events for each city were selected based on peak rainfall intensity. For the selected events in a city, rainfall records of the same period were extracted for the other two cities. This results in 30 simulations per city. Using a 2D hydraulic modelling tool (FloodMap), surface water flood footprints were generated for the events. In the absence of depth-damage curves, the number of buildings flooded under each event were used as an approximation to building damages. Damage to buildings due to surface water flooding in Solo and Semarang were found to be most correlated, with a significant number of buildings flooded in both cities in 15 out of the 20 paired events. Solo and Jakarta show some correlation (7 out of 20) whilst flooding in Semarang and Jakarta are least correlated (4 out of 20). This study is an initial analysis relevant to the modelling of catastrophes in a relatively data sparse environment, providing an approximation of the correlation of flooding between three Indonesian cities. Further studies are required to develop pragmatic approaches to complement catastrophe modelling that integrate the spatial correlation between flood damages in cities.