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Flooding Under Climate Change in Small Island Developing States

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Small Island Developing States are a group of 57 island nations and territories which are some of the most at-risk places to the impacts of climate change globally, particularly from changes in hydrometeorological hazards such as flooding. Despite this, little research has quantified present day flood hazard and population exposure in small islands, let alone how this may change as global temperatures continue to rise. Until now, this was due to the insufficient data to produce high-resolution flood hazard and population exposure estimates for a wide range of possible scenarios at such a large scale. Following the release of Fathom's Global Flood Model 3.0, in this work we combine global flood hazard estimates for coastal, fluvial, and pluvial flood hazard at ~30m flood model resolution to estimate present day population exposure to flooding across all 57 small islands. We also investigate how flood hazard and population exposure changes under three climate scenarios: two plausible climate change scenarios (SSP1-2.6 and SSP2-4.5), and a plausible worst-case climate scenario (SSP5-8.5). We assess how present day flood hazard and exposure differs across the island typologies, and how these are projected to change under the different climate change scenarios. We also compare population exposure with vulnerability metrics to explore how population exposure to flooding and vulnerability interact. The results of this analysis aim to improve understanding regarding the range of plausible estimates of current and future population exposure to flooding in Small Island Developing States. These results will help inform adaptation to more extreme flood risk in Small Island Developing States under current and future climate change.