



How urbanization increased exposure to coastal flood risk in the Pacific Islands: A case study of the Republic of Palau

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Coastal flooding occurring in Oceania is often attributed directly to Climate Change-induced sea level rise. This overlooks how post-World War II urbanization, intranational migrations to urban centers, expanded development next to coastlines increasing risk to coastal flooding. This research seeks to determine how urbanization contributes to coastal flooding in the Pacific and show different ways those nations can adapt to future sea level rise.

Tracking urbanization in Pacific Islands is difficult because few maps of pre-urbanized conditions are available. Using the Republic of Palau as a case study, maps created by the Japanese government before World War II and by the US after World War II were digitized through GIS and compiled with recent data collected by Palau to track urbanization. This was compared with tide gauge data to quantify the risk of coastal flooding due to urbanization and separately, sea level rise. Additionally, the actual impact on households living next to the coast was investigated through questionnaire surveys collected in the urban center.

Spatial data illustrated clear expansion towards the coastline while tide gauge data revealed a 3mm increase in average high tides per year. The difference between buildings at risk from present and previous sea levels was less than 1%. Questionnaire surveys showed that of households bordering the coastline, Palauans from the urban center experienced 6% less flooding than Palauans who migrated after the war.

These findings suggest that population growth in the urban center likely increased the exposure to chronic coastal flooding. Action is even more necessary as future sea level rise magnifies the risk of coastal flooding. This relationship highlights the diversity of potential pathways for Pacific nations to minimize their exposure to hazards exasperated by Climate Change.

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