

Comparative damage assessment for storms, tsunamis and sea level rise in Sydney

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In Australia most of the built environment is located along the coastal fringe. These assets are exposed to the effects of extreme inundation and erosion, which will become more severe in the future due to sea level rise. Extreme coastal inundation in Australia is generally associated with cyclones or storm surges, a prominent example of which was the 2007 “Pasha Bulker” storm in Newcastle. However, being surrounded by active subduction zones, Australia is also exposed to a significant risk from Tsunami.

As part of the multi-awarded project COVERMAR (*CO*astal *VulnER*ability to *M*ultiple *inundA*tion *souR*ces), Dall’Osso et al (2014) undertook the first Australian probabilistic multi-hazard study comparing storm surges and tsunami. Results showed that in Botany Bay (Sydney) for the same probability events (i.e. 1 in 100), the number of buildings exposed to storm surges was much greater than that to tsunamis.

This paper builds upon Dall’Osso et al (2014) and provides a building by building inundation damage assessment, comparing the direct damage from same-probability storm surges and tsunami under present and future sea level conditions. Results show that even if storm surges would affect many more buildings, total damage estimates are similar. This has profound implications for coastal risk management in Australia, where in most instances there is a legal obligation for councils to plan for storm surges, but not for tsunami. Results also show an exponential relationship between damage and sea level rise, highlighting the need of consistent sea level rise planning benchmarks.

References:

Dall’Osso, F., Dominey-Howes, D., Moore, C., Summerhayes, S., & Withycombe, G. (2014). The exposure of Sydney (Australia) to earthquake-generated tsunamis, storms and sea level rise: a probabilistic multi-hazard approach. Scientific reports, 4.