



Investigating records of recent storms on a volcanioclastic barrier system in Bicol, Philippines.

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Typhoon Durian in November 2006 was most notable for a series of devastating lahars that buried communities at the base of Mayon volcano in Bicol, Philippines. Typhoon Durian delivered extreme rainfall that remobilized volcanic debris that caused more than ~1,200 deaths and extensive property damage. Although not as deadly as the lahar, Typhoon Durian also generated a storm surge that caused localized dune breaching on Malinao barrier sand spit in Lagonoy Gulf. In the absence of instrumental data of the storm surge, we used the geomorphological and sedimentary imprints including erosion scarps, washover fans and terraces to infer the inundation heights on the barrier spit. The surface elevations of washover fans, terraces and relic dunes indicate inundation heights above 1.5 m but not exceeding 3 m. Typhoon Durian's overwash deposit is characterized by typical washover fan stratigraphy, and exhibits horizontal to sub-horizontal lamination on the front to mid-fan and foreset stratification near the fan terminus. Sub-surface stratigraphy using shore-normal ground penetrating radar (GPR) imaging reveals at least two buried erosional surfaces farther inland from the erosional surface of Typhoon Durian. Similar to Durian, the older erosional surfaces were probably sustained from previous typhoons. We infer that episodic erosional events most likely have repeatedly disrupted the prograding development of the Malinao barrier spit. Typhoon Durian highlights the exposure of volcanic landscapes to multiple hazards from cyclone landfall.