

RE-MAPPING THE 2004 BOXING DAY TSUNAMI INUNDATION IN THE BANDA ACEH REGION WITH ATTENTION TO PROBABLE SEA LEVEL RISE

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ABSTRACT

The Great Sumatra-Andaman Earthquake on December 26, 2004 generated tsunami waves that were felt all over the world. Some of the greatest effects of this tsunami were felt in the Banda Aceh region of northern Sumatra, where wave heights reached between 9 and 34 meters. The colossal devastation was due in part to the low-lying nature of the area, which meant the tsunami inundated 3-4 kilometers inland, obliterating over 80% of the city of Banda Aceh. Furthermore, the region's proximity to the Sumatra-Andaman fault meant that the tsunami came only 15-30 minutes after the initial earthquake, leaving little time for warning. As a result, the death toll in Banda Aceh is estimated to be over 125,000, which is over half the pre-tsunami population. Because the entire fault did not rupture in 2004, however, seismologists project that the Sumatra-Andaman fault will rupture again, putting the Banda Aceh region in danger of another tsunami.

Looking at inundation maps from the 2004 tsunami is one method of understanding how a future tsunami might affect Sumatra, but these projections do not include how changes in sea level will affect future inundation. Climate change and subsidence from earthquakes are factors that will increase sea level in the Banda Aceh region, which will ultimately affect the extent of tsunami inundation in this area. Similarly, the time a tsunami hits this area relative to the 1-meter tide cycle will affect the inundation. Using google earth images from after the tsunami, topographic maps, and field work, this project re-maps the existing inundation maps from the 2004 tsunami in the Banda Aceh region assuming higher sea level than in 2004. We find that changes in sea level on the scale of 1 to 3 meters has the potential to cause inundation paths that go 400 meters to 1.2 kilometers farther than those experienced in 2004.

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