



Indonesia's major earthquake last year tilted Nias Island like a seesaw, disrupting villagers' lives and pointing to future dangers

The Day the Land Tipped Over

NIAS, INDONESIA—Jolted awake late in the night of 28 March 2005, Ahmad Chatib staggered outdoors to find fissures in the ground snaking from the beach up to his wooden house. He and others in Tagaulei, a seaside village on Nias Island off Sumatra's west coast, didn't hesitate. "We took our children and ran," says Chatib, a former village head. Fresh in memory was the tsunami that 3 months earlier had claimed more than 160,000 lives in Sumatra's Aceh Province, 500 kilometers to the north. Of Tagaulei's couple of hundred residents, all but four—two mothers with infants who moved too slowly—escaped. Within an hour, most homes had been swallowed by the sea.

It wasn't a tsunami that wiped Tagaulei off the map but subsidence caused by a rupture of the Sunda megathrust, the subduction zone that parallels Sumatra's west coast, 25 kilometers below the village. The great 2005 Nias-Simeulue fault break, which generated an earthquake with a magnitude of 8.7, instantly

yanked down Nias's southeast shore some 30 centimeters. The earthquake's sustained shaking then made vast stretches of beach liquefy and spread, lowering the coast by another meter or more in places and leading to the inundation of buildings during high tide. Erosion since the quake has erased most vestiges of the once-picturesque village. On

Nias and nearby islands, "places with minor subsidence are being massively rearranged," says Richard Briggs, a geologist at the California Institute of Technology in Pasadena and member of a Caltech-Indonesian Institute of Sciences (LIPI) team that has spent a decade probing the region's tectonics.

While the quake lowered southeast Nias, it lifted parts of the island's northwest coast nearly 3 meters, thrusting coral reefs into the air and extending the shoreline by hundreds of meters in places. Although such upheavals go hand in hand with a major earthquake of this kind, the Caltech-LIPI team, led by paleoseismologist Kerry Sieh, has used painstaking geodetic measurements to put together one of the finest-grained maps of seismic deformation. The portrait of Nias reveals in unprecedented detail how subsidence and uplift can utterly remake a landscape. "The ecological changes are profound," Briggs says.

The severe warping of Nias offers an unsettling preview of what may await central Sumatra's

Out of their depth. Near Lahewa, algae clinging to an uplifted reef mark the extent of high tide.



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