

# Tsunamis on Bonaire?

Coastal hazards are increasingly discussed by researchers and feared by inhabitants of coastal areas worldwide. When I first heard about Bonaire a couple of years ago, I learned that the island lies outside the Caribbean hurricane belt and only rarely experiences heavy wave damage. When I came here last time in January 2009, the damaging effects of Hurricane Omar (October 2008) were still visible at Kaya J.N.E. Craane. Moreover, this tropical cyclone joins a surprisingly high number of events in the last decade (think of Lenny in 1999, Ivan in 2004, Emily in 2005, or Felix in 2007) showing that hurricane-induced wave action indeed plays a role for the community and coastal infrastructure of Bonaire. But is this the only coastal hazard Bonaire (and the entire southern Caribbean) has to cope with?

Since the end of the 1990s, Anja Scheffers, a geographer now working at Southern Cross University in Australia, established the idea that the huge boulders on top of the cliff at Washikemba, Spelonk, Boka Olivia or Boka Onima might have been transported onshore by tsunamis in prehistorical times. Tsunamis are huge, long waves triggered by earthquakes, landslides or volcanic eruptions in the sea. Their potential destructiveness largely exceeds the one of storm waves which has strikingly been demonstrated by the Indian Ocean Tsunami in 2004.

Pros for the tsunami hypothesis on Bonaire: All triggering mechanisms described above occur in the Caribbean. Even tsunamis generated in the open Atlantic Ocean may reach the ABC Islands; historical accounts throughout the Caribbean comprise 53 reliable tsunamis within the last 500 years; boulder volumes found at Spelonk have rarely been observed to be moved by storm waves. However, the tsunami hypothesis on Bonaire has recently been challenged by several researchers.

Due to these discussions, Anja and colleagues from the University of Cologne (Germany) initiated a new research project in 2008 which also includes the exploration of tsunami overwash deposits in the bokas of Bonaire. Tsunamis also transport sand, coral rubble, and sea shells into the shallow salinas. If "normal" mud and salt covers these



Max Engel and Timo Willershaeuser drilling

deposits afterwards, the tsunami event is archived. Even after several thousands of years, the event may be detected and its age may be reconstructed using radiometric dating techniques. As the PhD student within this project, I conduct drillings to explore the sediment layers of the salinas of Bonaire in search of these tsunami deposits of sand and shells. So far, we found potential tsunami overwash sediments in a depth of several metres far inland at Lagun, Playa Grandi, Boka Bartol, Wayaka, Funchi, Saliña Tam, and Klein Bonaire, supporting Anja's initial hypothesis. The sediment layers seem to represent three major tsunamis around 3300, 2000 and 600(?) years ago.

So far, our research indicates that tsunamis are a potential hazard for Bonaire. Even though no historical accounts on tsunami occurrence exist from Bonaire, we found geological traces of tsunamis which are older than the historical records.

I use this opportunity to thank STINAPA

and DROB as well as Jan Brouwer for their great support during the past three years. Whoever is interested in this research, please write an email to [max\\_engel@uni-koeln.de](mailto:max_engel@uni-koeln.de) for further information. I am also looking for photos or videos of wave impacts on Bonaire during the hurricanes mentioned above (see classified ad on page 13). Just email! Thanks in advance! ■ Max Engel

Jan Brouwer photo

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