

New Evidence and Datings of Paleo-Tsunami Events in the Caribbean

by

Anja Scheffers and Dieter Kelletat, Essen University (Germany)

After publishing of the fabulous tsunami relics on the Lower Lesser Antilles of Aruba, Curacao and Bonaire and their dating on three periods of the Younger Holocene around 3500 BP, 1500 BP and 450 BP by A. Scheffers, we have tried to find out the source area of these strong tsunami along the Antillean Island Arc east of the ABC islands, with investigations on Grenada, St. Lucia, Barbados, Guadeloupe, St. Martin and Anguilla (and additionally along some Bahaman islands). However, on the west facing coastlines of the Island Arc no undisputable Holocene tsunami evidence could be found. Grenada and St. Lucia exhibit very coarse and extended Younger Pleistocene tsunami deposits incorporated into tephra stratigraphy from sea level up to at least +50 m asl. Tsunami evidence from all other islands show impacts from the east, i.e. from the open Atlantic Ocean.

On Barbados there are 2-3 boulder ridges on elevated Young Pleistocene coral reef terraces near the eastern Cape between 13 and 20 m asl and up to 250 m apart from the modern cliff. The largest overturned single boulder at 13 m asl has a weight of about 170 t. Radiocarbon data point to at least 2 events around 4500 and 1400 BP.

At the central east coast of Guadeloupe chevron-like features and large single boulders up to 11 m asl could be dated at about 2400-2700 BP, which is in agreement with vegetation and soil development there.

These strong Holocene tsunami threats from the east along the Antillean Island Arc could be confirmed by the investigation along Eleuthera and Long Island of the Bahamas in the north. Here for many kilometres extended boulder fields, boulder ridges and bimodal tsunami deposits several metres thick between about + 5 m and + 17 m asl have been dated to at least 2 events about 3000 and 450 BP. The younger one has dislocated stony ballast from capsized European sail ships on land. Some boulders of the older tsunami have a weight of 200 to 300 tons.

Although a lot more of field survey and dating has to be done in other parts of the Intra Americas Seas, we can conclude that several Younger Holocene tsunami much stronger than those reported in historical catalogues for the last 500 years have hit this area, and that the tsunami risk worked out by field evidence and absolute dating is about ten times greater than that gained by geophysical modelling and historical data. In contrast to published models tsunami from the open Atlantic play a major part in these risks.