Geophysical Research Abstracts,
Vol. 11, EGU2009-502, 2009
EGU General Assembly 2009

The 1755 tsunami propagation in Atlantics and its effects on the French West Indies

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The present study examines the propagation of tsunami waves generated by the 1755 Lisbon earthquake in the Atlantic Ocean and its effects on the coasts of the French West Indies in the Caribbean Sea. Historical data of tsunami manifestation in the French West Indies are briefly reproduced. The mathematical model named NAMI DANCE which solves the shallow-water equations has been applied in the computations. Three possible seismic source alternatives of the tsunami source are selected for 1755 event in the simulations. The results obtained from the simulations demonstrate that the directivity of tsunami energy is divided into two strong beams directed to the southern part of North America (Florida, the Bahamas) and to the northern part of South America (Brazil). The tsunami waves reach the Lesser Antilles in 7 hrs. The computed distribution of tsunami wave height along the coasts of Guadeloupe and Martinique are presented. Calculated maximum of wave amplitudes reached 2 m in Guadeloupe and 1.5 m in Martinique. These results are also in agreement with observed data (1.8 – 3 m). The experience and data obtained in this study show that transatlantic events must also be considered in the tsunami hazard assessment and development of mitigation strategies for the French West Indies.