Editorial

The Caribbean Sea is not only a unique attractive tropical area but also a region of various marine hazards. The impact of natural disasters in the region provides invaluable data for scientists and researchers, application engineers and administrative officers as well as for the hazard managers. Monitoring events, interdisciplinary international research and collaboration are necessary for success in hazard assessment and mitigation strategies.

This 1st International Workshop on Caribbean Waves: Risk Evaluation of Natural Hazards in the Caribbean held in Pointe-a-Pitre (Guadeloupe, F.W.I., Lesser Antilles) was organized by University of Antilles and Guyane during December 9 - 10, 2008. The workshop was designed to bring together geophysicists, geologists, oceanographers, coastal engineers and hazard managers to discuss marine natural hazards (tsunamis, cyclones, flooding, storm surges, landslides, volcanic activities). Presentations involved discussions of hazard assessment, experiences and lessons from the historical events, field survey results, results of experiments and numerical simulations of real events; analysis, prediction and mitigation of natural disasters; hazard and risk evaluations; early warning systems, comparisons of worldwide experience.

This special issue of the Open Oceanography Journal includes selected papers presented in this Workshop. In the paper "Tsunami in Guadeloupe (Caribbean Sea)" by I. Nikolkina. N. Zahibo, and E. Pelinovsky detailed analysis of historical data of tsunamis for 1498-2008 period in Guadeloupe, collected in different books, papers and sites is presented. Concerning validity scale 10 events are selected as true and almost true; 6 of them were generated by underwater earthquakes, 3 events – by volcano eruptions, and one was a teletsunami. The geographical and temporal distributions of tsunami events are studied. Results of the numerical modeling of potential tsunamis generated in the center of the Caribbean Sea are summarized in paper "Understanding the possible effects of near and far field tsunamis on Lesser Antilles by numerical modeling" by A. Yalciner, N. Zahibo, E. Pelinovsky, I. Insel, D. Dilmen, A. Zaytsev, A. Chernov, and C. Ozer. Numerical modeling is performed with the use of TUNAMI N3 and NAMI DANCE. The maximum amplitude of the water elevation in Lesser Antilles can reach 3 – 4 m. The travel time of tsunami, is 1.5 hours to North islands of Lesser Antilles and 2 hours to South islands of Lesser Antilles. It must also be noted that the southern coast of Caribbean Sea will be much more effected comparing to the Lesser Antilles. In the paper "The 1755 Lisbon tsunami in Guadeloupe Archipelago: source sensitivity and investigation of resonance effects" by J. Roger, S. Allgeyer, H. Hébert, M.A. Baptista, A. Loevenbruck, and F. Schindelé the tsunami waves induced by the catastrophic earthquake in Lisbon (November 1, 1755), propagated through the Atlantic Ocean and reached the Lesser Antilles coasts are studied numerically for various assumptions on the source parameters. Obtained results highlight important wave heights of the range of 1 m to more than 2 m in some particular coastal places of Guadeloupe. A preliminary investigation of the resonance phenomenon in Guadeloupe is also presented, which could amplify tsunami heights in the harbors. The key point of the paper "Coupling of dispersive tsunami propagation and shallow water coastal response" by F. Løvholt, G. Pedersen, and S. Glimsdal presents the concept of combining a model dedicated to dispersive large scale propagation of tsunamis with ComMIT, developed and made freely available by NOAA, that is a state of the art tool for tsunami impact studies. The main motivation for this approach, namely the need for efficient computation of runup of tsunamis from submarine/subaerial slides and certain types of earthquake, is discussed. The dispersive model component which is a Boussinesq type model that is recently developed for tsunami propagation purposes is described. The performance and flexibility of the joint model approach is illustrated by two case studies including inundation computations at selected cites. The potentially disastrous, but small probability, flank-collapse event at the La Palma Island is used as an example of slide generated tsunamis where dispersion plays an important role. The second example is a tsunami from a potential inverse thrust fault at the Lesser Antilles. In this case dispersion during propagation is important for some regions, but not for others. In the paper "Hurricane Omar waves impact on the west coast of the Guadeloupe Island, October 2008" by J-F. M. Dorville and N. Zahibo a swell produced by the Hurricane Omar touched west coast of Guadeloupe during October 15-17, 2008 is discussed. The waves of this swell hit several islands of the Greater and Lesser Antilles. West coast of Basse-Terre (Guadeloupe) was impacted by waves of observed height about 2.5-3 m. Results of field survey and discussion of causes and the consequences of waves are given, the propagation of waves inland is studied. The compilation of different testimonies, observations on several spot of the coast and the buoys measurements in the Caribbean Sea allow to give the synoptic of the event and to qualify the consequences of the impact of waves. To give more accurate values of the characteristics of the waves, numerical simulations of wave propagation were carried out applying SWAN model. The results of numerical simulation are in the agreement with the observed waves of 2.5-3 m height and 12 s of peak period. In conclusion, some indications to protect the coastal population are given. In last paper "Self-similar solutions in the theory of the underwater landslide dynamics in inclined canyons" by N. Zahibo, E. Pelinovsky, T. Talipova, and I. Nikolkina the landslide motion in the inclined underwater canyons is described in the framework of the basic equations of gravity driven shallow-water flows. The analytical self-similar solutions are obtained in the explicit form and the spatial structure of avalanche that depends on the cross-section of the inclined channel is studied. Temporal variation of landslide parameters for different cross-sections of the underwater channel is analyzed. Obtained results can be used to test the 2D numerical models of landslide motion and tsunami generation by underwater landslides.

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We hope that this series of workshop on Water Natural hazards in the Caribbean shall continue in the future to accumulate knowledge of marine disasters and to invite attention of society to catastrophic geohazards.

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