An experimental cyclone-induced marine and river floods forecasting system for La Reunion Island: the SPICy project

Sophie Lecacheux, Rodrigo Pedreros, Alexandre Nicolae Lerma, Eric Chateauminois, Jeremy Rohmer, François Bonnardot, Hubert Quetelard, Olivier Bousquet, Soline Bielli, David Barbary, et al.

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Ref. author:
Lecacheux S. – BRGM
3 av. Claude Guillemin, 45060 Orleans, France
s.lecacheux@brgm.fr

Co-authors:
Sauvagnargues S., Ayral P.A., Tena-Chollet F. – Armines
Centre de Recherche LGEI, 6 avenue de Clavières, 30319 ALÈS
sophie.sauvagnargues@mines-ales.fr, pierre-alain.ayral@mines-ales.fr, florian.tena-chollet@mines-ales.fr

Pedreros R., Paris F., Chateaumoinois E., Nicolae-Lerma A., Rohmer J. – BRGM
3 av. Claude Guillemin, 45060 Orleans, France
r.pedreros@brgm.fr, f.paris@brgm.fr, e.chateaumoinois@brgm.fr, a.nicolaelerma@brgm.fr, j.rohmer@brgm.fr

Recouvoir R., Germain M.C. – BRL Ingénierie
1105, av. Pierre Mendès France, BP 94001, 30001 NIMES CEDEX 5
Romain.recouvoir@brl.fr, marie-christine.germain@brl.fr

Bouquet O., Barbary D., Bielli S. – LACy
Unité Mixte 8105 CNRS/Météo-France/Université de La Réunion, Sainte-Clotilde, Réunion
olivier.bouquet@meteo.fr, david.barbary@meteo.fr, soline.bielli-bouquet@univ-reunion.fr

Bonnardot F., Quetelard H. – Météo-France Ocean Indien
50 boulevard du Chaudron, BP 4, 97491 Sainte-Clotilde cedex
francois.bonnardot@meteo.fr, hubert.quetelard@meteo.fr

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Title:
An experimental cyclone-induced marine and river floods forecasting system for
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Abstract:
Forecasting cyclone-induced inundations in the French Overseas Territories raises specific issues, as most of
them are steep volcanic islands with a complex orography and presenting (1) very dense water systems with
numerous gullies and potential intense water flows (2) a lack of continental shelf that leads to an important
exposure of the coast to high waves and overtopping despite the presence of fragmented barrier reefs (3)
complex interactions between marine and river water supplies in river inlet environments. To date, there is
no forecasting system taking into account all these specificities.

This presentation gives an overview of the research project SPICy that aims at tackling the issue of cyclone-
induced marine and river floods forecast in the French Overseas Territories through the realization of a
demonstrator for the pilot site of Réunion Island. To reach this objective, the project addresses various
challenges, focusing on : (1) the assessment of meteorological forecast uncertainties with the development of
ensemble tracks generation techniques (2) high resolution meteorological modelling taking into account
orography and real-time data assimilation to improve local rainfall predictions (3) the extension of meteorological forecast information to marine and river floods through the development of dedicated
modules, notably in urban areas (4) the consideration of marine/river interaction (5) the management of
computation times and the investigation of optimization techniques including the use of meta-models (6) the
development of users interfaces to provide relevant information to emergency managers.

The originality of the project is the interdisciplinary approach that enables to build a comprehensive strategy
to holistically address cyclone-induced inundations forecast issues for this type of Territory. Beyond the
development and combination of physical models, the novelty of SPICy also lies in the consideration of
crisis operators’ needs at an early stage of the project and the realization of crisis exercises.

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on the project are available at http://spicy.brgm.fr.