

Marine Le Gal, PhD

Environmental hydraulics, Fluid mechanics modelling, Engineer - Researcher

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📍 Sevilla, Spain

- 5+ years of Hydrodynamic Numerical Modelling experience as engineer-researcher with tsunami/wave and ocean background (Telemac System, Coastal and Regional Ocean COmmunity model (CROCO)).
- Proficient in programming with Fortran and post-processing data with Matlab (tool-box for metocean data), experience with High-Performance-Computer (HPC) and operating systems Mac OS, Linux.
- Good communication skills with ability to work in French (native), English (Fluent), Japanese (beginner) and comfortable with writing tool such as Latex.
- Capacity to adapt to international and multidisciplinary environment.

Experience

Post-doctoral researcher, Marine Biophysics unit, Okinawa Institute of Science and Technology, Japan 2017–2020

3 year institute grant with Pr. Satoshi Mitarai, working on different projects:

- Management of an independent project about the influence of the reef during the 1771 Meiwa **tsunami flood**, using Telemac2D for numerical modelling leading to a publication in *Ocean and coastal management journal*.
- Engaged in the development of **regional oceanographic modelling** using CROCO and **Matlab** software for processing results or metocean data, such as the CFSv2 dataset. Baja California and Okinawa models have been developed in order to link hydrodynamic and environmental processes.
- Leader of a fieldwork activity aiming to local bathymetry mapping using sonar, kayaks and matlab for post-processing, project SoKa summer 2020.
- Active collaborator in scientific communication outreach events for a broad public.

Communications: 1 peer-reviewed **article**, 3 presentations at international conferences 2 presentations at Japanese symposium, 1 **interview** in national newspaper. Won the OIST Public choice of the *200seconds My Research* contest.

Commitment: Head of the scientific committee organizing a week-long internal conference, counselling board member of the OIST Researcher Committee, committee member of the OIST charity club.

Phd student, Laboratoire Hydraulique Saint-Venant, Chatou, France 2014–2017

3 year work in a national grant funding project **TANDEM** with 12 entity collaborators under the supervision of Dr. Damien Violeau.

- Development of a new theoretical solution that measures the influence of timescales during seismic generation of tsunamis, in addition to numerical models proving that the kinematic motions can have an important impact in particular conditions.
- Estimation of the capacity of the numerical Telemac system to model tsunamis from benchmarks to real cases as the Tohoku tsunami event that occurred in Japan in 2011, validation on buoy and flood data. This work legitimized the use of Telemac for modelling such events.

Communications: 2 peer-reviewed **articles** in international journals, 5 communications in international conferences, 1 invited talk.

- Final year internship student**, National Hydraulics and Environment Laboratory, EDF R& D, Chatou, France 2013
Updating the validation cases of the spectral numerical model Tomawac and integrating a new dissipative term from the flow-wave interaction.
- Internship student**, RMIT, Melbourne, Australia 2012
Testing of the shape optimization for objects under mechanical constraints with ABAQUS software.
- Internship student**, UCLA, Los Angeles, US 2011
Experimental study of the spin-up of particles in a rotating tank.

Education

- Doctor of Philosophy (Ph.D.)**, Laboratoire Hydraulique Saintt-Venant, France 2017
Subject of the dissertation: **Theoretical and numerical study of seismic tsunami dynamics**.
Supervisors: **Damien Violeau**.
- Engineering School**, ENSEIRB MatMeca Dep. of Mathematics and Mechanics, France 2013
- Classes Préparatoires**, Mathematics and Physics, France 2008-2010
Intensive mathematics and physics courses preparing entrance exams to French graduate engineering schools.

Certifications

- Open water diving certification by NAUI 2018
- Diving Emergency Management Provider certification by NAUI (on going)
- Leadership and Management Skills workshop with certification from hpf expert 2019

Personal interests

Dynamic person with an addiction to outdoor activities,
Climber and aerial dancer during free time,
Strong background in gymnastics with National competitions.

Selected publications

- **Marine Le Gal**, Damien Violeau, Michel Benoit, Influence of timescales on the generation of seismic tsunamis, European Journal of Mechanics - B/Fluids, Volume 65, 2017, Pages 257-273, <https://doi.org/10.1016/j.euromechflu.2017.03.008>.
- **Marine Le Gal**, Satoshi Mitarai, Reef influence quantification in light of the 1771 Meiwa tsunami, Ocean & Coastal Management, Volume 195, 2020, <https://doi.org/10.1016/j.ocecoaman.2020.105248>.

References

Dr. Damien Violeau

Senior scientist at EDF / Laboratoire d'Hydraulique Saint-Venant: damien.violeau@edf.fr.

Dr. Satoshi Mitarai

Associate professor at Okinawa Institute of Science and Technology: satoshi@oist.jp.

Publications

Peer-reviewed journals

- [1] Influence of timescales on the generation of seismic tsunamis
Marine Le Gal, Damien Violeau, Michel Benoit
European Journal of Mechanics-B/Fluids 65 (2017), Elsevier
DOI: [10/gbv37](https://doi.org/10.1016/j.gbv37)
- [2] Shallow water numerical models for the 1947 gisborne and 2011 Tohoku-Oki tsunamis with kinematic seismic generation
Marine Le Gal, Damien Violeau, Riadh Ata, Xiaoming Wang
Coastal Engineering 139 (2018), pp. 1–15
DOI: <https://doi.org/10.1016/j.coastaleng.2018.04.022>
- [3] Reef influence quantification in light of the 1771 Meiwa tsunami
Marine Le Gal, Satoshi Mitarai
Ocean and Coastal Management 195 (2020), Elsevier
DOI: [10.1016/j.ocecoaman.2020.105248](https://doi.org/10.1016/j.ocecoaman.2020.105248)

Peer-reviewed conference proceedings

- [1] A database of validation cases for tsunami numerical modelling
Damien Violeau, Riadh Ata, Michel Benoit, Antoine Joly, Stéphane Abadie, Lucie Clous, M Martin Medina, Denis Morichon, Jérémie Chicheportiche, Marine Le Gal
Sustainable Hydraulics in the Era of Global Change: Proceedings of the 4th IAHR Europe Congress (Liege, Belgium, 27-29 July 2016), 2016
- [2] Tsunami seismic generation and propagation: validity of the Shallow Water Equations
M Le Gal, D Violeau
Sustainable Hydraulics in the Era of Global Change: Proceedings of the 4th IAHR Europe Congress (Liege, Belgium, 27-29 July 2016), 2016
- [3] An overview on the capabilities of the TELEMASCARET system to deal with tsunamis: feedbacks from TANDEM project
Riadh Ata, Marine le Gal, Damien Violeau
Proceedings of the XXIVth TELEMASCARET User Conference, 17 to 20 October 2017, Graz University of Technology, Austria, 2017
- [4] Joint numerical study of the 2011 Tohoku-Oki tsunami: comparative propagation simulations and high resolution coastal models
Anne Loevenbruck, Luca Arpaia, Riadh Ata, Audrey Gailler, Yutaka Hayashi, H  l  ne H  bert, Philippe Heinrich, Marine Le Gal, Anne Lemoine, Sylvestre Le Roy, Richard Marcer, Rodrigo Pedreros, Kevin Pons, Mario Ricchiuto, Damien Violeau
EGU General Assembly Conference Abstracts, 2017
- [5] Numerical model of 1771 Meiwa tsunami and influence of sea level rise on the inundation
Marine Le Gal, Kirk Sato, Satoshi Mitarai
EGU General Assembly Conference Abstracts, 2018
- [6] Modeling mangrove propagule dispersion around the Baja California peninsula through numerical hydrodynamics model
Marine Le Gal, Satoshi Mitarai
ASLO, 2019
- [7] Numerical Model of the 1771 Meiwa tsunami and the influence of the reef
Marine Le Gal, Satoshi Mitarai
EGU General Assembly Conference Abstracts, 2020
- [8] Numerical models of the 1771 Meiwa tsunami to better understand tsunami-reef interactions
Marine Le Gal, Satoshi Mitarai
KOZwaves: The 4th Australasian Conference On Wave Science, 2020

Invited talks

- [1] Seismic generation of tsunamis, Impact of timescales.
Marine Le Gal, Damien Violea
tsunami workshop organised by CENtre d'Alerte aux Tsunamis (CENALT) - Paris, 2016
- [2] WP3 : Simulation of the Tohoku-Oki tsunami with Telemac.
Marine Le Gal, Riadh Ata, Damien Violeau
French-Japanese Week on disaster Risk Reduction TANDEM workshop - Tokyo, 2017
- [3] Tsunami modelling.
Marine Le Gal
OIST Internal seminar, 2018
- [4] Numerical models of tsunamis: Kinematic generation and effects of sea level rise.
Marine Le Gal, Satoshi Mitarai
COFTEC symposium - Kobe. 2018