

Curriculum Vitae

PERSONAL INFORMATION

Lorenzo Mentaschi



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🌐 https://www.researchgate.net/profile/Lorenzo_Mentaschi

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📅 **Date of birth:** November, 2, 1978

📍 **Place of birth:** Milan, Italy

WORK EXPERIENCE

June 2021-Today

Junior Assistant Professor at Università di Bologna

- Research on physical and biogeochemical oceanography.
- Research on adaptation to climate changes.
- Teaching activity on geophysical fluid dynamics.

July 2015-May 2021

Researcher at the Joint Research Centre of the European Commission

- Development new statistical techniques for the studying of changing climatic extremes: a simplified technique for non-stationary extreme value analysis, and related copula-based non-stationary joint distributions. Using these methodologies, we studied the evolution in time of the hazard represented by extremes of waves, storm surges, river runoff, droughts, winds and heat waves on European and global scale.
- Study of climate changes and their effects on coastal risk and coastal inundation, using the models Wavewatch III and SCHISM/WWM.
- Development of a coupled storm-surges/currents/waves/tides model for operational purposes on unstructured meshes, using the model SCHISM/WWM.
- Development and application of a high-resolution runoff model (LISFLOOD) to estimate the future evolution of the dynamics of European river catchment areas in view of future climate change. Analysis of and future risks associated with river floods.
- Global-scale estimation of coastal erosion and accretion, based on the Google Earth Engine.
- Global-scale estimation of the Urban Heat Island, based on satellite data and on the Google Earth Engine.
- Development and testing new techniques for wave subscale modelling in the model Wavewatch III.
- Contribution to international scientific intercomparison groups on the impact of climate changes on waves and coasts (e.g., COWCLIP and CoastMIP).

January 2012 - March 2016

PhD

Course: fluid dynamics and environment technologies.

University of Genova, Dipartimento di Ingegneria Chimica, Civile e Ambientale (DICCA).

Supervisors: professors Giovanni Besio and Andrea Mazzino.

- Study of wave dynamics and use / development of Wavewatch III model.
- Implementation and validation of wave models in the Mediterranean Sea.
- Development of a high-resolution wave hindcast in the Mediterranean Sea.
- Development of a technique for parameterizing the effects of unresolved obstacles on wave models based on source terms.

Thesis title: Spectral wave modelling: improvements and applications in the Mediterranean Sea

2003 - 2015 **Software developer**

Atomos s.p.a./Sedapta s.r.l.

Via Nizza 35a 17100 Savona, Italy

<http://www.atomos.it/>

- I was the coordinator of the development of the Demand Planning modules.
- I collaborated to the definition of models and data fluxes for the leading projects concerning the Demand Planning.
- I participated to the definition of product specifications of different modules of the suite.
- I collaborated to the design and the implementation of the Atomos library components.

Sector: computer science, software engineering, industrial engineering, Supply Chain Management.

September-October 2013 **Collaboration with IH Cantabria**

In the frame of my PhD course I lived for two months in Santander, Spain, and collaborated with professors Fernando Mendez, Melisa Menendez and their staff. The argument of the collaboration is a new parameterization of unresolved obstacles in wave modelling. After my return to Italy we continued to collaborate. This collaboration resulted in the publication of a paper to Ocean Modelling in December 2014 with title "Parameterization of unresolved obstacles in wave modelling: a source term approach".

EDUCATION AND TRAINING

1998 – 2003 **Degree in Physics**

University of Padua, Dipartimento di Fisica (DIFI)

Thesis: "North Atlantic Oscillation and analysis of its dynamics through simplified models on global scale"

Supervisor: professor Piero Lionello

PERSONAL SKILLS

Mother tongue Italian

Other languages English, fluent written and spoken.
Russian, good written and spoken. (International certificate of level B1, obtained at the Pushkin institute in Moscow).
Hungarian, B1 written and spoken.

Technical skills

- Excellent knowledge of the python language.
- Excellent knowledge of the MATLAB language.
- Excellent knowledge of the wave model Wavewatch iii.
- Proficient knowledge of the Google Earth Engine, both in Javascript and Python.
- Excellent knowledge of the bash language and of the linux console.
- Strong experience in parallel development in python, MATLAB, Delphi, both multithread and multi-process.
- Strong experience in object-oriented programming.
- Knowledge of the river catchment area model LISFLOOD.
- Knowledge of the ocean circulation/wave model SCHISM/WWM.
- Knowledge of the ocean circulation model NEMO.
- Knowledge of the model of Biogeochemistry BFM.
- Good knowledge of the fortran language.
- Excellent knowledge of version control systems (git, svn).
- Excellent knowledge of pascal language and Delphi RAD studio.
- Excellent knowledge of relational databases and of SQL language (Oracle, MsSql, Sqlite, Mysql).
- Proficient knowledge of regular expressions.
- Proficiency using LaTeX.
- Knowledge of Microsoft Visual Studio and c# language.
- Familiarity with netcdf and grib data format.
- Familiarity with storage and elaboration of large output (about 120 Tb of output for the sole catchment area projections).
- Good knowledge of the Docker virtualization environment.

PUBLICATIONS

- Hinkel J, Feyen L, Hemer M, Le Cozannet G, Lincke D, Marcos M, **Mentaschi L.**, Merkens JL, de Moel H, Muis S, Nicholls RJ. Uncertainty and bias in global to regional scale assessments of current and future coastal flood risk. *Earth's Future*. 2021 Jul;9(7), Q1.
- Mulholland E., Dottori F., Alfieri L., **Mentaschi L.**, Ciscar J-C., Feyen L. (2021) Increased flood risk to European transport infrastructures with global warming. *Environ. Res. Lett.* (submitted) 3-y IF: 6.474, Q1.
- ***Mentaschi L.**, Duveiller G., Zulian G., Corbane C., Pesaresi M., Maes J., Stocchino A., Feyen L. (2021). Global long-term mapping of surface temperature shows intensified intra-city urban heat island extremes. *Global Environmental Change* (submitted). IF: 10.427, Q1.
- Tebaldi C., Ranasinghe R., Vouskoukas M., Rasmussen D., Vega-Westhoff B. Kirezci E., Kopp R, Sriver R., **Mentaschi L.** (2021). Extreme Sea Levels at Different Global Warming Levels. *Nature Climate Change* (under review). IF: 20.893, Q1.
- Morim J., Vitousek S, Erikson L, ..., **Mentaschi L.** et al. (2021). Global changes in high-frequency extreme ocean wave events due to anthropogenic warming exceeding 2° C, *Environ. Res. Lett.* (submitted), Q1.
- Naumann G., Cammalleri C., **Mentaschi L.**, Feyen L. (2021). Increasing economic drought impacts in Europe with anthropogenic warming. *Nature Climate Change* (accepted). IF: 20.893, Q1.
- ***Mentaschi L.**, Vousdoukas M., Fernandez Montblanc T., Kakoulaki G., Voukouvalas E., Besio G., Salamon P. (2020). Assessment of global wave models on regular and unstructured domains Using the Unresolved Obstacles Source Term. *Ocean Dynamics*. IF: 2.043, Q2.
- De Leo F., Besio G., **Mentaschi L.** (2020). Trends and variability of ocean waves under RCP8.5 emission scenario in the Mediterranean Sea. *Ocean Dynamics* (accepted). IF: 2.043, Q2.
- Cammalleri C., Naumann G., **Mentaschi L.**, Bisselink B., Gelati E., De Roo A., Feyen L. (2020). Diverging hydrological drought traits over Europe with global warming. *HESS* (accepted). 3-y IF: 5.044, Q1.
- Morim J. Trenham C., ..., **Mentaschi L.** et al. (2020). A global ensemble of ocean wave climate projections from CMIP5-driven models. *Nature Scientific Data*. IF: 5.541, Q1.
- Vousdoukas M., Ranasinghe R., **Mentaschi L.**, Plomaritis T., Panagiotis A., Luijendijk A., Feyen L. (2020). Sandy coastline under threat of erosion. *Nature Climate Change*. IF: 20.893, Q1.
- ***Mentaschi L.**, Alfieri L., Dottori F., Bisselink B., De Roo A., Feyen L. (2020). Independence of Future Changes of River Runoff in Europe from the Pathway to Global Warming. *Climate*. IF: 1.89, Q3.

- Vousdoukas M., **Mentaschi L.**, Ciscar J. C., Hinkel J., Ward P., Feyen L. (2020), Economic incentives for raising coastal flood defenses in Europe. *Nature Communication*. IF: 12.121, Q1.
- Fernandez-Montblanc T., Vousdoukas M., **Mentaschi L.**, Ciavola P. (2020). A Pan-European high resolution storm surge hindcast. *Environment International*. IF: 7.943, Q1.
- Marcos M., Rohmer J., Vousdoukas M.I., **Mentaschi L.**, Le Cozannet G., Amores A. (2019). Increased Extreme Coastal Water Levels Due to the Combined Action of Storm Surges and Wind Waves. *Geophysical Research Letters*. 3-y IF: 4.988, Q1.
- Morim J. Hemer M., ..., **Mentaschi L.** et al. (2019), Robustness and uncertainties in global multivariate wind-wave climate projections. *Nature Climate Change*. IF: 20.893, Q1.
- Bevacqua E., Maraun D., Vousdoukas M., Voukouvalas E., Vrac M., **Mentaschi L.**, Widmann M. (2019), Higher probability of compound flooding from precipitation and storm surge in Europe under anthropogenic climate change. *Science Advances*. IF: 13.116, Q1.
- The WAVEWATCH III™ Development Group (WW3DG, 2019), User manual and system documentation of WAVEWATCH version 6.07, tech note 333, NOAA.
- ***Mentaschi, L.**, Vousdoukas, M., Besio, G., Feyen, L. (2019), alphaBetaLab: automatic estimation of subscale transparencies for the Unresolved Obstacles Source Term in ocean wave modelling. *SoftwareX*. IF: 2.14, Q2.
- Fernandez-Montblanc T., Vousdoukas, M., Ciavola, P., Voukouvalas E., **Mentaschi, L.**, Breyiannis G., Salamon, P., (2018), Towards robust pan-European storm surge forecasting. *Ocean Modelling*. 3-y IF: 3.715, Q1.
- ***Mentaschi, L.**, Vousdoukas, M., Pekel, J-F., Voukouvalas, E., Feyen, L. (2018), Global long-term observations of coastal erosion and accretion. *Nature Scientific Reports*. 3-y IF: 4.558, Q1.
- Vousdoukas, M., **Mentaschi, L.**, Voukouvalas, E., Verlaan, M., Jevrejeva, S., Jackson, L., Feyen, L. (2018), Global probabilistic projections of extreme sea levels. *Nature Communication*. IF: 12.121, Q1.
- Vousdoukas, M., **Mentaschi, L.**, Voukouvalas, E., Bianchi, A., Dottori, F., Feyen, L. (2018), Climatic and socioeconomic controls of future flood risk in Europe, *Nature Climate Change*. IF: 20.893, Q1.
- ***Mentaschi, L.**, Kakoulaki, G., Vousdoukas, M., Voukouvalas, M., Feyen, L., Besio, G. (2018), Parameterizing unresolved obstacles with source terms in wave modeling: A real-world application. *Ocean Modelling*. 3-y IF: 3.715, Q1.
- Ciscar-Martinez JC, Feyen L., ... **Mentaschi L.** et al. 2018. Climate impacts in Europe: final report of the JRC PESETA III project. Publications Office of the European Union, Luxembourg. ISBN:978-92-79-97218-8.
- Bisselink B., Bernhard J., Gelati E., Adamovic M., Guenther S., **Mentaschi L.**, De Roo Arie 2018. Impact of a changing climate, land use, and water usage on Europe's water resources. JRC Report number: JRC110927.
- Dosio, A., **Mentaschi, L.**, Fischer, E. and Wyser, K. (2018). Extreme heat waves under 1.5°C and 2°C global warming. *Environ. Res. Lett.* 3-y IF: 6.474, Q1.
- Vousdoukas M, Buziotas D, Giardino A, Bowver L, **Mentaschi L.**, Voukouvalas E, Feyen L (2018). Understanding epistemic uncertainty in large-scale coastal flood risk assessment for present and future climates. *Natural Hazards and Earth System Sciences*. 3-y IF: 3.47, Q1.
- Neumann, G., Alfieri, L., Wyser, K., **Mentaschi, L.**, Betts, R. A., Carrao, H., Spinoni, J., Vogt J., and Feyen, L. (2018). Global Changes in Drought Conditions Under Different Levels of Warming. *Geophys. Res. Lett.* 3-y IF: 4.988, Q1.
- Monioudi I, Asariotis R, Becker A, Bhat C, Dowding-Gooden D, Esteban M, Feyen L, **Mentaschi L.**, Nikolaou A, Nurse L, Phillips W, Smith D, Satoh M, O'Donnell Trotz U, Velegrakis A, Voukouvalas E, Vousdoukas M, Witkop R (2018). Climate change impacts on critical international transportation assets of Caribbean Small Island Developing States (SIDS): the case of Jamaica and Saint Lucia. *Regional Environmental Change*. 3-y IF: 3.74, Q2.
- Besio, G., Briganti R., Romano A., **Mentaschi L** and De Girolamo, P. (2017). Time clustering of wave storms in the Mediterranean Sea, *NHESS*. 3-y IF: 3.47, Q1.
- ***Mentaschi, L.**, M. I. Vousdoukas, E. Voukouvalas, A. Dosio, and L. Feyen (2017), Global changes of extreme coastal wave energy fluxes triggered by intensified teleconnection patterns, *Geophys. Res. Lett.*, 44, 2416–2426. 3-y IF: 4.988, Q1.

- Vousdoukas, M. I., **Mentaschi, L.**, Voukouvalas, E., Verlaan, M. and Feyen, L. (2017), Extreme sea levels on the rise along Europe's coasts. *Earth's Future*, 5: 304–323. IF: 6.141, Q1.
- ***Mentaschi L.**, Vousdoukas M., Voukouvalas E., Sartini L., Feyen L., Besio G., and Alfieri L. 2016. The transformed-stationary approach: a generic and simplified methodology for non-stationary extreme value analysis. *Hydrology and Earth System Sciences*. 3-y IF: 5.044, Q1.
- Vousdoukas M. Voukouvalas E., **Mentaschi L.**, Dottori F., Giardino A., Bouziotas D., Bianchi A., Salamon P. 2016. Developments in large-scale coastal flood hazard mapping. *Natural Hazards and Earth System Sciences*. 3-y IF: 3.47, Q1.
- Besio, G., **Mentaschi, L.** & Mazzino, A. 2015. Wave energy resource assessment in the Mediterranean Sea on the basis of a 35-year hindcast. *Energy*,94:50-63, 2016. 3-y IF: 7.05, Q1.
- ***Mentaschi L.**, Perez J., Besio G., Mendez F., Menendez M. 2015. Parameterization of unresolved obstacles in wave modeling: a source term approach. *Ocean modelling*, Ocean Surface Waves, Special Issue:93-102. 2-y IF: 3.715, Q1.
- ***Mentaschi L.**, Besio G., Cassola F. & Mazzino A. 2015. Performance evaluation of WavewatchIII in the Mediterranean Sea. *Ocean modelling*,90:82-94. 3-y IF: 3.715, Q1.
- Sartini L., **Mentaschi L.** & Besio G. 2015. Comparing different extreme wave analysis models for wave climate assessment along the Italian coast: the case of the Ligurian Sea. *Coastal engineering*, 100, pp. 37-47. 3-y IF: 4.576, Q1.
- ***Mentaschi L.**, Besio G., Cassola F. & Mazzino A., 2013. Problems in RMSE-based wave model validations. *Ocean modelling*, 72, pp. 53-58. 3-y IF: 3.715, Q1.
- ***Mentaschi L.**, Besio G., Cassola F. & Mazzino A., 2013. Developing and validating a forecast/hindcast system for the Mediterranean Sea. *Journal of Coastal Research*, SI 65. IF: 0.95, Q2.

Metrics overview



Document & citation trends

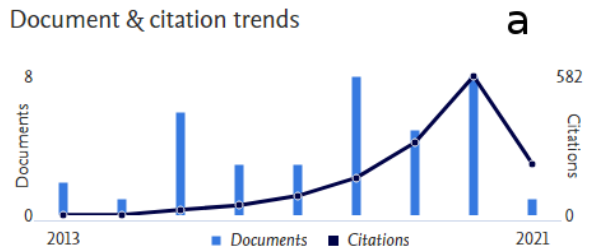


Figure 1: h-index graphs from Scopus (a) and WoS (b) as of April 23, 2021.

CONFERENCES & WORKSHOPS

- XXXIII Convegno Nazionale di Idraulica e Costruzioni Idrauliche, IDRA 2012, Brescia, Italy.
Presentation: Implementazione e validazione di un modello di previsione e reanalisi del moto ondoso nel Mediterraneo Occidentale. Presented by L.M.
- G3-Giornate Giovani GNRAC, 2012, Ferrara, Italy.
Presentation: Implementazione e validazione di un modello di previsione e reanalisi del moto ondoso nel Mediterraneo Occidentale. Presented by L.M.
- European Geoscience Union, 2013, Vienna, Austria.
Presentation: Why NRMSE is not completely reliable for forecast/hindcast model test performances. Presented by L.M.
- 13th Wave Workshop, 2013, Banff, Canada.
Presentation: Improving wave model validation based on RMSE. Presented by L.M.
- XXXIV Convegno Nazionale di Idraulica e Costruzioni Idrauliche, IDRA 2014, Bari, Italy.
Presentation: Un modello di re-analisi del moto ondoso nel Mediterraneo: prestazioni e affidabilità. Presented by L.M.
- European Geoscience Union 2015, Vienna, Austria.
Presentation: Parameterization of unresolved obstacles in wave modeling: a source term approach. Presented by L.M.
- Oceans 2015, Genova, Italy.
Presentation: A preliminary wave energy exploitation assessment in the Northern Tyrrhenian Sea. Presented by L.M.
- 14th Wave Workshop, 2015, Key West, USA.
Presentation 1: Source term parameterization of unresolved obstacles in wave modelling: work in progress. Presented by L.M.
Presentation 2: Non-stationary Extreme Values Analysis of waves: a simplified approach. Presented by L.M.
- Spring Waves School 2016, Brest, France.
Presentation: Parameterization of unresolved obstacles in wave modeling: a source term approach. Presented by L.M.
- 1st Workshop on Waves, Storm Surges and Coastal Hazards, 2017, Liverpool, UK.
Presentation: Extreme coastal wave energy fluxes: projected global changes. Presented by L.M.
- The Coordinated Ocean Wave Climate Project (COWCLIP) Meeting, 2017, Liverpool, UK.
Presentation: LISCoAsT – Large scale Integrated Sea-level and Coastal Assessment Tool. Presented by L.M.
- The Coordinated Ocean Wave Climate Project (COWCLIP) Meeting, Paris, France.
Presentation: The effects of changing spatial resolution in global wave models. Presented by L.M.
- 13th Annual International Symposium on Environment, 28-31 May 2018, Athens, Greece.
Presentation: Global long-term patterns of coastal erosion and accretion. Presented by L.M.
- 2nd International Workshop on Waves, Storm Surges, and Coastal Hazards 16th International Workshop on Wave Hindcasting and Forecasting, Melbourne, Australia.
Presentation: The Unresolved Obstacles Source Term, application cases on regular and triangular meshes. Presented by L.M.
- European Geoscience Union 2020, Vienna, Austria (virtual session)
Presentation: On the independence from the emission pathway of the projected changes of river runoff. Presented by L.M.

BEST ACHIEVEMENTS

- In 2020, I was awarded the Italian **National Scientific Qualification - Abilitazione Scientifica Nazionale as Associate Professor**, for the scientific field of Geophysics (GEO/12).
- In 2017 we received the JRC Excellence Award as the best scientific research group of the JRC.
- I was awarded a grant by PADI foundation in 2014, for the project "Subscale Wave Modelling".
- I reviewed scientific publications on Earth Future, Nature Scientific Reports, Science of the Total Environment, Geophysical Research Letters, Ocean Modelling, Ocean Dynamics, Limnology and Oceanography, Natural Hazard, Marine Geodesy, Ocean Engineering, Natural Hazard and Earth System Science, Atmosphere, Journal of Marine Science, Coastal Engineering, Journal of Climate, Journal of Hydrology, Frontiers in Marine Science and others.
- At the university of Genova, I implemented the wave component of an operational forecast chain on the Mediterranean Sea which is available online at the address
<http://www3.dicca.unige.it/meteocean/> .
This service is popular in the Ligurian surfing community.
- I contributed to the implementation of wwww at the meteorological center of the environmental agency of Liguria district (ARPAL). Results of the operational model are available at the link
<https://servizi-meteoliguria.arpal.gov.it/mare/meteomare.html> .
- As a software developer I coordinated the development of the demand planning suite of Atomos group, and personally participated to the implementation of leading projects at some important industrial customers on the Italian panorama (e.g. Same, Gucci, D&G, Fendi). Now this product is used with satisfaction by several industries.
- As a developer at Atomos I participated in defining, engineering and implementing several software components which are now widely used in all Atomos products by hundreds of industrial partners.

OTHER PERSONAL INFOS

I love studying and learning. For many years I spent much of my spare time studying physics and since February 2011 I have been collaborating with professors Andrea Mazzino and Giovanni Besio at the university of Genova, working on the dynamics of sea waves. In 2012 I was happy to take the opportunity to joining the PhD course of fluid dynamics at the university of Genova, which I attended while maintaining my job at Atomos as a software developer. Working at the European Commission, I could enlarge my horizons, and engage in multidisciplinary research in sectors of interest for policy making. I love my job as a researcher, yet in my work I still find very useful my professional background as a software developer.