RODRIGO VICENTE CAMPOS CABA

Nationality	: Chilean
Profession	: Ocean engineer specialized in Coastal Engineering
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Language	: Spanish (native), English (fluent), Italian (basics)

PROFESSIONAL SUMMARY & TECHNICAL SKILLS

Ocean engineer with a Ph.D. in Future Earth, Climate Change and Societal Challenges, specializing in storm surge modeling and data-driven downscaling for the northern Adriatic Sea. Experienced in coastal dynamics, numerical simulations, and meteo-oceanographic analysis. Proven expertise in applying Machine Learning techniques and hydrodynamic modeling for sustainable coastal development and renewable energy projects. Strong background in both academic research and consulting environments across Europe and Latin America.

Technical Skills & Tools:

- Numerical modeling: SHYFEM-MPI, SWAN, IH2VOF, Capytaine, WEC-Sim
- Programming, data analysis, and visualization: Python and MATLAB
- Machine Learning: Principal Component Analysis, Regression algorithms (MLR, MLP, RNN, LSTM)
- Other tools: QGIS, Global Mapper, AutoCAD, Hypack, Linux operating system

EDUCATION & TRAINING

2025 — **ALMA MATER STUDIORUM UNIVERSITY OF BOLOGNA, BOLOGNA, ITALY**

Ph.D. degree in Future Earth, Climate Change and Societal Challenges

- Thesis: "Developments in Machine Learning downscaling for storm surge in the northern Adriatic Sea".
- Recipient of PON cycle 37 scholarship.

2020 — **UNIVERSITY OF CANTABRIA, SANTANDER, SPAIN**

Master's degree in Coasts and Ports, Specialty in Coastal Dynamics

- Recipient of Fundación Carolina scholarship.
- Final work: "Analysis of wave transfer produced in different types of coral reefs in Recife (Brazil)".

2016 — **UNIVERSITY OF VALPARAISO, VALPARAISO, CHILE**

Ocean engineer

- Final work: "Analysis of historical and recent storm waves in the Chilean coast"

RECENT PROFESSIONAL EXPERIENCE

2022 - ongoing **ALMA MATER STUDIORUM UNIVERSITY OF BOLOGNA, BOLOGNA, ITALY**

Research Fellow

- Contributing to EU-funded research projects on sea-level rise and coastal hazard modeling.
- Developing hybrid systems combining ML and physics-based models for storm surge forecasting. Proficient in Matlab and Python for algorithm implementation and optimization.
- Collaborating on scientific publications and conference presentations.

Ph.D. candidate

- Led storm surge prediction studies using ML techniques trained on numerical simulations and observations.
- Ran SHYFEM-MPI ocean circulation models for long-term sea-level downscaling in the Adriatic (Reference: Campos-Caba et al., 2024).

2023 - ongoing **INDEPENDENT**

Coastal Engineering Consultant

- Conducted met-ocean data analysis for infrastructure development and vulnerability assessments.
- Simulated wave environments using SWAN for ports and coastal walkways.
- Modeled WEC hydrodynamics with Capytaine and WEC-Sim for energy applications.
- Preliminary implementation of ML models for significant wave height prediction in Chile.

2020 - 2021 **UNIVERSITY OF VALPARAISO, VALPARAISO, CHILE**

Technical Manager, Coastal Processes Laboratory

- Oversaw physical and numerical modeling projects including overtopping studies with IH2VOF (Reference: Campos-Caba & Winckler, 2023).
- Contributed to peer-reviewed research on wave dynamics and coastal hazards (Reference: Araya et al., 2022).
- Academic of Coastal Geology and Ocean Engineering in the Ocean Engineering School.

2017-2019 **SKYRING MARINE LTDA, VIÑA DEL MAR, CHILE**

Coastal and Survey Engineer

- Delivered technical assessments for coastal construction projects across Chile.
- Executed field surveys and conducted wave modeling for feasibility and planning studies.

PARTICIPATION IN SCIENTIFIC PUBLICATIONS

2024	**Campos-Caba,** et al. *Assessing the storm surge model performance: what error indicators can measure the skill?* Ocean Sci., 20. https://doi.org/10.5194/os-20-1513-2024
2023	**Campos-Caba** & Winckler. *Evaluación del caudal de sobrepaso en una defensa costera mediante un modelo basado en las ecuaciones de Navier-Stokes promediadas por Reynolds en el volumen (VARANS)*. Obras y Proyectos 33. http://dx.doi.org/10.21703/0718-281320233301
2022	Araya, et al. *Extreme sea surges, tsunamis and pluvial flooding events during the last ~1000 years in the semi-arid wetland, Coquimbo, Chile*. Geosciences, 12. https://doi.org/10.3390/geosciences12030135
2017	Winckler, et al. *The storm of August 8, 2015 in the regions of Valparaíso and Coquimbo, Central Chile*. Lat. Am. J. Aquat. Res., 45. http://dx.doi.org/10.3856/vol45-issue4-fulltext-1

RELEVANT PARTICIPATION IN CONFERENCE PROCEEDINGS

2025	Mentaschi, L. et al. *Storm surge prediction in the Northern Adriatic Sea: a comparison between Machine Learning and numerical modelling*. European Geoscience Union, General Assembly 2023. Vienna, Austria.
2024	**Campos-Caba,** et al. *Developments on a machine learning downscaling system for storm surge in the Northern Adriatic Sea*. Fourth ESA-ECMWF workshop: Machine Learning for Earth system observation and prediction. Frascati, Italy.
2023	**Campos-Caba,** et al. *Preliminary developments for a machine learning downscaling and prediction system trained on long-term numerical simulations of sea level*. First Workshop on Observing and Predicting the Global Coastal Ocean. Lecce, Italy.
2023	**Campos-Caba,** et al. *Long-term numerical modeling of sea level in the Northern Adriatic for a machine learning downscaling system*. European Geoscience Union, General Assembly 2023. Vienna, Austria.
2022	**Campos-Caba** & Winckler, P. *Análisis de un modelo basado en las ecuaciones de Navier-Stokes promediadas por Reynolds y el volumen (VARANS) para evaluación de caudal de sobrepaso en una defensa costera*. IX International Seminar on Port Engineering. Valparaíso, Chile.
2016	**Campos-Caba,** et al. *Propuesta de escala de intensidad de daños de marejadas*. VII International Seminar on Port Engineering. San Antonio, Chile
2015	**Campos-Caba,** et al. *Cuantificación de los daños históricos por marejadas en las costas de Chile*. XXII Chilean Congress of Hydraulic Engineering (SOCHID). Santiago, Chile.