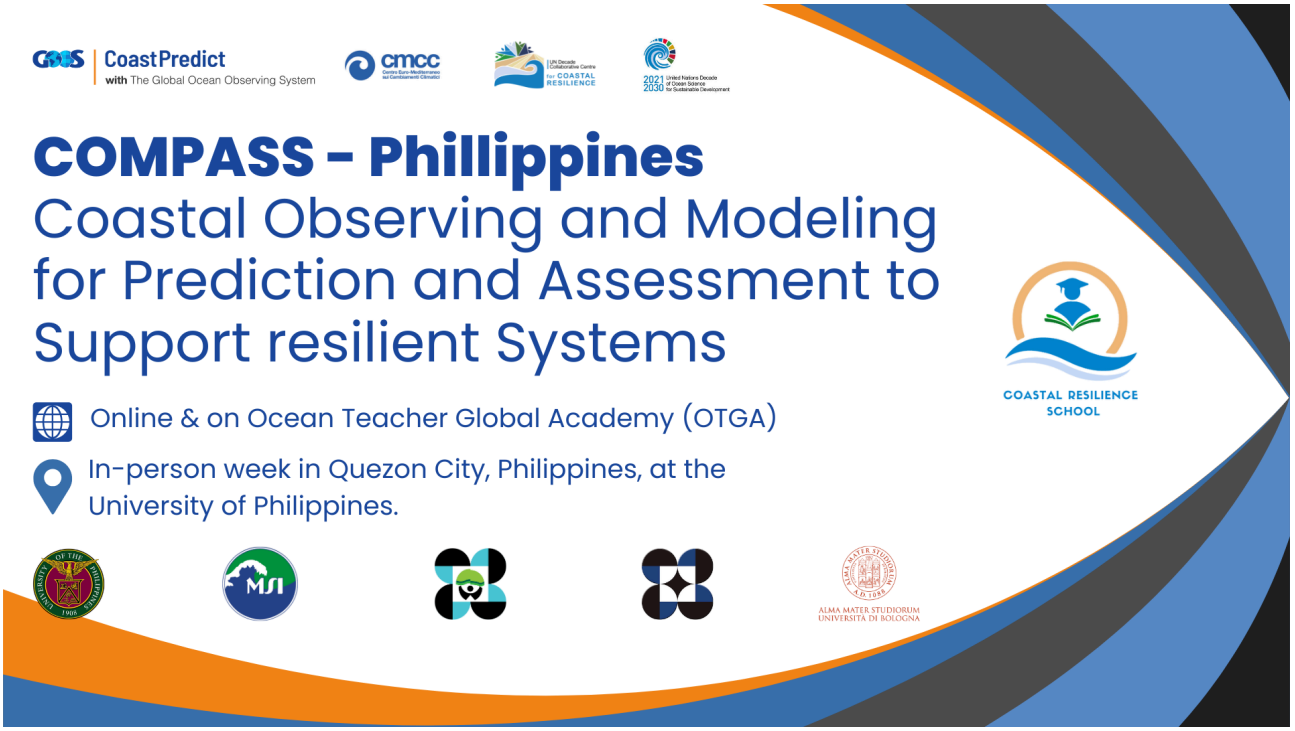

COMPASS - Philippines

Coastal Observing and Modeling for Prediction and Assessment to Support resilient Systems

Course Description/Summary

This training course is part of CoastPredict UN Ocean Decade GOOS Programme's capacity-building efforts and is a collaboration with the SUSTAIN project (UN endorsed project affiliated to CoastPredict). The training focuses on advancing skills in coastal ocean, wave, and biogeochemical modeling, and introduces innovations in observation and remote sensing, to strengthen coastal resilience in the Philippines. The course is organized by CoastPredict in collaboration with the Decade Collaborative Centre for Coastal Resilience (DCC-CR) 'Coastal Resilience School' and CMCC Foundation - Euro-Mediterranean Center on Climate Change, Italy.

Course Objective

The course is designed to provide participants with a comprehensive understanding of numerical ocean modeling, machine learning techniques, and remote sensing applications to simulate and analyze the dynamic and biodiverse marine environments of the Philippines.

A key feature of the course is hands-on training using the SURF ocean modeling platform, enabling participants to simulate real-world scenarios through detailed tutorials and case studies centered on the Philippine coastal region. The program emphasizes integrating physical, biological, and chemical processes in marine systems to support the protection and sustainable management of natural resources. Through this initiative, the course aims to enhance capacity for implementing data-driven solutions and strategies for resilience that can serve as a replicable model for other regions facing similar challenges.

In addition, the course integrates an Ocean Best Practices System (OBPS) module to promote standardized, reproducible methods in ocean observing and data management.

Learning Outcomes

By the end of this course, participants will be able to:

- Understand the fundamentals of ocean circulation, wave dynamics, and biogeochemical modeling.
- Set up and execute downscaling experiments using the SURF platform.
- Apply advanced AI modeling techniques to predict and analyze coastal chlorophyll concentrations.
- Understand key concepts in satellite data processing and remote sensing for oceanographic monitoring
- Understand how decision-support systems can assist in marine hazard management, oil spill forecasting, and ship route optimization
- Gain practical knowledge of coastal observations and hands-on experience in implementing and operating low-cost sea-level monitoring systems
- Explain the principles of ocean best practices, search for relevant methodologies within the OBPS, and contribute to the system by creating and submitting their own best practices.

  The following table outlines a provisional schedule for the training.
  The course is structured over two weeks:
  1) Week 1: Online introduction to the three major components of the training: circulation, waves and biogeochemical modelling
  2) Week 1 (Recommended Module): Introduction to the Ocean Best Practices System (OBPS), covering key concepts for creating and implementing ocean best practices
  3) Week 1: Online assignment due on March 2, 2025 to be submitted via OTGA
  4) Week 2: In presence lectures and practical exercises on the CINECA interactive computing infrastructure

Course Directors: Prof. Aletta Yñiguez and Dr. Francesco Trotta

WEEK 1: ONLINE Sessions - 24 + 26 February 2025 **Total Duration:** 4.5 hours		
Monday, 24 February 2025		
Time PH time	**Topic**	**Instructor**
15:00 – 15:15	Opening Session: Welcome, introduction of tutors, and course structure overview	Aletta T. Yñiguez Marine Science Institute - University of the Philippines
15:15 - 15.45	Overview of the Relocatable Ocean Modeling Platform SURF	Francesco Trotta CMCC Foundation - Euro-Mediterranean Center on Climate Change, Italy
15:45 - 16:15	Overview of Coastal Wave Modelling	Lorenzo Mentaschi UNIBO
16:15 - 16:30	**Coffee break**	
16:30 - 17:00	Introduction to Marine Ecosystem Modeling	Marco Zavatarelli University of Bologna
17:00 - 17:15	Introduction to Cineca's cloud computing system	Francesco Trotta CMCC Foundation - Euro-Mediterranean Center on Climate Change, Italy
17:15 – 18:00	Practical application of SURF	Luca Giunti CMCC Foundation - Euro-Mediterranean Center on Climate Change, Italy
18:00 – 18:30	Assign Exercises: Instructions and Overview (For downscaling)	Francesco + Luca
Wednesday, 26 February 2025		
15:00 – 16:00	Q&A session	Francesco + Luca + Lorenzo + Marco

~ 8 hours of online assignments are due March 2, 2025, to be submitted via OTGA.	
Recommended Module: Ocean Best Practices	
Lesson 1	What is a Best Practice?
Lesson 2	Creating a Best Practice

The following table outlines a provisional schedule for the in-person training. The week's activities will involve participants working in groups to develop case study simulations. These simulations will be submitted (through OTGA platform) and presented in a group presentation format at the end of the week.

WEEK 2: In-Person Sessions - 3 - 8 March 2025 Location - Marine Science Institute - University of the Philippines Format - Lectures practical sessions, case studies and group project work		
Monday, 3 March 2025		
Time (PH time)	**Topic**	**Instructor**
8:00 – 8:30	Registration	
8:30 – 8:40	National Anthem	
8:40 – 8:50	Welcome remarks	**Laura T. David** Director Marine Science Institute - University of the Philippines
8:50 – 9:00	Opening remarks	**Reynaldo V. Ebora** Executive Director Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development
9:00 – 9:10	Opening remarks	**Ivan Henares** Secretary-General Philippine National Commission for UNESCO

9:10- 9:30	Intro of CoastPredict and GlobalCoast as part of the UN Ocean Decade	**Nadia Pinardi** CoastPredict Chair Director - UN Decade Collaborative Center on Coastal Resilience
9:30 - 9:50	Welcome and Introduction to COMPASS (including recap)	Aletta T. Yñiguez Professor, Marine Science Institute - University of the Philippines Co-Director, COMPASS-Philippines
9:50 - 10:00	Introduction and Initial Reflections/Expectations	Francesco Trotta CMCC Foundation – Euro-Mediterranean Center on Climate Change Co-Director, COMPASS-Philippines
10:00 - 10:45	Icebreaker: Lecturers and Participant introductions and group distribution announcement	All participants
10:45 - 11:00	**Coffee break**	
11:00 - 11:30	Regional physical oceanography	Cesar L. Villanoy Marine Science Institute - University of the Philippines
11:30 - 12:00	Remote sensing applications in the Philippines	Laura T. David Marine Science Institute - University of the Philippines
12:00 - 13:00	**Lunch break**	
13:00 - 14:00	Observation and modeling in the Philippines	Aletta T. Yñiguez Marine Science Institute - University of the Philippines
14:00 - 15:00	Applications of SURF Ocean Model in the Philippines	Aiko Love B. del Rosario Marine Science Institute - University of the Philippines

15:00 - 16:00	Numerical modeling of marine ecosystems	Samantha Siedlecki (Remote) Department of Marine Sciences University of Connecticut
Tuesday, 4 March 2025		
9:00 – 10:30	Numerical Ocean Circulation, Dynamical Downscaling, and the NEMO Model: Advanced Techniques and Applications	Francesco Trotta CMCC Foundation
10:30 - 10:45	**Coffee Break**	
10:45 - 11:15	Practical session 1: • Review of Week 1 assignment • Case study simulations - instructions on what is needed at the end of week for the presentations	Francesco Trotta Luca Giunti CMCC Foundation
11:15 - 12:00	Practical session 2: Downscaling experiment using the SURF platform	Francesco Trotta Luca Giunti CMCC Foundation
12:00 - 13:00	**Lunch Break**	
13:00 - 14:00	Practical session 2 continuation: Downscaling experiment using the SURF platform	Francesco Trotta Luca Giunti CMCC Foundation
14:00 - 15:00	Decision Support system applications for Oil spills	Igor Atake (Remote) CMCC Foundation
15:00 -16:00	Ship voyage optimisation with VISIR-2	Gianandrea Mannarini (Remote) CMCC Foundation
Wednesday, 5 March 2025		
9:00 - 11:00	Practical session 3: Wave Modelling	Lorenzo Mentaschi University of Bologna
11:00 - 11:15	**Coffee break**	
11:15 - 12:00	Practical session 4: Biogeochemical models - 1D	Marco Zavatarelli University of Bologna
12:00 - 13:00	**Lunch Break**	
13:00 - 14:00	Practical session 4 continuation: Biogeochemical models - 1D	Marco Zavatarelli University of Bologna

14:00 - 15:00	Machine-learning model for chlorophyll	Federica Benassi CMCC Foundation
15:00 - 15:15	**Coffee Break**	
15:15 - 16:30	Practical session 5: Machine Learning Model Implementation	Federica Benassi CMCC Foundation
Thursday, 6 March 2025		
9:00 - 11:00	Coastal observations and citizen science	Viviana Piermattei CMCC Foundation
11:00 - 11:15	**Coffee Break**	
11:15 - 12:00	Practical session 6: Finalizing the Case Study Simulation	All in-person instructors
12:00 - 13:00	**Lunch Break**	
13.00 - 16.00	Preparations for group presentations	All in-person instructors
Friday, 7 March 2025		
09:00 - 10:30	Group Presentations	All in-person instructors
11:00 - 11:15	**Coffee Break**	
10:45 - 11:00	Group Presentations	All in-person instructors
11:00 - 12:00	Discussion and Q&A	All in-person instructors
12:00 - 12:30	Closing Remarks and Certificates	All in-person instructors
Saturday, 8 March 2025		
8:00 - 12:00	Field trip - Installation of Low-Cost Sea Level Sensors Details will be confirmed soon. Travel will be arranged from Marine Science Institute - University of the Philippines	Viviana Piermattei & Juan Francisco Martinez Osuna, CMCC Foundation