cmcc
Centro Euro-Mediterraneo sui Cambiamenti Climatici

FERS
Future Earth Research School

CMCC - Advanced Training and Education Center: The case of FERS School on Sea Level Rise and Coastal Adaptation

November 7, 2024
Ecomondo, Rimini

www.cmcc.it

Giulia Galluccio,
Director of the Information Systems for Climate Science and Decision-Making
Director of the Advanced Training and Education Center and FERS School
Euro-Mediterranean Center on Climate Change (CMCC)

CMCC Advanced Training and Education Center

The **Euro-Mediterranean Center on Climate Change** (CMCC) is an international, independent, multi-disciplinary research center that studies the interaction between climate change and society. We produce advanced climate research developing cross-cutting and multidisciplinary analyses and data that combine first-class climate modeling with climate change impact modeling and environmental economics.

We deliver the crucial scientific insight needed for a successful transition to a sustainable future by providing **foresight and quantitative analysis on our future planet and society**.

Among its institutes and centers of excellence, CMCC established the **Advanced Training and Education Center** (ATEC) in 2024. It is within the framework of the Center that the FERS School is offered. The Center operates with a fourfold mission:

- **Educating the next generation**
- **Building a Global Knowledge Hub**
- **Training for Policy and Governance**
- **Accelerating innovation in the Global South**

Climate Change Education

Sustainability-related degree programmes have proliferated rapidly among higher education institutions and sustainability literacy is therefore quickly emerging as a trend in Europe, with a marked geographic concentration in the North and Western Europe.

There is still **a gap in current Education programmes** focused on our themes:

UNESCO **data from 100 countries** shows that **only 53%** of the world's national education curricula **make any reference to climate change** and when the subject is mentioned, it is **almost always given very low priority**. (*UNESCO, Getting every school climate-ready: how countries are integrating climate change issues in education 2023*)

Distribution of the number of dedicated sustainability-related MSc degree programmes in Europe, per country, in 2024.

Distribution of the number of dedicated sustainability-related PhD degree programmes, in Europe, per country, in 2024.

Source: MAGICA Deliverable 4.8 "Report on Strategic Mapping of current available higher education programmes and products on climate change issues" (July 2024)

Future Earth Research School in a Nutshell

FERS is a **CMCC** initiative, organized within the **Advanced Training and Education Center**, funded by the **Emilia-Romagna Region**.

The School aims to become **a reference point** in research on sustainability by providing high-level scientific courses that give **young researchers and early-career professionals** the tools to **understand and anticipate future global environmental challenges**.

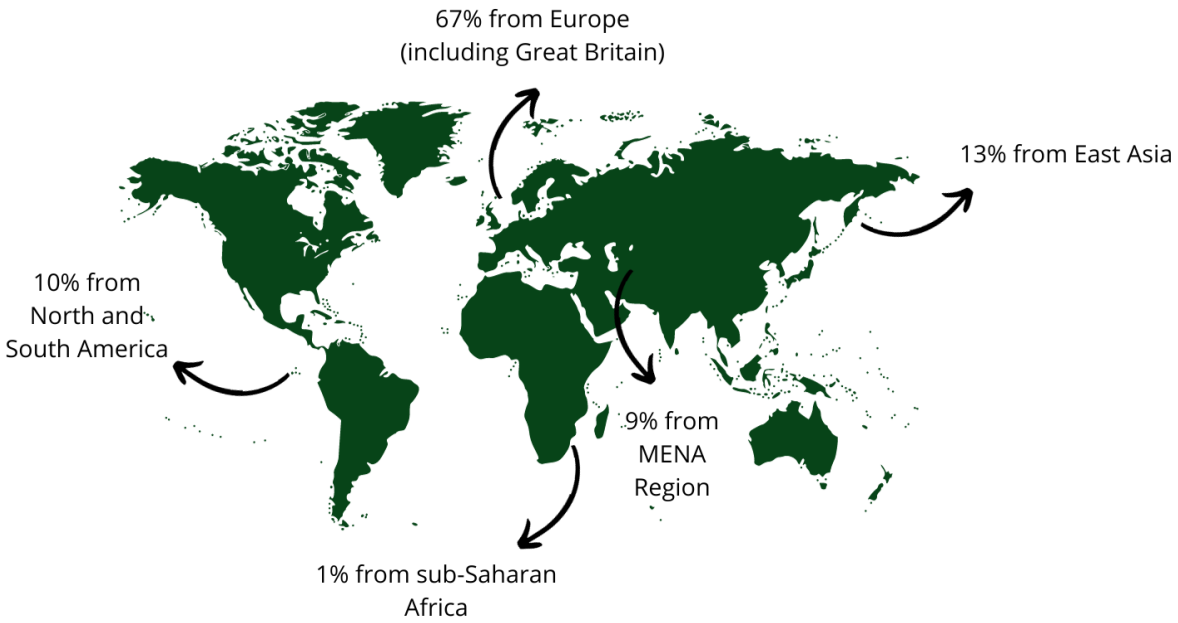
The school offers a unique opportunity for researchers and international experts to **collaborate and share experiences** on different multidisciplinary aspects of research, building a fertile ground for innovation and new research pathways.

FERS
Future Earth
Research School

Future Earth Research School

The school offers its courses in the beautiful, historic setting of the Fortress in Bertinoro, at CEUB, near Forlì-Cesena.

Future Earth Research School – Highlights



6 Courses completed
528 Hours of high-level scientific contents
+50 faculty members

120 Students
24 Countries
28.5 average age
51% Female

WATER RESOURCES, LAND-USE AND FORESTRY

20/6/2022 – 2/7/2022

Bologna, (BO)

ADAPTATION AND SUSTAINABLE RISK MANAGEMENT

3/10/2022 – 15/10/2022

Bertinoro, (FC)

Future Earth Research School – Highlights

DATA SCIENCE AND MACHINE LEARNING

5/6/2023 - 16/6/2023

Bertinoro, (FC)

LAW, FINANCE, AND LITIGATION: addressing climate change risks in Europe

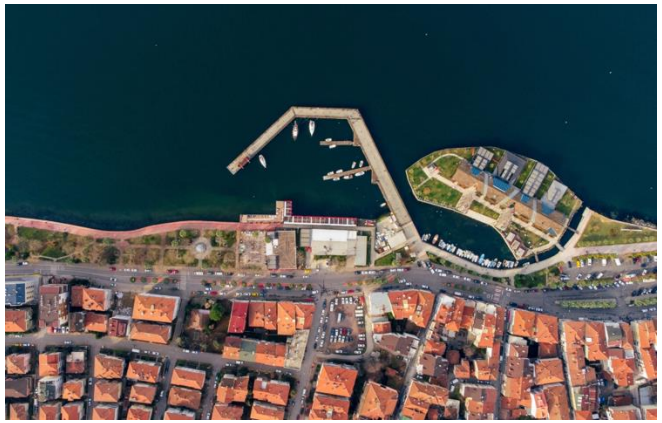
7/10/2024 - 18/10/2024

Bertinoro, (FC)

SEA LEVEL RISE AND COASTAL ADAPTATION

9/10/2023 - 20/10/2023

Bertinoro, (FC)



DATA DRIVEN MODELING AND PREDICTIONS OF THE EARTH SYSTEM

9/12/2024 - 20/12/2024

Bertinoro, (FC)

Course on
Sea Level Rise and Coastal Adaptation

The course took place from October 9 to 20, 2023.

It involved **21 attendants** from **11 different countries** and with **different multidisciplinary backgrounds**.

The participants had the opportunity to

- Meet and participate in **lectures** delivered by a **high-level faculty** specialized on the course topics.
- **Network and interact with the faculty.**
- Meaningfully **interact** with each other and **develop experience** on the course main topics.
- Have direct experience through guided tour a **guided tour visit**, together with members of the faculty, to the **Po Delta Park**, one of the most important wetlands in Europe and the largest in Italy.

Sea Level Rise and Coastal Adaptation - The Structure

Course structure

Week 1: Understanding Sea Level Rise

- The science behind sea level changes
- Sea level measurement techniques
- Sea level modelling
- Factors influencing sea level variability
- Climate change and sea level rise

Week 2: Impacts and Adaptation

- Coastal processes affected by sea level rise
- Analysis of case studies showcasing the environmental, economic, and social impacts of sea level rise on coastal regions
- Overview of different adaptation strategies and approaches to addressing sea level rise impacts
- Integrating Science into Coastal Adaptation

Sea Level Rise and Coastal Adaptation - The Faculty

Begoña Pérez Gómez
Director of the Course
Physical Oceanographer
Head of the Harbour Oceanography Department at Ports of Spain

Gianandrea Mannarini
Physicist
Institute for Earth System Predictions
Global Coastal Ocean Division at CMCC Foundation

Simona Masina
Physical Oceanographer
Director of the Ocean Modelling and Data Assimilation (OMDA) Division at CMCC Foundation

Nadia Pinardi
Physical Oceanographer
Director of the UN Decade Collaborative Centre for Coastal Resilience hosted by the University of Bologna

Ivan Federico
Scientist in Ocean Modelling
Ocean Predictions and Applications (OPA) Division at CMCC Foundation

Agustín Sánchez-Arcilla
Civil Engineer
Full professor at the Department of Civil and Environmental Engineering (DECA) of the Polytechnic University of Catalonia

Sea Level Rise and Coastal Adaptation - The Faculty

Sara Morucci
Physicist
National Centre for Environmental Characterization, Coastal Protection and Maritime Climatology, Operational Oceanography; ISPRA

Giorgia Verri
Physist and Envrionmental scientist
Ocean Predictions and Applications (OPA) Division at CMCC Foundation

Vittoria Mencarini
Architect
Municipality of Ravenna

Claudia Romagnoli
Geologist
Associate Professor, University of Bologna, Department of Biological Sciences, Geology and Environment (BiGeA)

Francesco Trotta
Ocean Modeler
Ocean Predictions and Applications (OPA) Division at CMCC Foundation

Javier López Lara
Civil Engineer
Head of the Climate Risks, Adaptation and Resilience Group of IHCantabria

Johannes Pein
Marine Environmental Scientist
Institute of Coastal Systems, Analysis and Modelling, Hereon Research Center, Geesthacht

Group Works: Coastal Cities - Case Study

Besides a more traditional learning approach, FERS courses include active learning activities, to engage with the faculty and fostering interaction among participants.

Participants in the course on Sea Level Rise and Coastal Adaptation were divided into 5 small groups to put into practice and exchange knowledge.

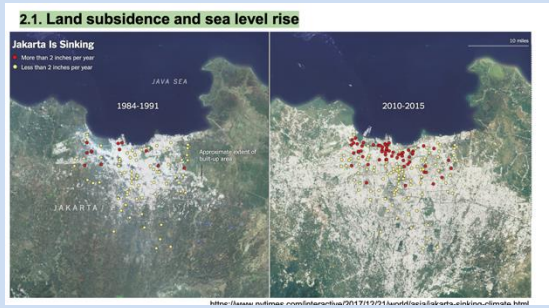
Group Works: Coastal Cities - Case Study

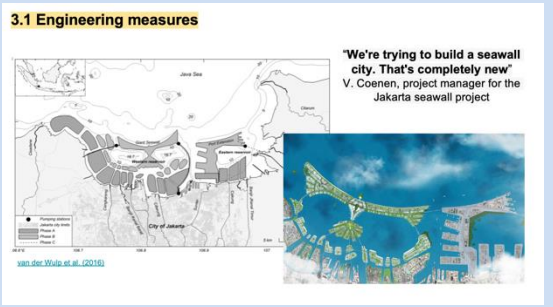
The groups analyzed **5 different case studies** (i.e., **coastal cities**), delving into and evaluating different type solutions and responses, including

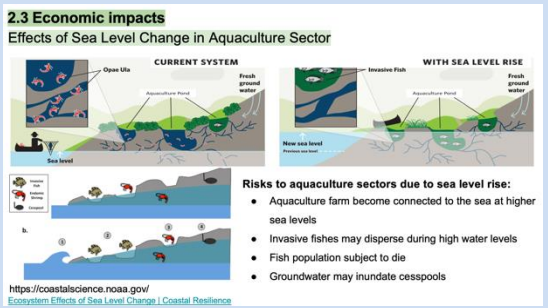
→*Current & Future Conditions*
→*Risk & Impact Analysis*
→*Existing adaptation solutions assessment*
→*New proposal development*

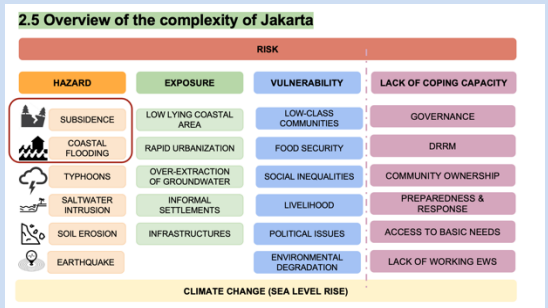
During the activities, while gaining concrete insight into coastal adaptation to sea level rise, the groups received **recommendations from the faculty.**

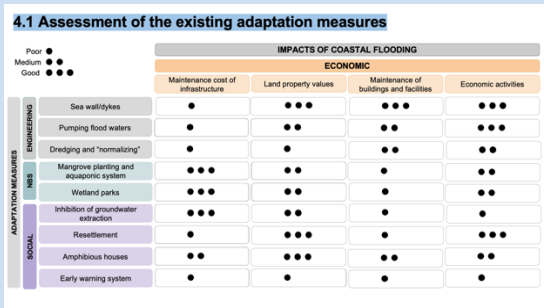
Jakarta, Indonesia





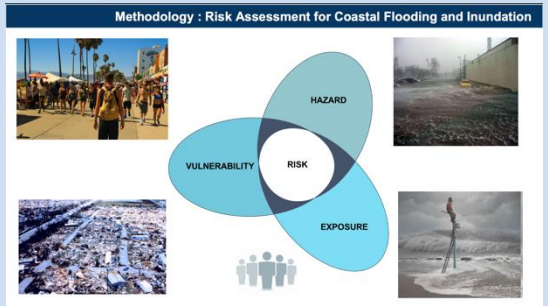


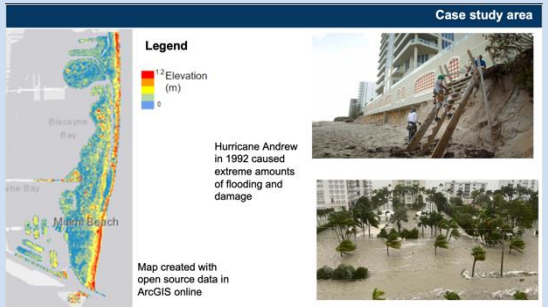


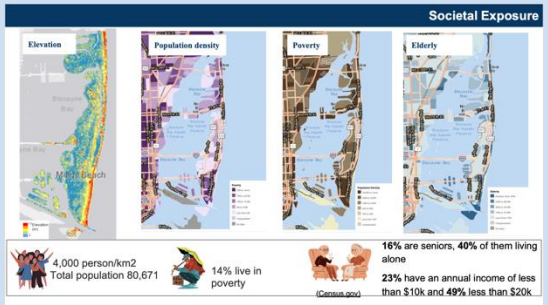


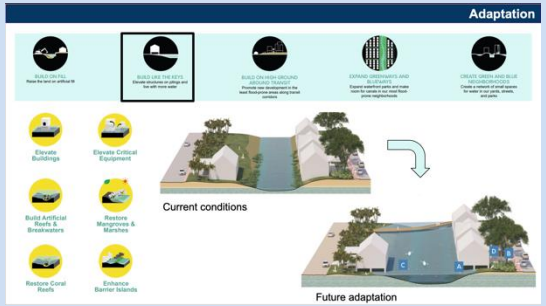
Group Works: Coastal Cities - Case Study

Miami, USA

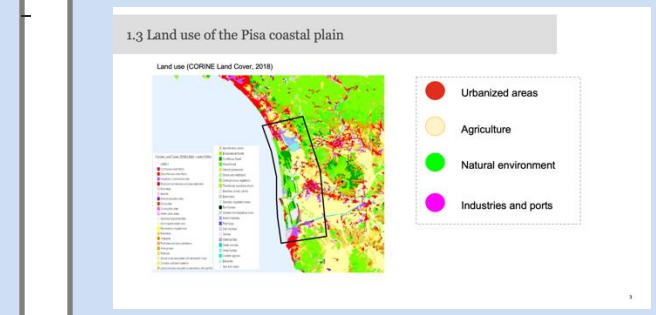


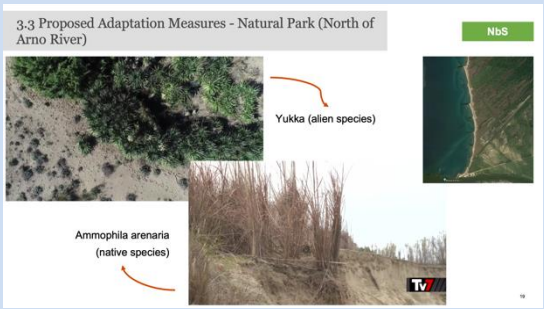


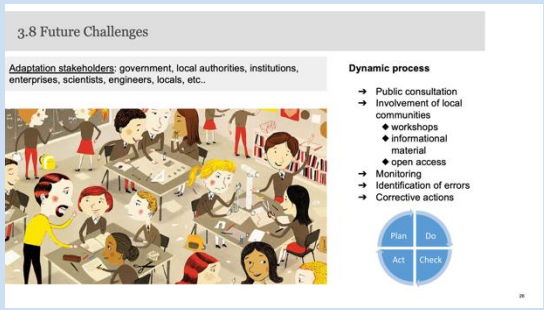




Pisa, Italy

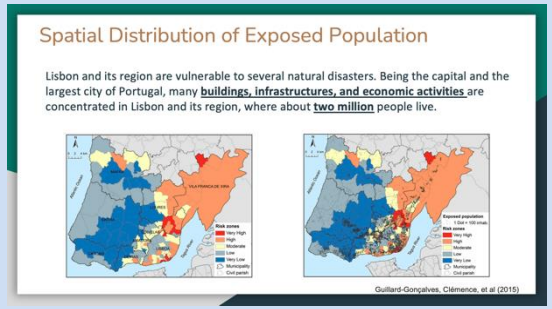


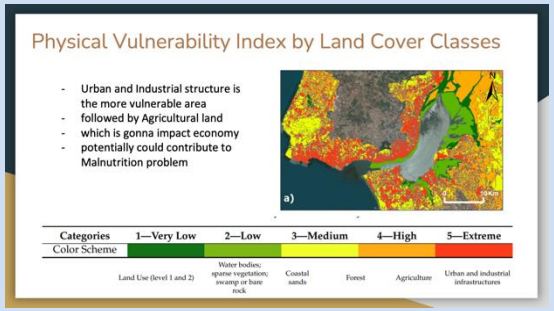




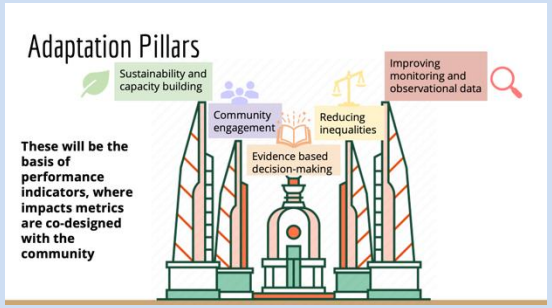
Group Works: Coastal Cities - Case Study

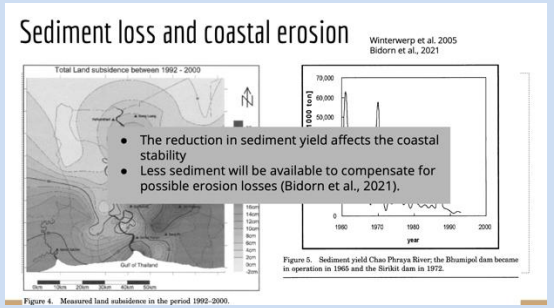
Lisbon, Portugal

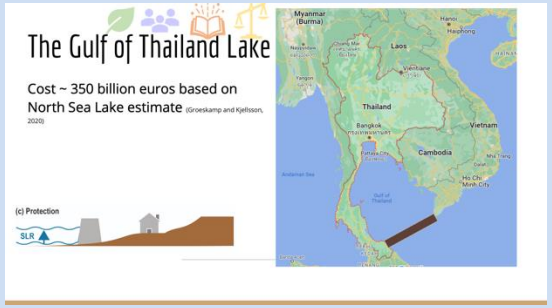




Bangkok, Thailand







Site visit: Po Delta Park

The course included a site visit to provide participants with **a first-hand experience of sea-level rise challenges in Italy.**

The activity included a visit to the Delta Po Park, near Ravenna, included in UNESCO **Man And Biosphere (MAB) Reserves list**, and an example of **Ecosystem-Based Adaptation measure**.

As a **sea-level rise hotspot in Italy,** the group was guided by the expertise of **local practitioners**, exploring the sandy coastline and historical managed pine forests around the **Lamone River mouth.**

Participants' feedback and future perspectives

FERS School considers it essential to **collect feedback** from participants in order to further establish itself as a **reference point**, while continuously adapting to the **evolving needs of new generations and trends**.

The course on Sea Level Rise and Coastal Adaptation was structured to enable participants to get a **comprehensive understanding** of the science, measurement and modelling techniques, impacts and adaptive measures related to sea level, to **access and interpret relevant data** sources and visualization tools**,** and to be well-equipped to **contribute to the development** of sustainable and resilient coastal communities based on existing and ongoing initiatives.

What the participants appreciated:

- **Networking** with professors and students with different backgrounds
- New **ideas and methodologies**
- **Group works, site visit, practical sessions**

The School aims for future courses to keep the **interdisciplinary and holistic approach**, exploring ways to further **expand the blend of more traditional and practical activities**, which are often the most challenging yet valuable opportunities for younger generations of researchers and professionals.

FERS
Future Earth
Research School

Thank you for your attention!

Any questions?

cmcc
Centro Euro-Mediterraneo
sui Cambiamenti Climatici

www.cmcc.it