

Advancing multi-risk assessment for sustainable climate change adaptation

Research keywords:	Multi-risk approach for compound and interlinked climate, environmental and natural hazards on terrestrial, marine, and coastal environments Risk trade-offs and synergies between land and sea interactions Machine learning and data science for advanced risk assessment
Reference ERCs:	PE10_3 Climatology and climate change PE6_11 Machine learning, statistical data processing and applications using signal processing (e.g. speech, image, video) PE4_18 Environment chemistry
Reference SDGs:	GOAL 11: Sustainable Cities and Communities GOAL 13: Climate Action GOAL 14: Life Below Water
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Research topic

Climate change is inextricably linked with natural disasters and other environmental and anthropogenic risks within a complex system featured by the interplay of micro- and macro-processes, a non-linear causal structure, and potential irreversible effects. However, the prevalent climate change risk governance paradigm still focuses on hazard-silos, thereby not accounting for interactions and feedbacks that can significantly alter our understanding of future disaster scenarios. The PhDs main objective is to explore new conceptual and analytical approaches for transdisciplinary, integrated, multi risk assessments, toward sustainable climate adaptation, in the context of the spatiotemporal dynamics of terrestrial, marine, and coastal environments in response to multiple natural and anthropogenic hazards. The research will seek to connect different aspects of multi-risks within real-world case studies, including the consideration of compound and consecutive events, cascading and transboundary effects, focusing on trade-offs and synergies between land and sea interactions. Emphasis will be given to the use of new technologies (machine learning, artificial intelligence, crowdsourcing and earth observation data) unlocking opportunities of addressing multi-risks and sustainable adaptation pathways in ways that have never been possible before.

Research team and environment

The PhD candidate will take advantages of the laboratories, tools and infrastructures at the CMCC@CaFoscari. CMCC@CaFoscari is the research centre on climate change of CaFoscari University of Venice, the result of a strategic partnership with the CMCC FoundationEuro-Mediterranean Center on Climate Change (CMCC). CMCC@CaFoscari is today the most important climate research centre developed by an Italian university. Its multidisciplinary task force includes climatologists, economists, chemists, and statisticians, conducting national and international research on the interaction between the climate, the environment, the economy, and society. The Fellow will benefit from CMCCs computational modelling infrastructure, including one of the most powerful supercomputers in Europe, dedicated to the climatic modelling and forecasting and to the assessment of the economic repercussions of climate change. The beneficiary will be offered with an international and multi-disciplinary environment that is non-discriminatory and transparent in its recruitment and professional advancement. Furthermore, professional supervision and career mentorship, a periodic research review and evaluation, and a stimulating research and training atmosphere are all guaranteed for the Fellows career advancement.

Suggested skills

- A) Knowledge of the impacts of climate change and extreme events;
- B) Knowledge of environmental risk assessment;

- C) Experience in data compilation and handling;
- D) Experience in the development and validation of Machine Learning models (e.g. Neural Networks) for the spatio-temporal analysis of environmental systems dynamics;
- E) Programming skills in R and Python;
- F) Excellent communication and writing skills in English;GOAL 14