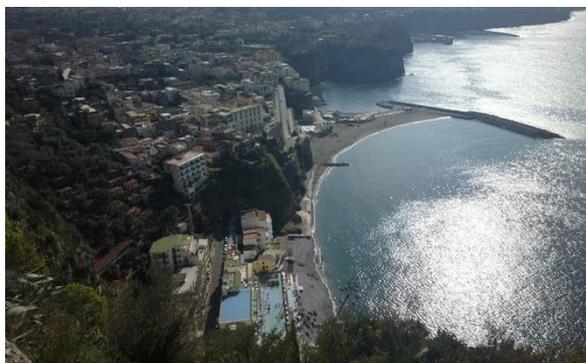


ECRA Collaborative Programme

Sea Level Change and Coastal Impacts



Changes in the sea level and vulnerable regions

Sea level rise poses a particularly ominous threat to human habitations and infrastructure in the coastal zone: 10% of the world's population (about 0.7 billion people) live in low-lying coastal regions within 10 m elevation of present-day mean sea level. Sea level rise impacts have been identified as a critical variable for the establishment and maintenance of coastal communities, as a threat to biodiversity and as being responsible for the increasing magnitude and spatial extent of storm surge flood hazard. There are however still large uncertainties regarding the dimensions and timing of the changes to come. Therefore, more research is needed on methods to assess the effects of climate change, to establish sea level confidence thresholds, to consistently assess future risk of extreme sea level events, and to create and implement adaptation strategies to face the most drastic sea level rise impacts, particularly those associated with low-probability but high-impact changes.

Key topics for ECRA – Sea Level Change and Coastal Impacts

- Coastal Flooding
- Regional studies of sea level change, sea level extremes and possible impacts
- Regional context of semi-enclosed basins (e.g. Mediterranean Sea and Baltic Sea)
- Adaptation strategies in a regional context
- Communication and collaboration between natural, social and economic scientists, stakeholders, policy makers, and the public.

Recommendations for research priorities in H2020 and beyond

➤ *Continue and expand observations of sea level*

A combined use of different types of Earth system data is necessary in order to properly understand processes governing variability and long-term change. **Assimilation of high quality observational data** into operational models and development of decadal prediction systems is essential for improved understanding of the Earth system, and hence being able to project future changes. **Paleo sea level records** help placing modern changes in context and can be used to constrain estimates of future sea level change. Paleo records aid estimations of present and future vertical land motion, which is essential for regional sea level assessments.

➤ *Improve regional ocean modelling*

The largest and the most uncertain contributions to relative regional sea level change need to be in the focus of research. **Ocean models should resolve the regional physics** governing continental shelf and coastal sea level change on a local scale. **Uncertainties** need to be reduced **and confidence in projections** improved. **Upper tail risks of regional sea level rise** are particularly important for adaptation of key infrastructure, since they represent low probability, high impact events. **Decadal prediction systems** will improve our knowledge of the system and the way we model it. **Reduction of emission scenario uncertainty** is a scientific topic of socioeconomics that feeds back to the natural science research on sea level projections.

➤ *Studies on the combination of sea level change and extremes*

Storm surges and flood risks need to be better known along our coasts, and ideally the same analysis methodologies should be employed across Europe. **Combining extreme sea level estimates with mean sea level projections** in order to estimate future extreme levels is an emerging subject of research, and a probabilistic approach to this is recommended. **Changes in storms, wave climate, tidal regimes, and their interaction with changing mean sea levels** are subjects not widely incorporated in sea level change research efforts today, but of importance for potential future impacts.

➤ *Impact and adaptation strategies*

Socio-economic impacts of sea level rise, extremes and adaptation measures on human settlements and human activities need to be assessed and mapped out for our coastal regions. **Adaptation governance and risk management** is needed for society in the face of the potential impacts. The efficiency of these measures could be increased if a common methodology was shared.

➤ *Improve collaboration between natural, social and economic scientists, stakeholders, policy makers, and the public*

Co-designing projects from the start is necessary for trans-disciplinary communication and co-production of knowledge relevant for decision-making. **Collaboration with other initiatives** focussing on communication between natural and socioeconomic research in climate (e.g. Future Earth) should be increased. **Community engagement and education** is particularly important as there is still significant reluctance to accept adaptation.

Coordinators

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