JPI OCEANS
JPI Climate

KNOWLEDGE HUB
SEA LEVEL RISE

PRELIMINARY FINDINGS
BASIN WORKSHOPS

2021
2030
United Nations Decade
of Ocean Science
for Sustainable Development

PRELIMINARY FINDINGS
BASIN WORKSHOPS

This booklet contains the preliminary findings from the four basin-specific workshops organized by the Knowledge Hub on Sea Level Rise in the spring of 2022.

The workshops were an integral part of a two-year long scoping process carried out to identify and target the needs and involvement of policy makers, coastal planners and stakeholders at large. The findings from the workshops served to inform and co-design the key topics addressed at the Sea Level Rise Conference 2022. They will also inform the Knowledge Hub's first assessment report on sea level rise drivers, impacts and policy options for each of the major ocean basins around Europe.

The Knowledge Hub on Sea Level Rise thanks all participants to these workshops, and the hosts who helped to make them possible.

Each workshop was divided into three sections addressing:

SLR PHYSICAL SCIENCE AND DATA

SLR HAZARDS AND IMPACTS

SLR ADAPTATION POLICIES AND DECISION MAKING

North Sea and Arctic basins

21-22 March 2022

SCIENCE AND DATA

Recurrent themes in the sessions on the physical science of sea level rise (SLR) were the need to have locally specific reconstructions and projections of extreme sea levels. It is recommended to assimilate or integrate appropriately local observations for the historical extreme events thus providing the ba- sis for accurate impact studies and statistics. Science users also expressed the wish for more guidance on existing models, recent advances, limitations and the interpretation of model outputs, particularly with respect to low probability high-impact scenarios and sea-level milestones.

HAZARDS AND IMPACTS

With respect to hazards and impacts, regional assessments need to combine effects from multiple processes, such as vertical land movements and changes in wind patterns, among others, that can in- fluence the magnitude of sea-level extremes and the footprint of compound flooding events in coastal areas. Even though the relevant impacts of sea level rise (such as erosion, salt intrusion, flooding) vary across regions, potential benefits were identified for mutual learning and information sharing with respect to data, tools, and a European catalogue of major historical events.

ADAPTATION POLICIES AND DECISION MAKING

In the breakout sessions on policy and adaptation, a clear need for an overview of adaptation op- tions emerged. Such an overview should describe the applicability of individual options in specific environments, scalability, the co-benefits and drawbacks and example applications. Policy-makers expressed a particular interest in nature-based solutions and guidance on structuring the adaptation planning process, for example, through Dynamic Adaptive Policy Pathways. A comparative assess- ment of policies across countries was deemed desirable to learn from each other and to evaluate progress on adaptation.

WORKSHOP Hosts and Authors
Gundula Winter, Deltares NL; *Antonio Bonaduce*, Nansen Environmental and Remote Sensing Center - NERSC; *Bart van den Hurk*, Deltares NL.

Mediterranean and Black Sea basins

5-6 May 2022

SCIENCE AND DATA

The plenary session presented an overview of both SLR observations and projections in the Mediter- ranean and the Black Sea basins. In recent decades the Mediterranean basin witnessed lower Mean Sea Level (MSL) increase with respect to the global value. As regards the next decades, it was shown that mean sea level rise projections diverge from 2050, reaching about 1.20 m by 2150 in the Mediter- ranean Sea. Furthermore, coastal impacts of SLR will be felt much earlier than projected inundations due to sea level extremes and cascading effects.

The breakout sessions provided input on gaps and needs that have been subdivided into 5 main cate- gories: 1) Information data management; 2) combined in situ and satellite data analysis; 3) numerical modelling; 4) cross-disciplinary information; 5) data policy.

HAZARDS AND IMPACTS

The most important hazards and impacts identified during the keynote and the breakout sessions include coastal erosion, coastal flooding and water-related risks (mostly referring to the salt intru- sion due to SLR). It was also stated that one of the most important hazards is related to the chronic flooding in low-lying coastal areas and the change in coastal ecosystems that it implies. In addition, at centennial timescales, projected SLR poses an existential threat to island nations, low-lying coastal zones and their communities. There are major knowledge gaps related to the hazards and vulnerabil- ity of the southern Mediterranean Sea and non-European Sea coastal areas.

ADAPTATION POLICIES AND DECISION MAKING

During the breakout sessions, the following key themes emerged as important topics to be addressed in the assessment report: long-term planning for future generations; the need to close the knowledge gap through the standardization of data and new knowledge for informing prioritization of action; the need to recognize "integrated coastal management" (ICM) as a starting point for the definition of new policy instruments and the need to consider social aspect in the definition of adaptation policies.

WORKSHOP Hosts and Authors
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East Atlantic basin

28 – 29 April 2022

SCIENCE AND DATA

The discussions highlighted knowledge gaps relevant for our management of future sea level rise (SLR), such as comprehensive SLR scenarios in estuaries or local-scale assessments needed to fill geographic gaps in information. The spatial resolution of climate models and projections or the need to include low likelihood scenarios were also emphasized. The monitoring of ice sheets and other key processes was actively discussed in the context of the set-up of early warning systems. Other points of advance included the necessity to improve ice sheet modelling, a better understanding of tipping points, and updated sea level budgets along coastlines.

HAZARDS AND IMPACTS

There was broad consensus on the need of a better assessment of the combined impact of waves, surges, tides and mean sea level rise. Ideally, planning for the future should account for the variability of compound changes in flood hazard, due to, for example, changing trends in storminess. Cascading impacts involving sea level rise and human activities were felt as being often overlooked. The pro- tection of cultural heritage needs specific actions, but the implementation of tailored and informed strategies seems to be hindered by the lack of systemic and localized assessments.

ADAPTATION POLICIES AND DECISION MAKING

Adequate identification and improved engagement of stakeholders emerged as prerequisites to the adaptation process that necessitate additional effort. An improvement on the language used to com- municate with the general public and with policymakers was felt to be an essential issue, as was the need for national debates on SLR adaptation. Clearly framing the co-benefits of adaptation and the cost of action (and, just as importantly, the cost of non-action) are paramount to increase trust in sea level projections. There was general agreement on the need of developing a set of several future scenarios of SLR tailored to different stakeholders.

WORKSHOP Hosts and Authors
Natalia Vazquez Riveiros, French Research Institute for Exploitation of the Sea (IFREMER)

SCIENCE AND DATA

Knowledge gaps in the science of sea level rise, extremes, sediment transports, waves, coastal ero- sion, etc. were recently summarized by the Baltic Earth Assessment Reports and the HELCOM-Baltic Earth factsheet on climate change . For the detection of past changes, existing sea level records are too short and many analog data are still not digitized. More high-resolution satellite data products should become available. There is no evidence from future projections that wind and sea level ex- tremes relative to the mean sea level will change. Hence, the largest uncertainties in sea level pro- jections are caused by global model uncertainty (melting of ice sheets) and future greenhouse gas emissions. For the analysis of changing sea level extremes, larger ensembles of scenario simulations are needed.

HAZARDS AND IMPACTS

Due to the economic resources available in the Baltic Sea countries and due to land uplift indirect im- pacts of climate change induced sea level rise such as salinification of drinking water supplies might be as important or even more important than direct impacts such as flooding. However, compound hazards of the interaction of sea level rise and river discharge are threats for some coastal municipal- ities (Stockholm, Pärnu, Klaipeda).

ADAPTATION POLICIES AND DECISION MAKING

Sea level rise policies and maritime spatial planning, which is already well developed in many places, need to be better linked. Furthermore, the following themes were found to be important: (a) the role of the insurance/banking sector in sea level rise policy and planning; (b) the disconnection between the scientific approach that emphasises uncertainty and the planning/policy deterministic approach requiring specific numbers and thresholds; (c) how to combine short- and long-term planning (key- word: adaptive planning approaches); and (d) assessing the possible consequences of sea level rise related measures and policies.

WORKSHOP Hosts and Authors
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KNOWLEDGE HUB DESCRIPTION

The Knowledge Hub on Sea Level Rise, a joint effort by JPI Climate and JPI Oceans, is a networking platform facilitating the interaction between research and policy on regional to local sea level changes in Europe. It aims to support the devel- opment and implementation of related policies at local, national and European level by promoting exchange, synthesis, integration and generation of knowledge on regional and global, historic and future sea level rise.

By addressing scientific knowledge gaps and exchanging information between the involved disciplines to provide more frequent, detailed and regional-scaled assessments of sea level change, the Knowledge Hub can enable policy makers to make well-informed decisions regarding protective and adaptive measures.

The long-term ambition is to provide periodic assessments of knowledge on sea level rise drivers, impacts and policy options for each of the major ocean basins around Europe, to provide end-users and stakeholders with easy access to usable and regularly updated knowledge on regional-local sea level change. It will com- plement existing global and European assessments.

Since 2022, the Knowledge Hub on Sea Level Rise is endorsed as a UN Ocean Decade project, linked to the CoastPredict Programme.

KNOWLEDGE HUB SEA LEVEL RISE

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