Special Report on Coastal Risks

Concept note for discussion with MedECC partners and stakeholders

The First Mediterranean Assessment Report (MAR1) on the current conditions and expected risks of climate and environmental change in the Mediterranean Basin has been released on 17 November 2020. The overarching goal for the development of MAR1 was to cover all major risks associated with environmental change as comprehensive as possible, regarding the major drivers of risk, the major systems impacted and as much as possible the subregions of the Mediterranean Basin. During this work, several important issues have emerged that require deeper analysis, often associated with the appearance of new scientific studies. It is therefore proposed that the MedECC community, and the approach developed for MAR1, could be enabled to produce a special report, during the period 2021-2022 addressing coastal risks.

This note outlines the procedure and resource requirements for the development of this special report, as well as introducing the identified topics. It is essential that MedECC assessments imply an open thematic scoping process with full stakeholder participation, followed by work of MedECC network members bound solely by academic criteria. Findings are presented for discussion by stakeholders again, in order to ensure that the presentation of key results is comprehensible and useful for improved policy making.

Report preparation

The proposed preparation of each report follow the general principles applied in scientific assessments, as applied for MAR1, but within a compressed timeframe. The essential elements of this process are,

1) scoping of the report content among scientific experts, informed by the needs of decision makers, resulting in an outline approved by major stakeholders,
2) selection procedure of (voluntary, self-nominated) lead authors, emphasizing scientific competence but also regional, topical and gender diversity, the resulting list approved by the Steering Committee,
3) nomination and appointment of two scientific coordinators for each report,
4) collaborative assessment of the available scientific literature, in order to write the report content, guided by the report coordinators, assisted by MedECC coordinators, involving regular online meetings,
5) expert review of one intermediate and the final draft,
6) drafting of a summary for policymakers (SPM) by report coordinators, lead authors and MedECC coordinators,

7) discussion of SPM with key stakeholders in an open meeting.

Draft concept notes for MedECC Special Report on Coastal risks

A third of the Mediterranean population (around 150 million people) lives close to the sea and depends on infrastructure developed in the immediate vicinity of sea due to the low amplitude of the tides. 40% of Mediterranean coastal areas are built-up or otherwise modified, often rendering them particularly vulnerable to coastal flooding and erosion (caused by sea level rise in combination with extreme climatic events, and reduced sedimentation in river estuaries), to the infiltration of seawater into coastal aquifers (seawater intrusion), and more generally to the degradation of habitats including wetlands and agricultural systems.

Mean sea level in the Mediterranean Basin has risen by 1.4 mm yr^{-1} during the 20^{th} century and has accelerated to reach 2.8 mm yr^{-1} recently (1993–2018). Mediterranean sea level rise is expected to continue (with regional differences) by the expected global rate of 43-84 cm above current levels until 2100, but with a significant risk to exceed 1 m in the case of further ice-sheet destabilization in Antarctica. Sea level rise will increase most coastal risks through the increase in frequency and intensity of coastal floods and erosion. Until 2100, flood risk may increase by 50% and erosion risk by 13% across the Mediterranean region. Damaging flash floods are likely to increase in many countries including Italy, France and Spain, affecting mainly the coastal areas, in particular, where population and urban settlements are growing in flood-prone areas, these will likely become more frequent and/or intense due to climate change and surface-sealing. Important challenges to groundwater quality in coastal areas are likely to arise from salt-water intrusion driven by enhanced extraction of coastal groundwater aquifers and sea-level rise.

Reduced precipitation and prolonged droughts will reduce the water discharge and sediment flow of Mediterranean rivers and catchments, leading to the risk of land loss in estuaries and deltas. The agriculture sector will be affected by direct impact on (or loss of) agricultural areas in coastal zones (e.g., in Egypt), along with up to three-fold increase in salinity of irrigation water and soil and retention of sediments that do not reach the coast. Sea level rise affects also coastal wetlands and estuaries with most severe impacts on the least mobile species.

Coastal erosion due to sea level rise and urban development will also likely affect tourism. The effect of sea level rise, together with changes in storm features is likely to seriously impact port operations, slowing down trade operations and productivity levels. Parts of the rich Mediterranean cultural heritage, notably many UNESCO World Heritage Sites, are threatened directly by sea-level rise or other aspects of environmental change.

Proactive adaptation to these hazards is essential for maintaining functioning coastal zones. Coastal adaptation practices can be classified in the following broad categories: protect, accommodate, advance, and retreat. Nature based protection solutions, i.e. beach and shore

nourishment, dune or wetland restoration, reforestation in upstream areas, and adequate agricultural practices to retain water, are becoming a more common alternative. Flood fatalities are reduced as societies are learning to live with flood hazards. Good practices in flood management are development, such as early warning systems, construction of check dams, improvement of drainage systems in urbanized areas or emergency management plans.

The report will assemble new information and thereby update the assessment of MAR1 about coastal risks, and identify potential for adaptation and risk reduction. As a basis for discussion, a list of topics expected to be covered have already been identified (not definitive, neither exhaustive):

(1) the description of the present knowledge on drivers of change:

- pollution,
- climate change,
- use of resources,
- invasive species,
- geohazards and tsunamis…

(2) the observed impact and future risks on ecosystems, ecosystems services and socio-economic sectors:

- marine and terrestrial coastal ecosystems,
- wetlands, coastal lagoons, deltas, and estuaries
- water quality, availability, and salt water intrusion
- coastal erosion
- health,
- tourism,
- coastal infrastructure,
- energy,
- food production (including aquaculture),
- coastal urbanization,
- cultural heritage, trading, and port operations,
- economic impacts,
- coastal security…

(3) the adaptation and solutions:

- policy and financial tools,
- natural based solutions,
- sustainable development pathways,
- limits of adaptation and residual risks,
- tipping points,
- timing of action,
- rediscovering local traditional knowledge,
- social equity,
- Co-benefits with mitigation…