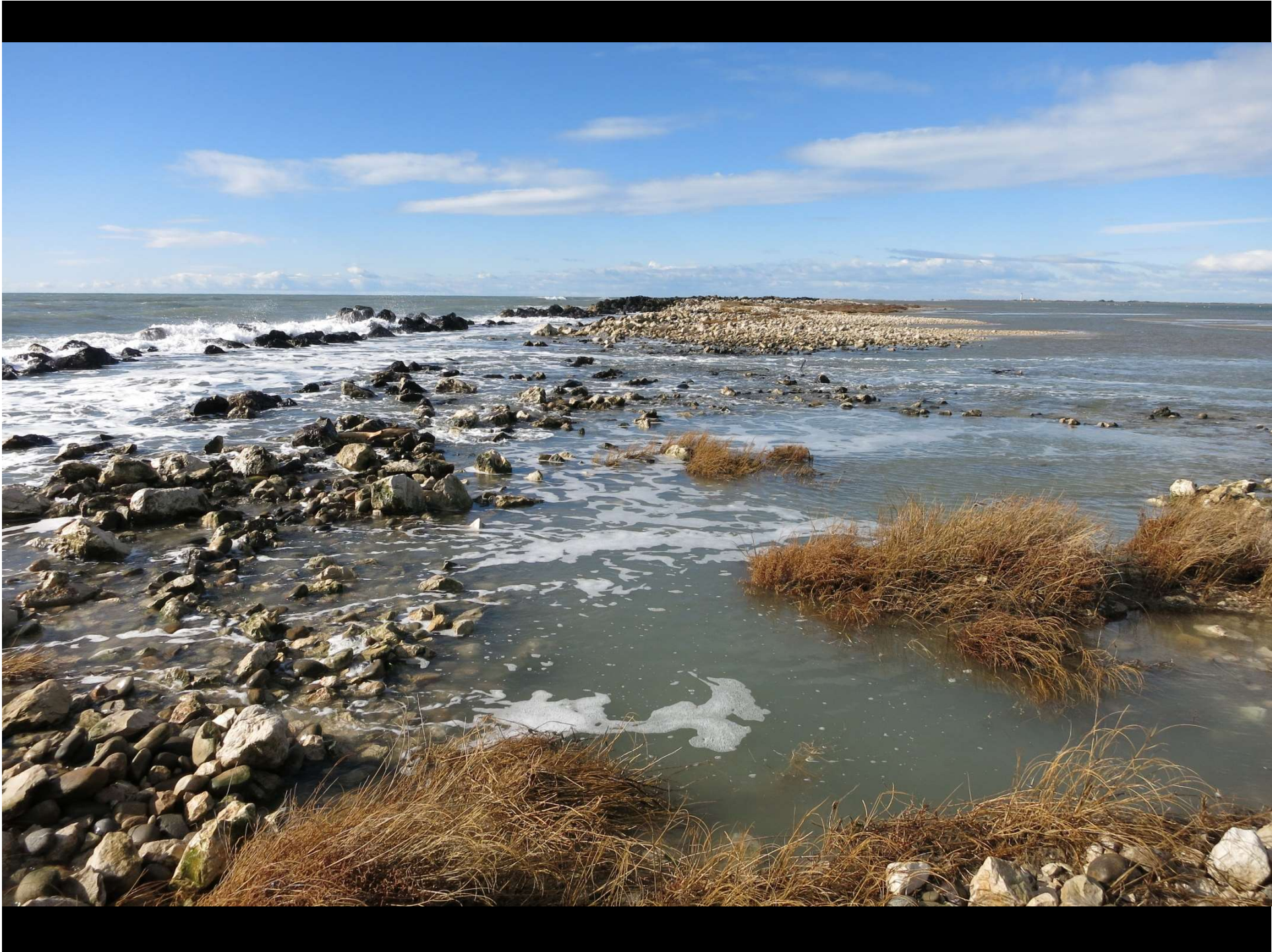


Mediterranean Coastal Risks

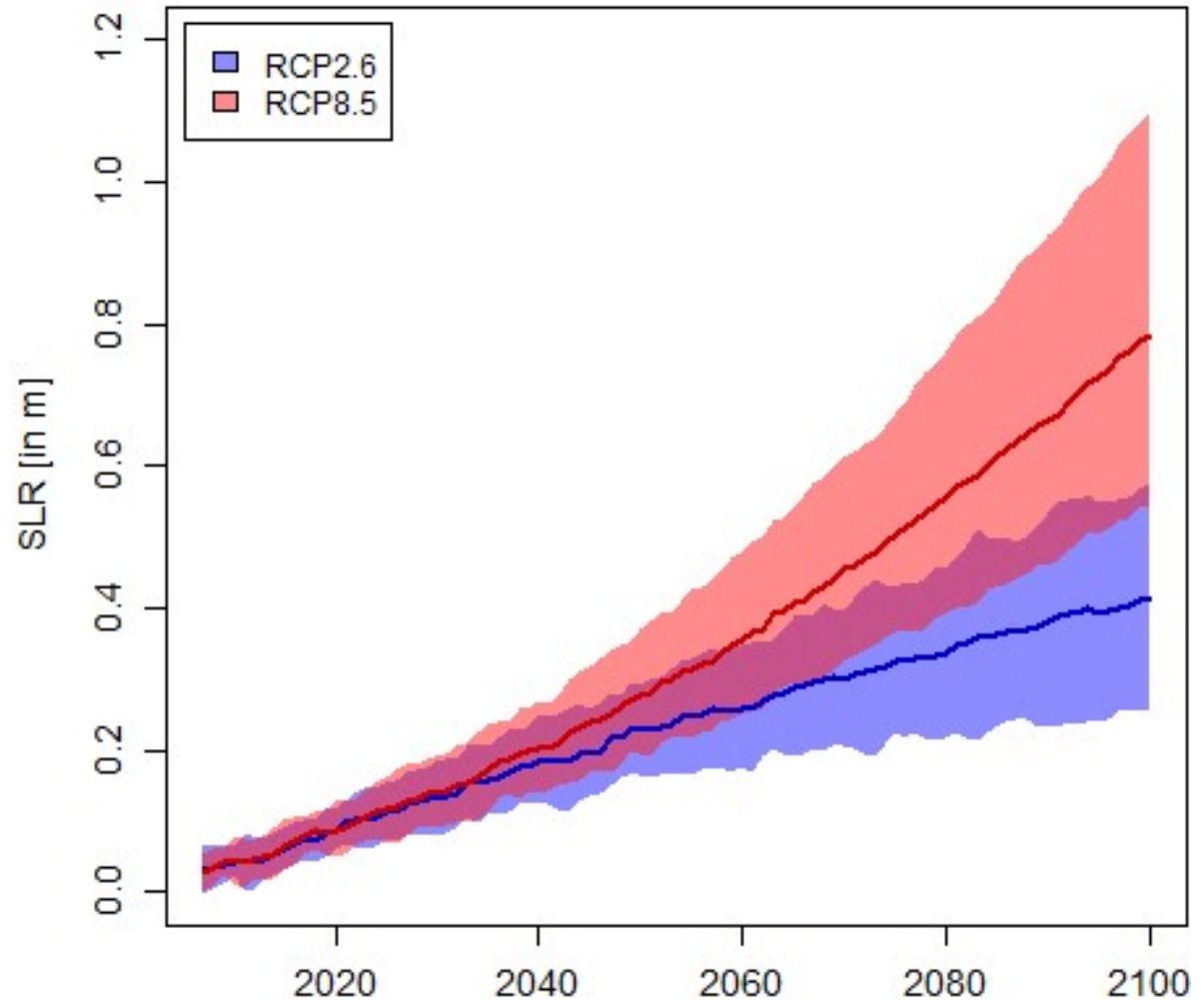
Wolfgang Cramer

Joël Guiot, Katarzyna Marini, Gonéri Le Cozannet, Piero Lionello, Rémi Thieblemont



Sea-level rise

- Global mean sea level has risen by 20 cm between 1901 and 2018
- Observed trends:
 - 1.35 mm/yr 1901-1990
 - 3.7 mm/yr 2006-2018
- These trends dominate above all local factors that apply to the Mediterranean
- MedECC estimate for 2100: 37-90 cm above 2000, “with a small probability to be above 110 cm”
- Other recent estimate: 20-110 cm (Le Cozannet, Thiéblement)







[image commons.wikimedia.org/wiki/File:Venezia_arqua_alla_notte_2005_modificata.jpg](https://commons.wikimedia.org/wiki/File:Venezia_arqua_alla_notte_2005_modificata.jpg)

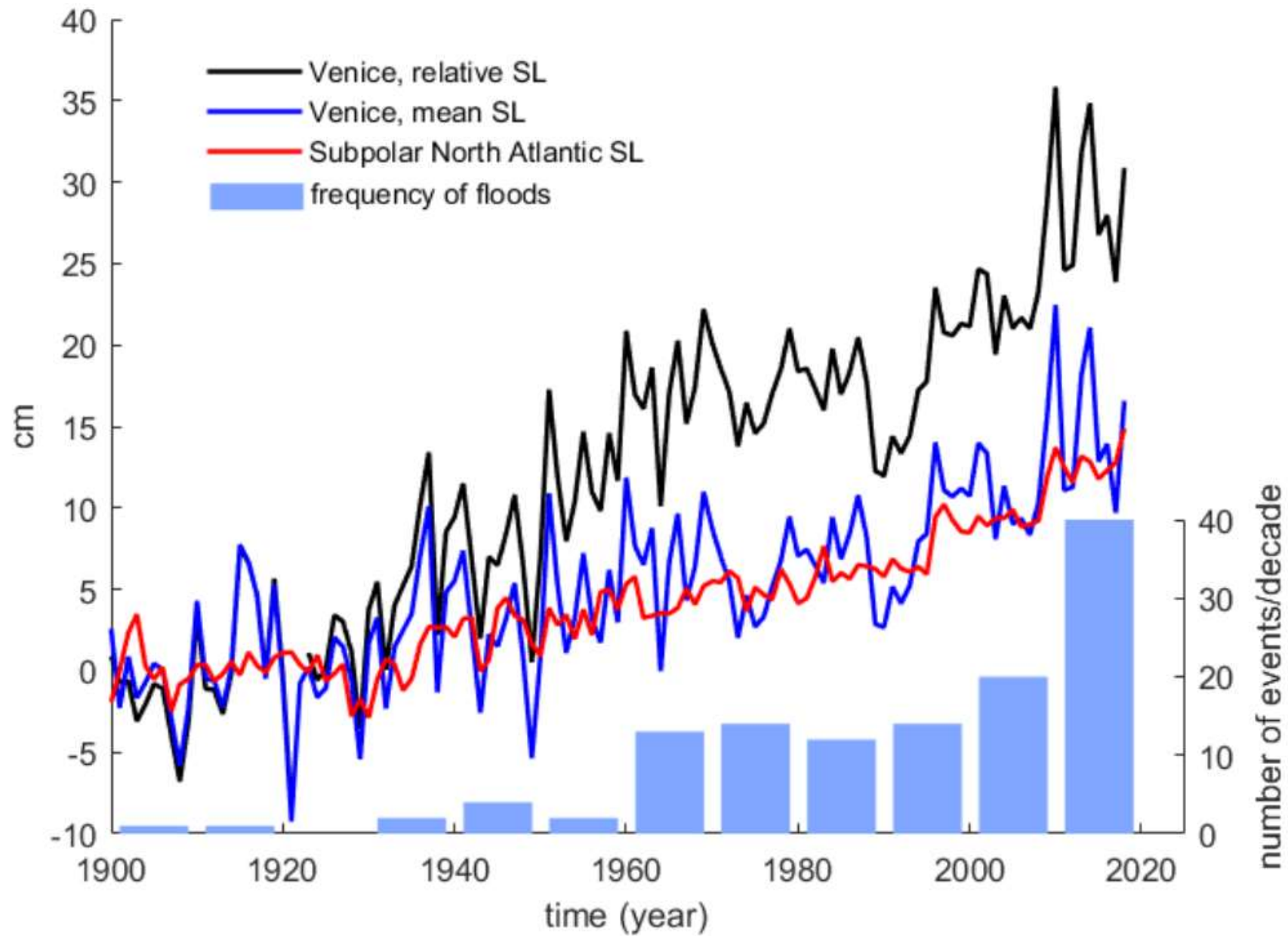


Figure 4 - Comparison between historical evolution of average sea level and flooding events in Venice, and the link with larger-scale changes in sea level.

Projected annual persistence of sea level above “present safeguard level” (MoSE)

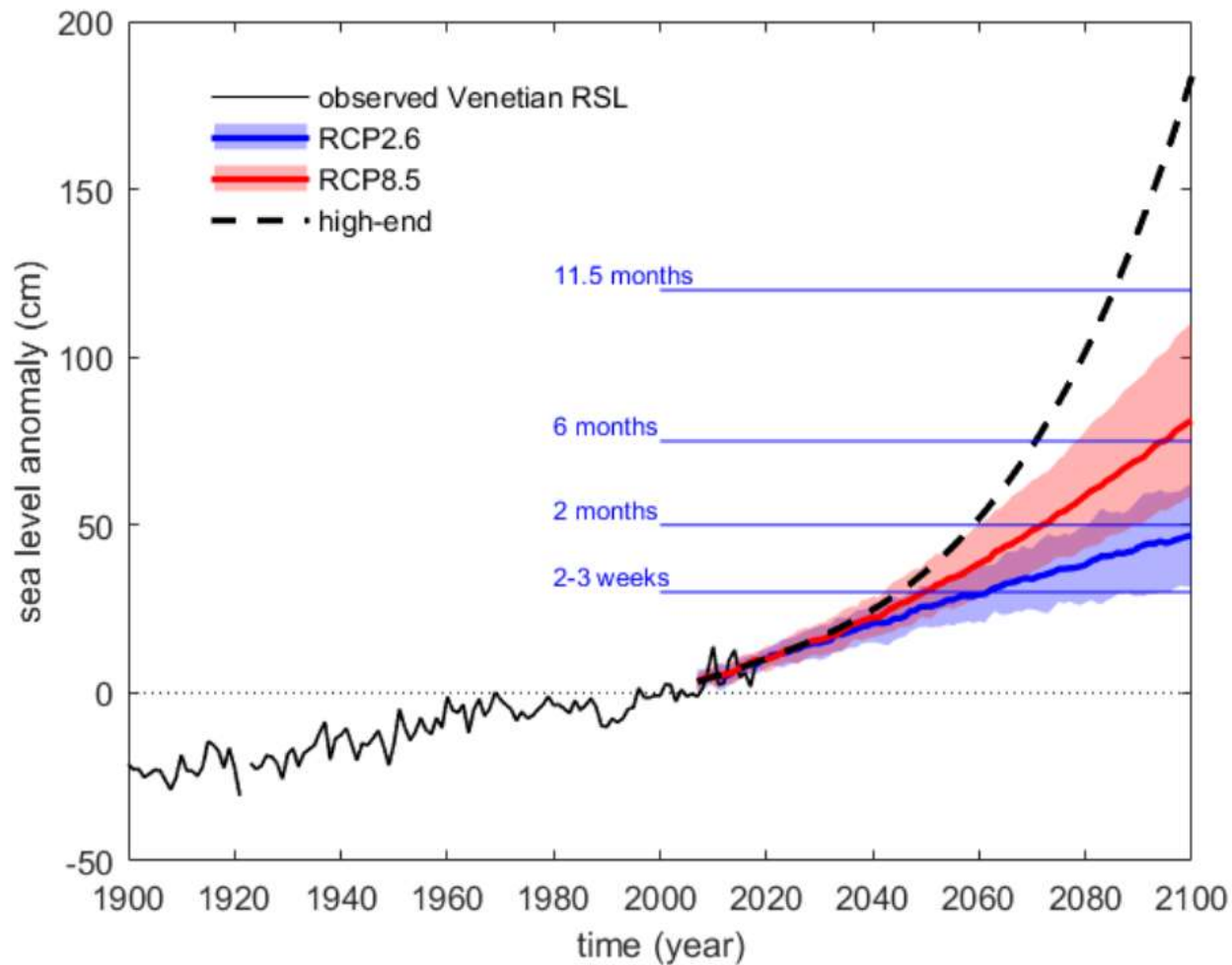
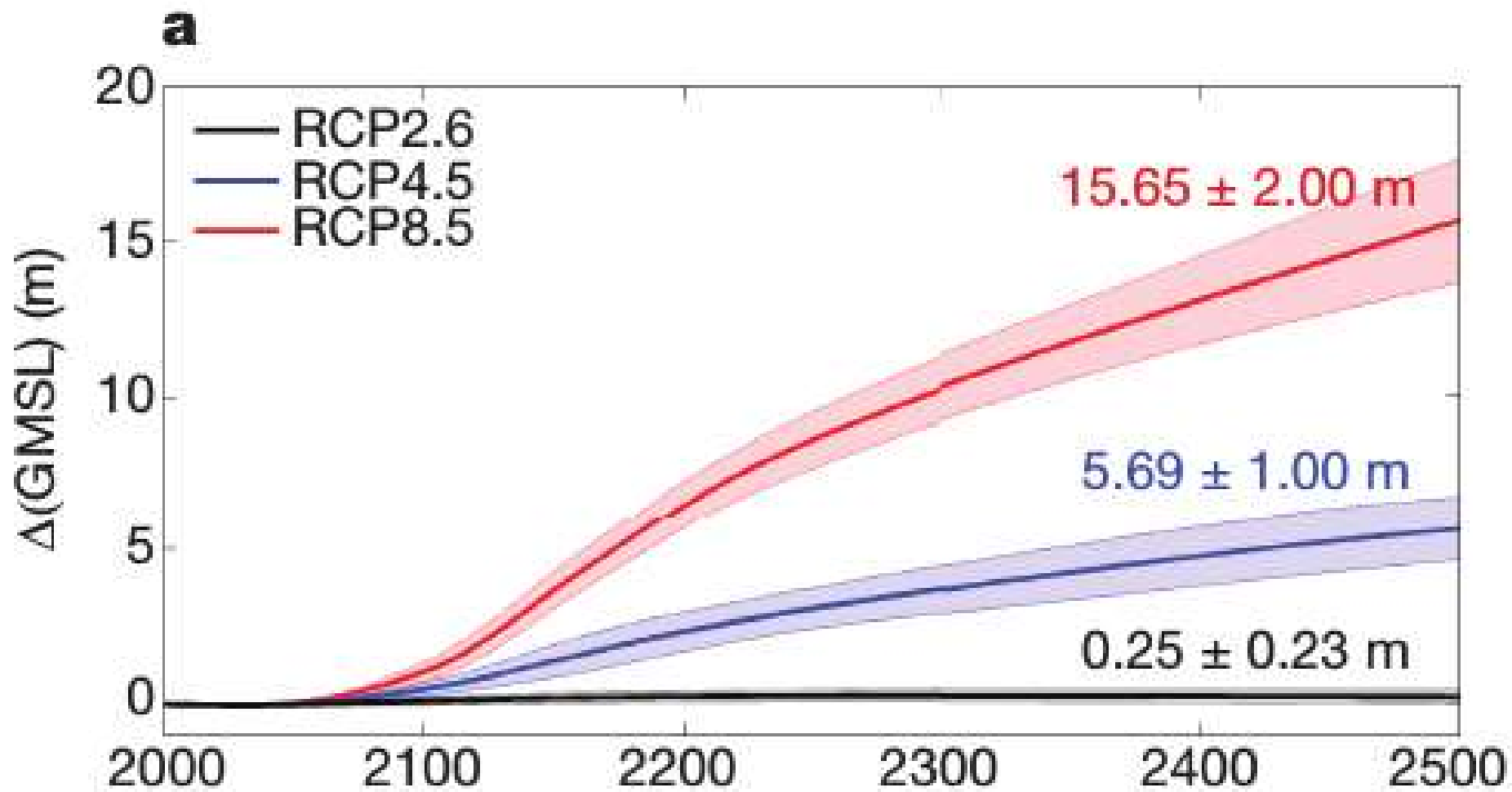
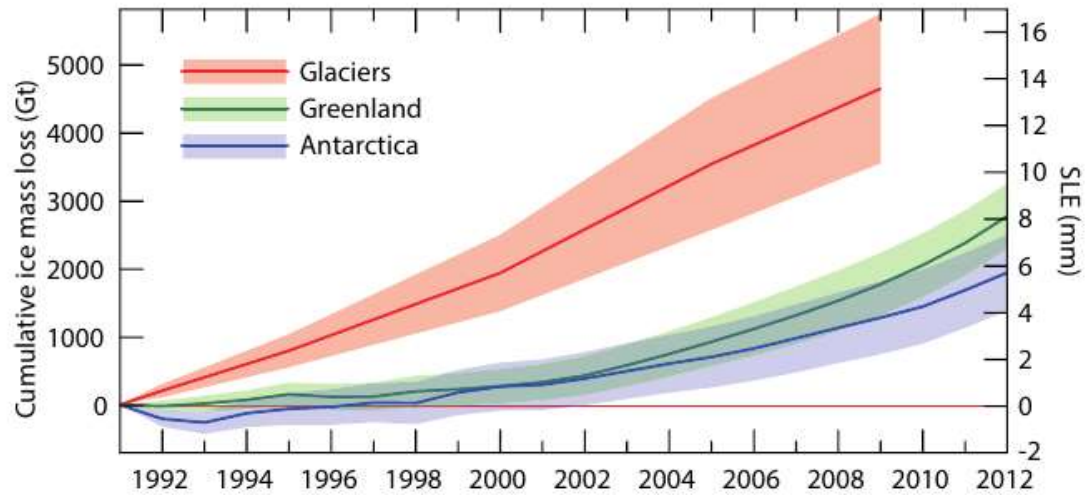
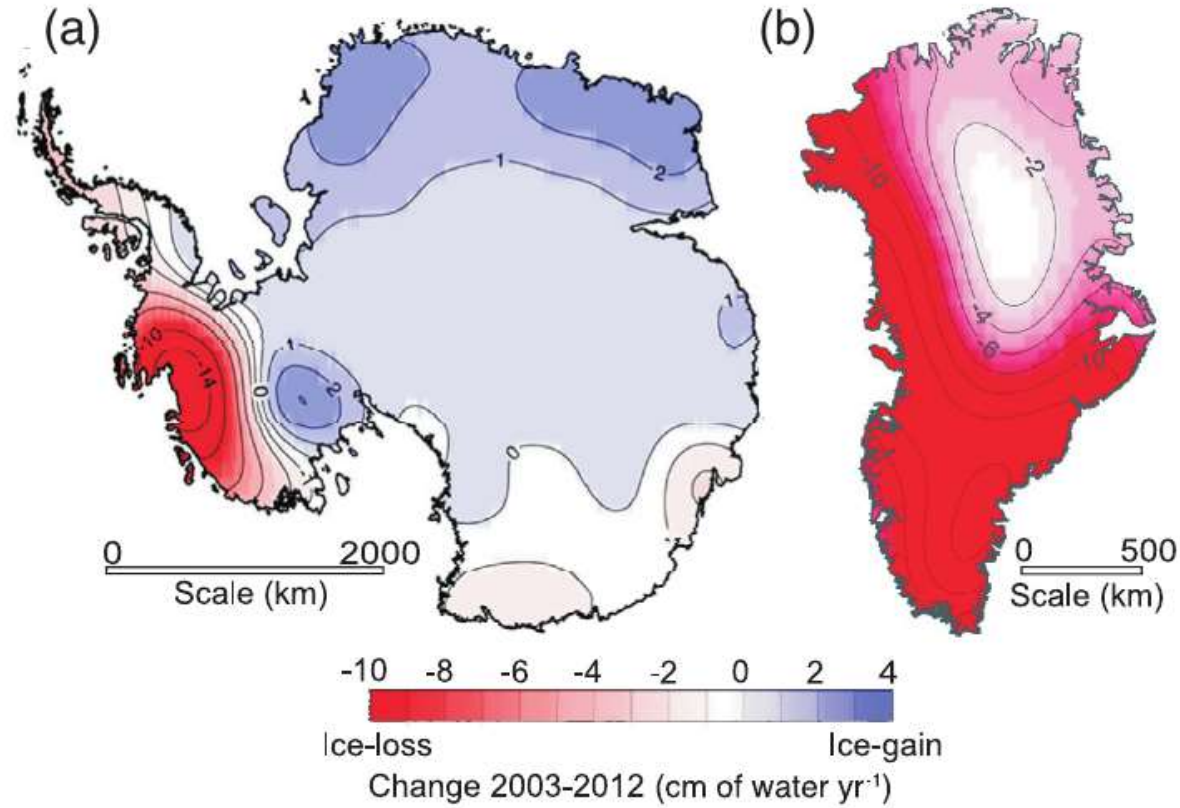


Figure 5 – Projected sea level change in Venice in the context of historical observations. Observations are annual-mean tide gauge relative sea-level height anomalies with respect to the 2000-2007 average. Projections are based on two reference scenarios of anthropogenic greenhouse gas emission, namely RCP2.6 (low emission scenario) and RCP8.5 (strong emission scenario), and a high-end scenario illustrating a plausible evolution obtained by combining the highest estimates of all individual contributions to relative sea level rise. The horizontal blue lines show the annual persistence of the sea level above the present safeguard level as a function of future relative mean sea level. These time intervals approximately correspond to the annual duration of the expected closures of MoSE.



Image www.tokoro.com/2941927-italy-coast-storm-waves-vernazza.html



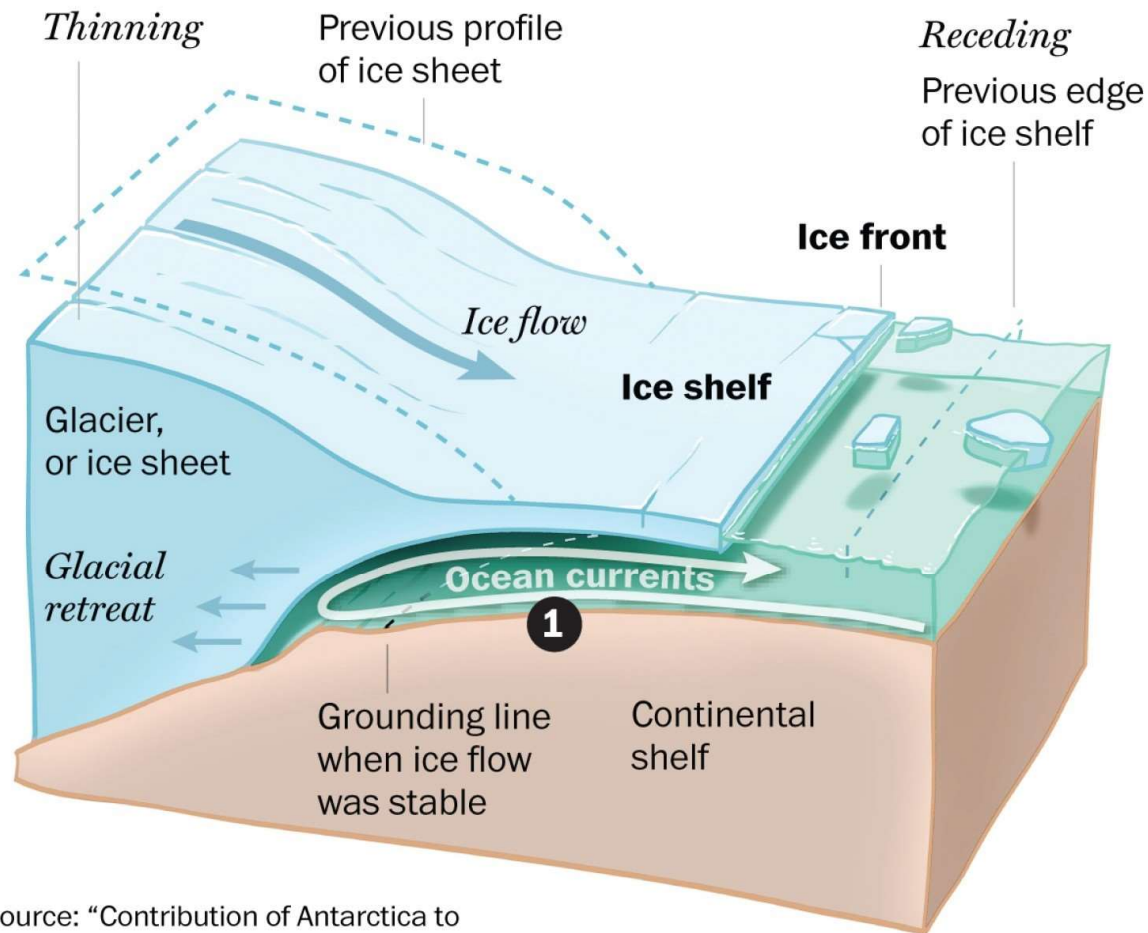


IPCC 2013 WG1 TS

Melting from below

Scientists have long known that glaciers resting under sea level can be unstable if they rest on a downward sloping sea bed.

1. Warmer ocean currents erode the glacier's base from below. The grounding line retreats downhill, and as it does, even more of the glacier is exposed to warm water. It melts more, and flows faster.



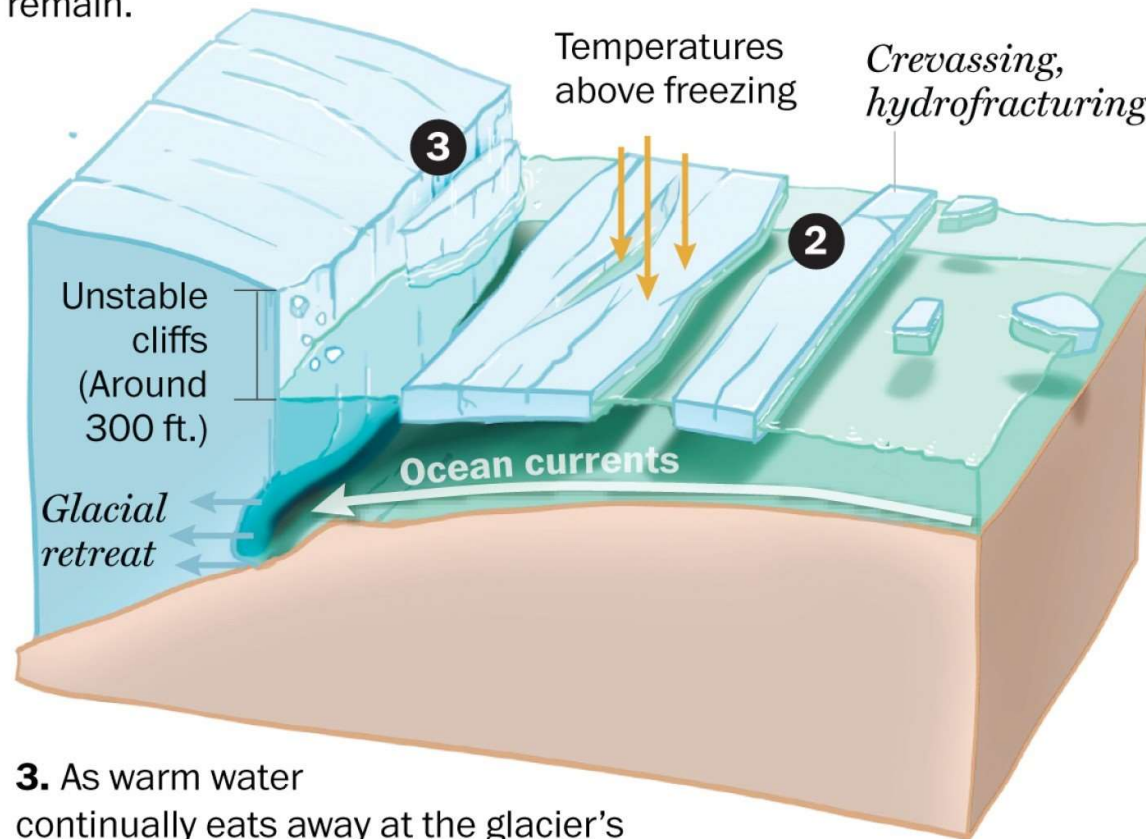
Source: "Contribution of Antarctica to Past and Future Sea-Level Rise," by Robert M. DeConto and David Pollard, in *Nature*

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PATTERSON CLARK / THE WASHINGTON POST

Shearing from cliffs

Now, researchers have identified two new processes that can make this still worse.

2. Warm air, rain and meltwater cause fissures in the shelf, which breaks away from the glacier in large swaths. Eventually, only vertical ice cliffs remain.



3. As warm water continually eats away at the glacier's base, the unstable cliff faces above the water line shear off under their own massive weight.

Source: "Contribution of Antarctica to Past and Future Sea-Level Rise," by Robert M. DeConto and David Pollard, in *Nature*

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Supporting institutions



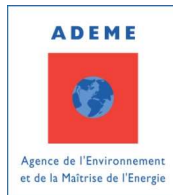
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الإتحاد من أجل المتوسط



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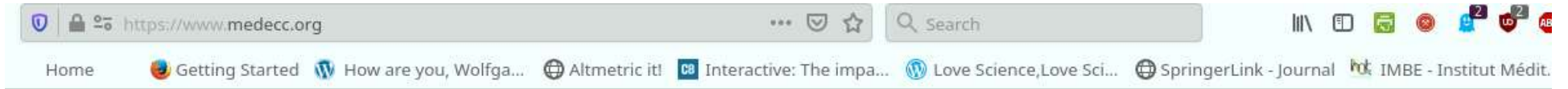


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Scientific assessment of climate and environmental changes impacts in the Mediterranean Basin



From science to policy-making

The network of Mediterranean Experts on Climate and Environmental Change (MedECC) has been created in 2015. MedECC is an open and independent international scientific expert network acting as a mechanism for decision-makers and the general public on the basis of available scientific information and on-going research. The construction of this network responds to several intentions of regional institutions, such as the UN Environment/MAP through the MSSD 2016-2015 and the Regional Framework for Climate Change Adaptation in the Mediterranean, and the Expert Group on Climate Change of the Union for the Mediterranean (UfM CCEG). MedECC includes more than 600 scientists from 35 countries.

Summary for Policymakers

6 main chapters:

1. Introduction
2. Drivers
3. Resources
4. Ecosystems
5. Society
6. Managing Risks



Climate and environmental change in the Medit. Basin



- Virtually all sub-regions of the Mediterranean Basin, on land and in the sea, are impacted by recent anthropogenic changes in the environment
- Main drivers of change include climate (temperature, rainfall, extreme events, sea-level rise, and acidification), but also pollution, unsustainable land/sea use, and alien invasive species
- In most areas, both natural ecosystems and human livelihoods are affected
- Impacts are highly likely to be exacerbated in coming decades, especially if global warming exceeds 1.5-2°C above the pre-industrial level
- Significantly enhanced efforts are needed for mitigation and adaptation in the region