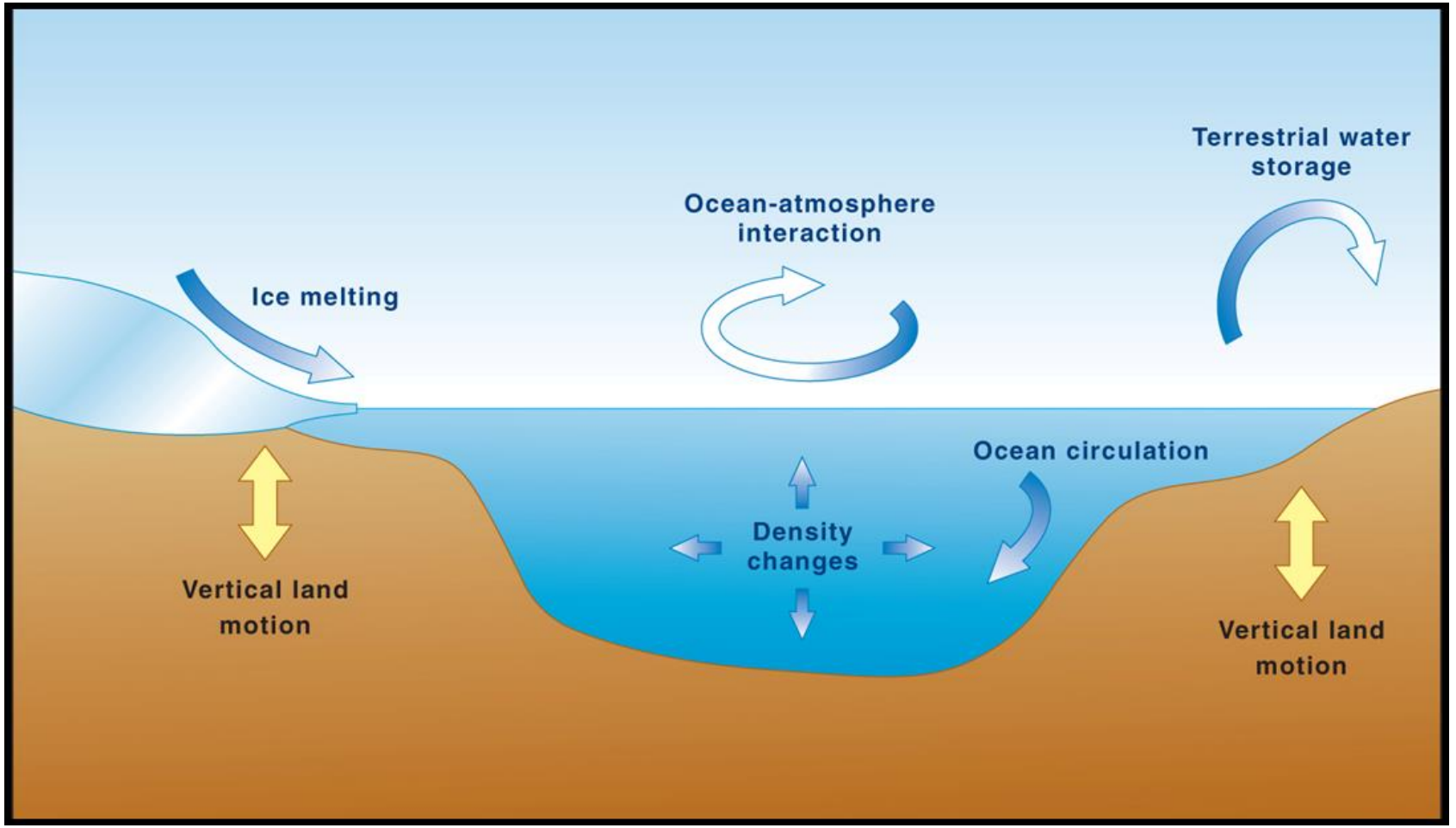
Kartverket

Sea level and climate adaptation

Matt Simpson, Aug 2022

Sea level and geodesy



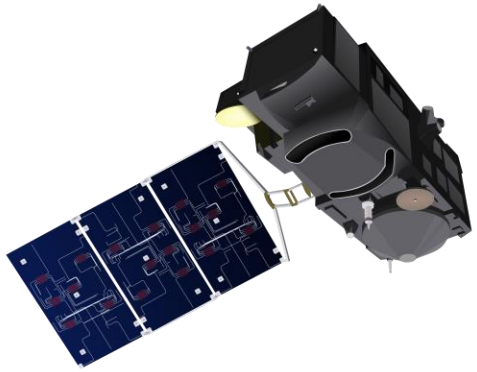
Milne et al., 2009

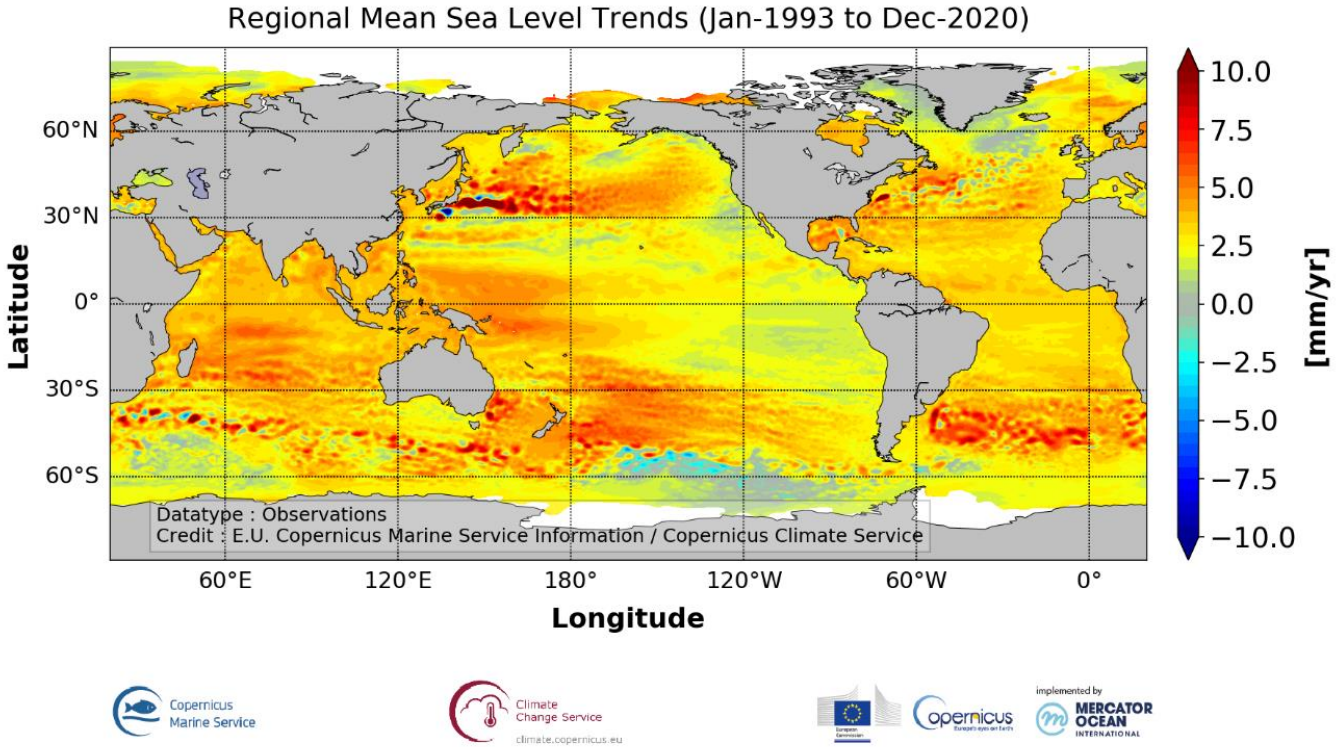
Sea level and geodesy

IPCC AR6 WG1:

+ 3.7 [3.2 to 4.2] mm/year

2006 to 2018





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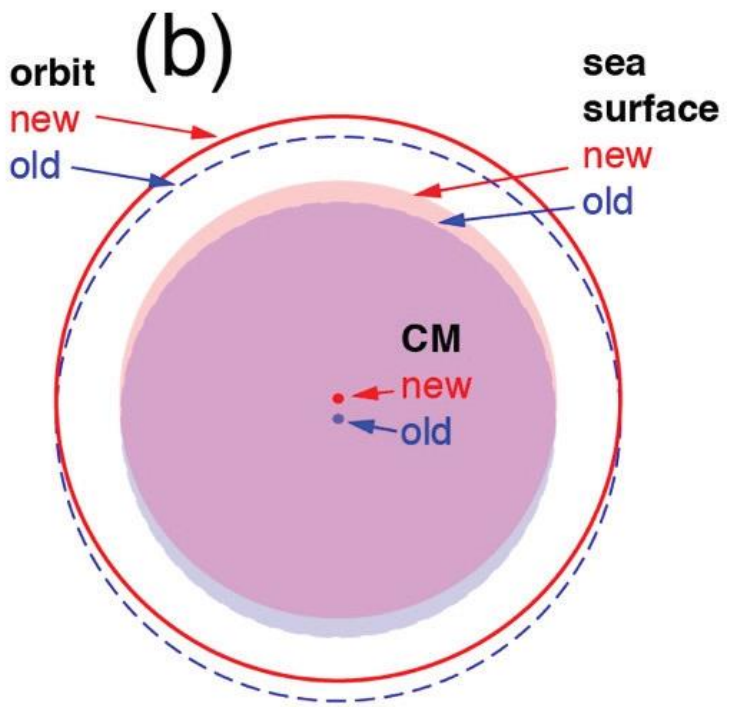
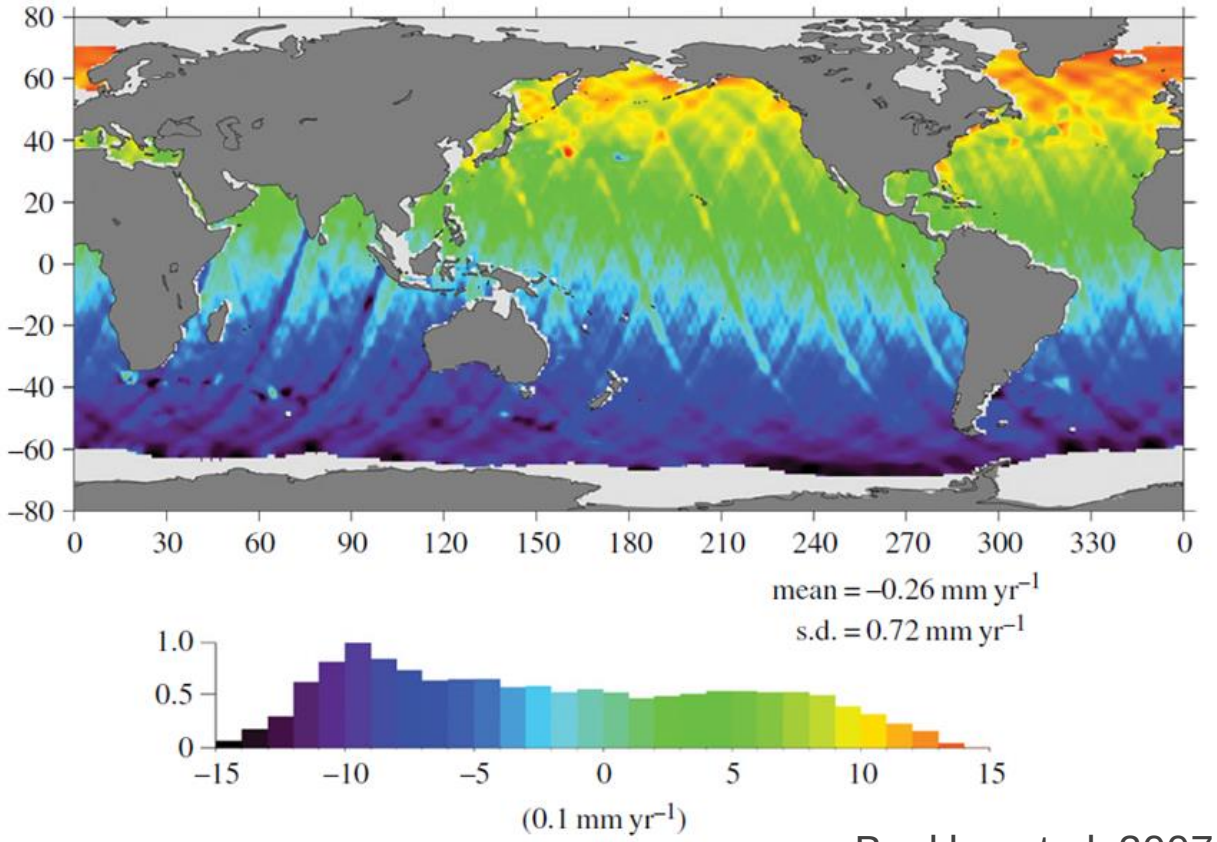
Sea level and geodesy

“Relating two measurements in time or space, whether separated by 100 years or 10,000 km, requires that we have a common reference system that is stable.” – Tamisiea et al., 2014



NASEM, 2020



Beckley et al.,2007

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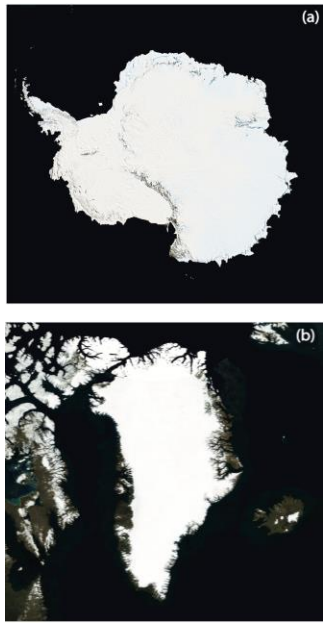
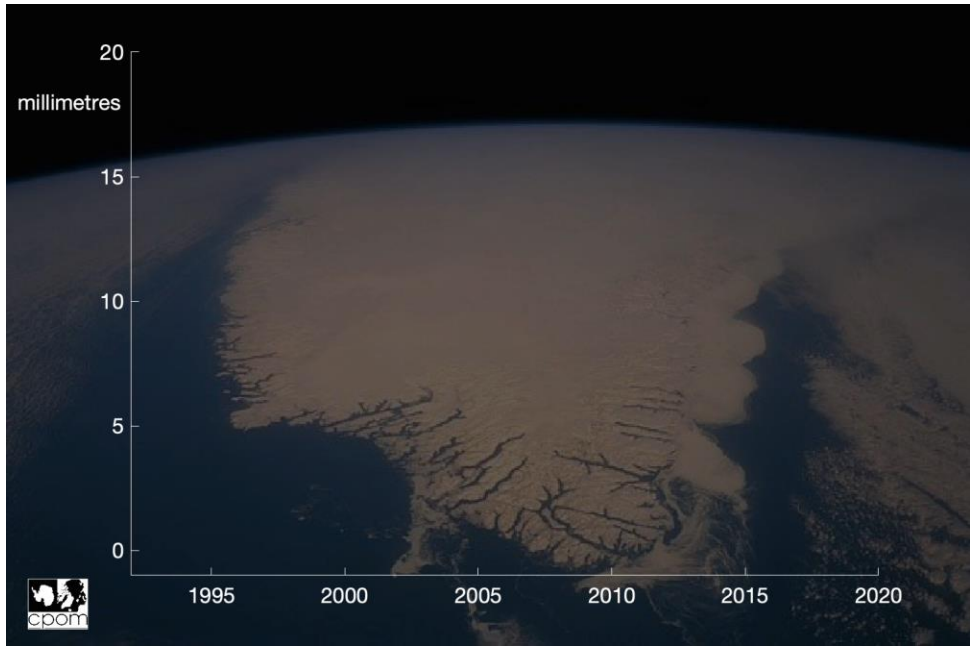
Small or big changes to the climate system?



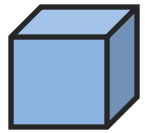


IMBIE, 2020

1 mm sea-level rise

360 Gt ice melt

360,000,000,000,000 kg

360 km3 water 

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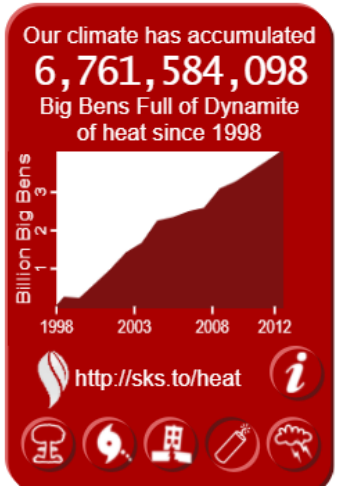
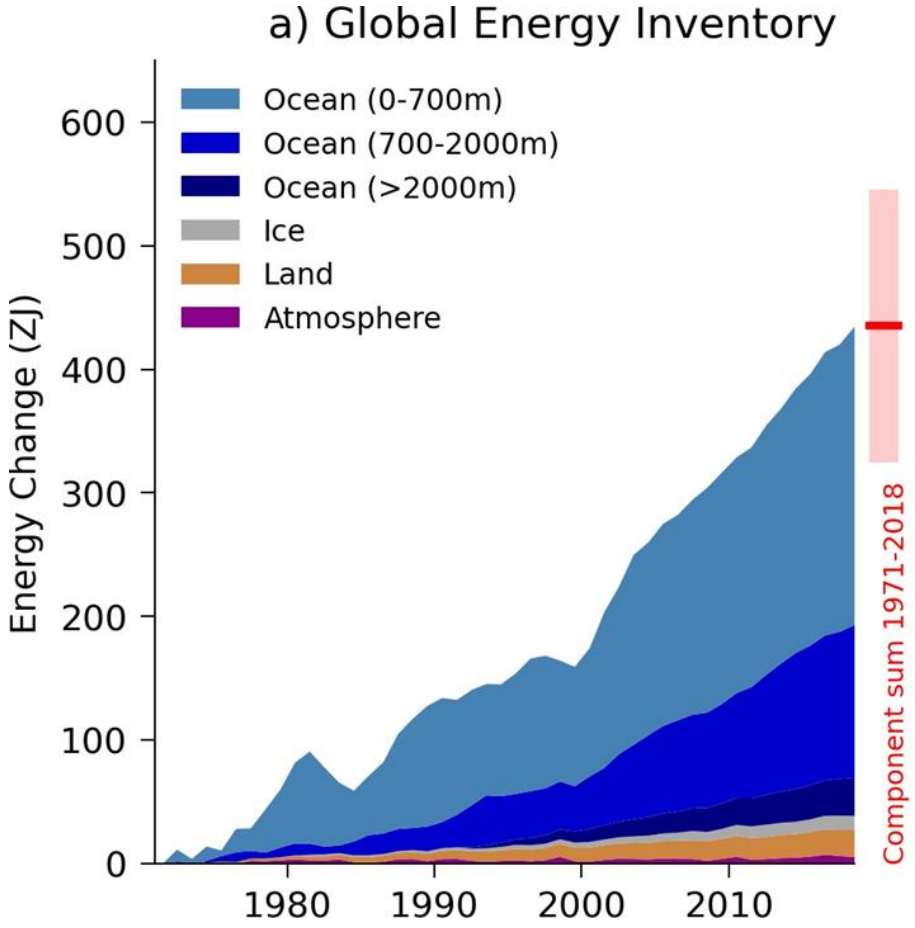
Small or big changes to the climate system?

Global heat content is increasing

Zettajoules

1,000,000,000,000,000 joules





IPCC AR6

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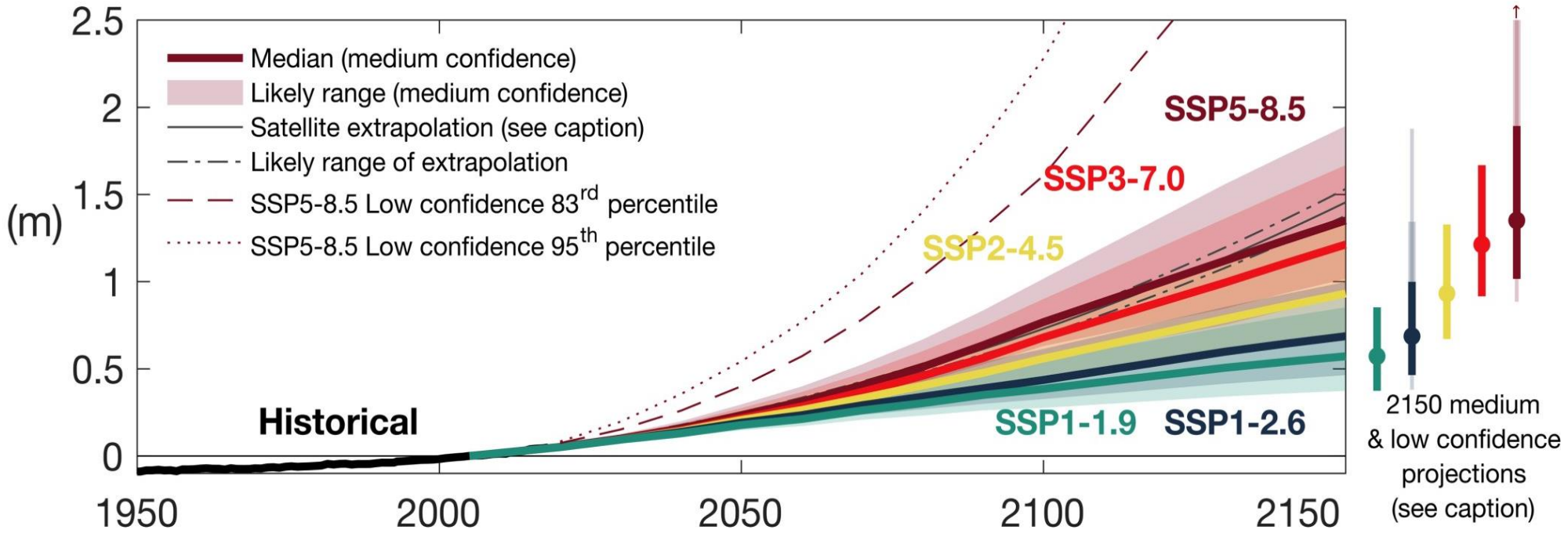
IPCC sea level projections

Historical emissions up to 2016 are projected to give 0.7 – 1.1 m sea level rise by 2300



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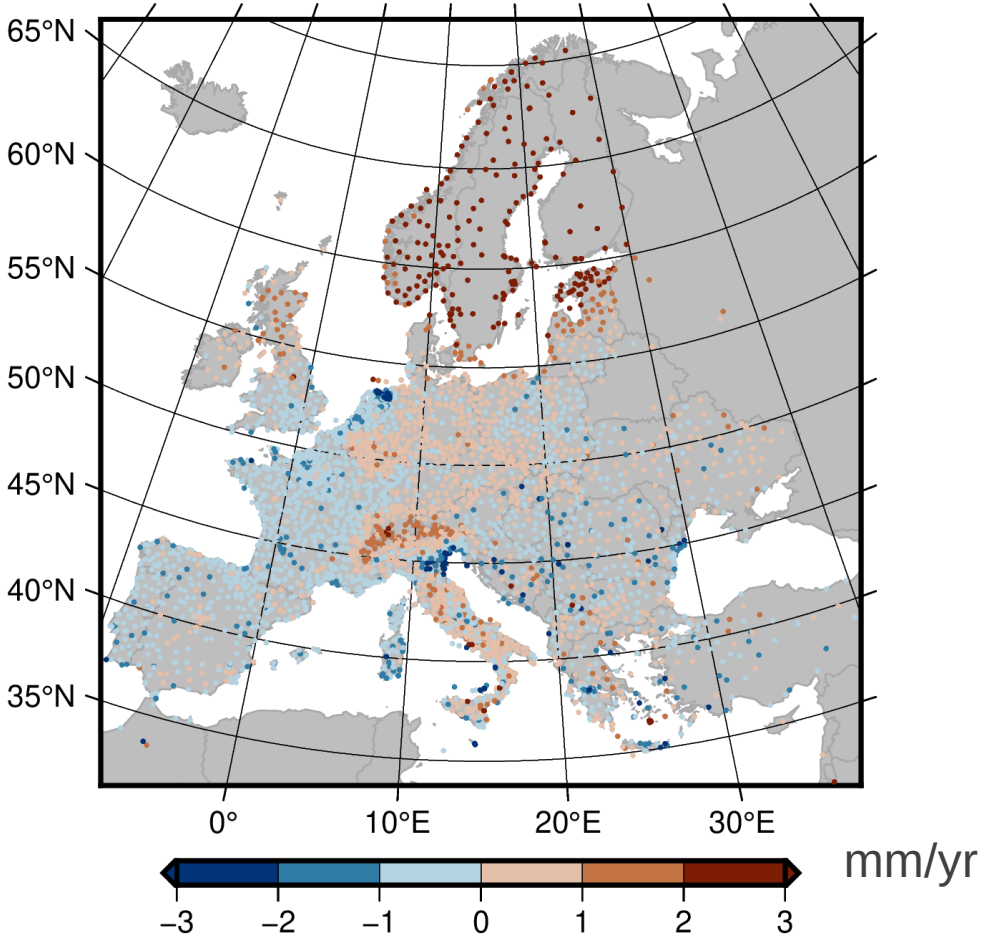
Regional Sea level?

Continuous GNSS measuring land surface deformation in a global geodetic reference frame



Piña-Valdés et al., 2022

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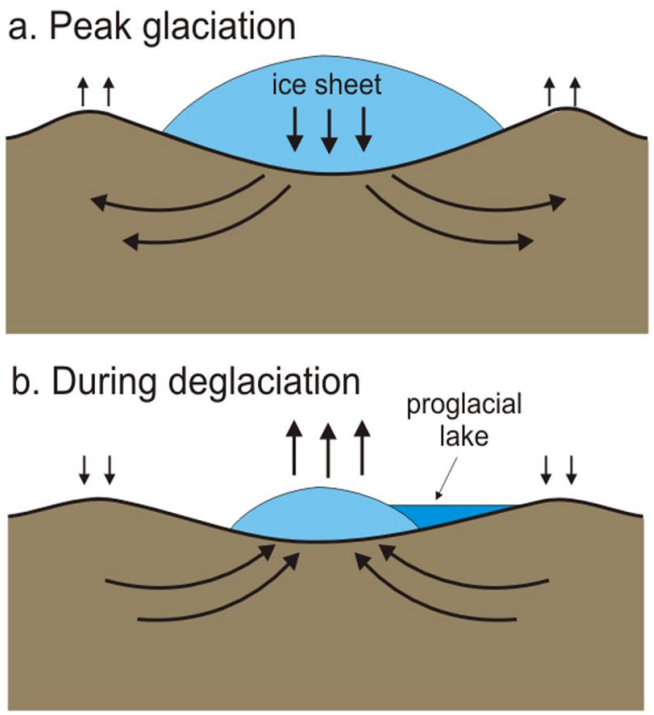
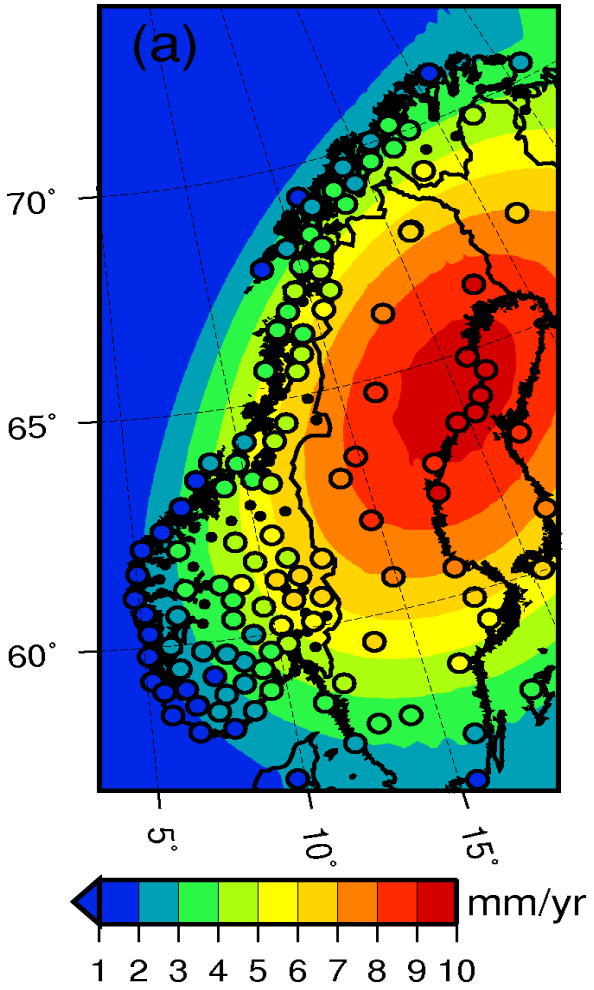
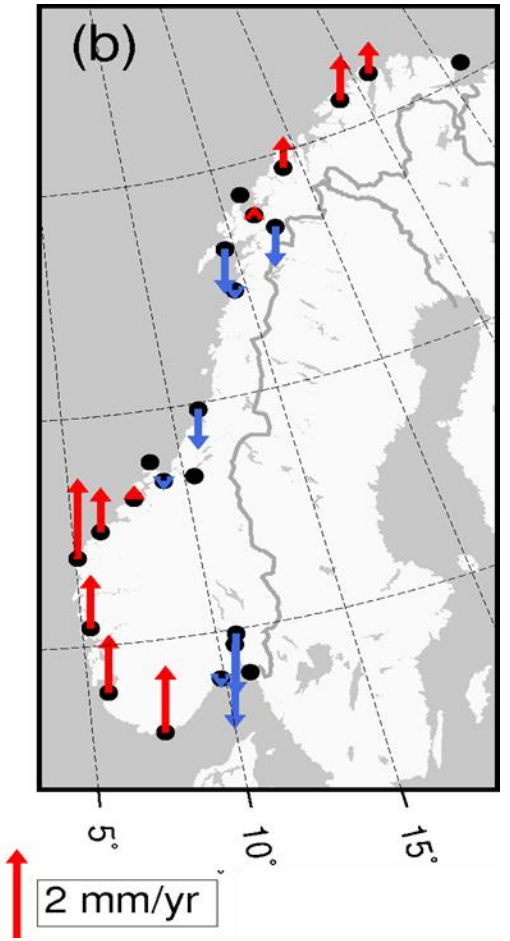
Sea level in Norway



Land motion



Sea level in relation to land motion



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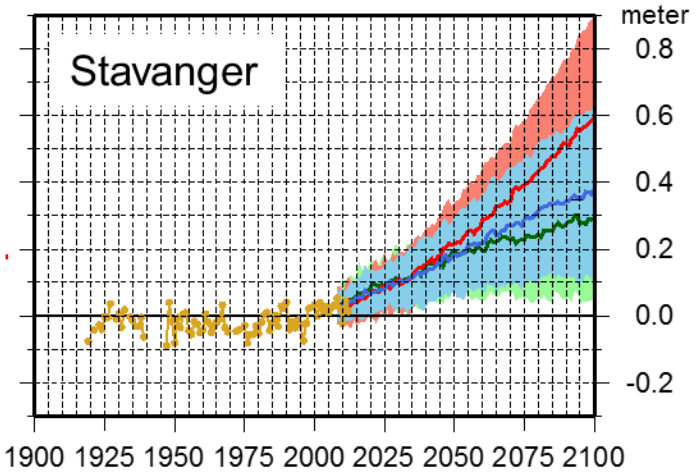
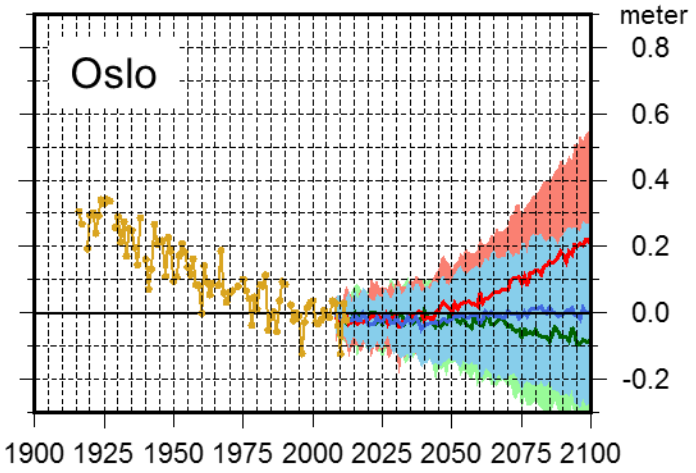
Sea level in Norway





Miljø-direktoratet

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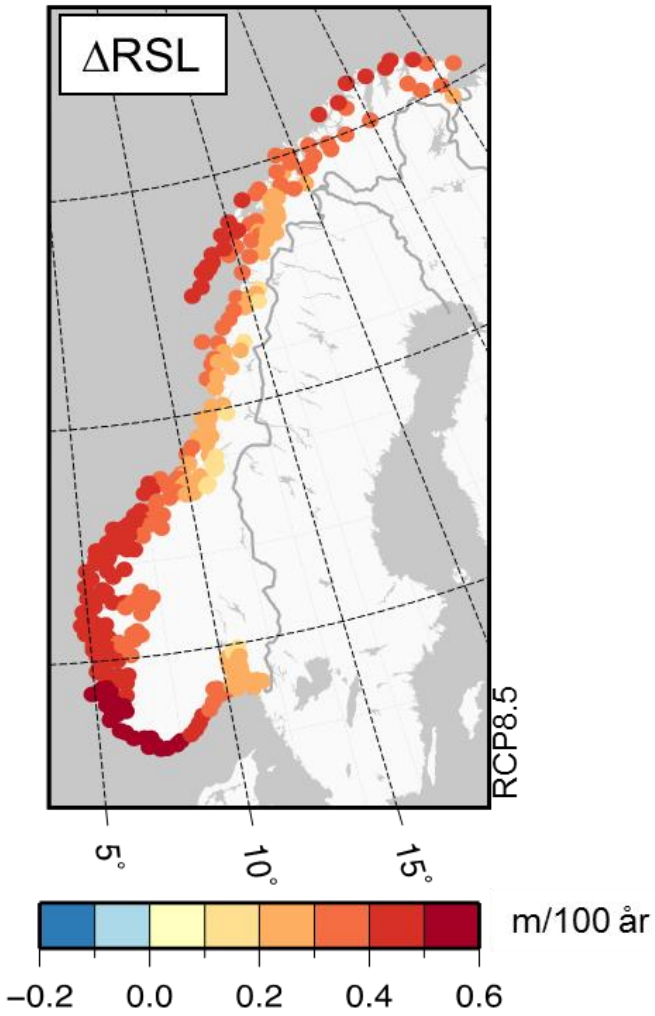
Norwegian Meteorological Institute

NORCE

NERSC

Sea level projections



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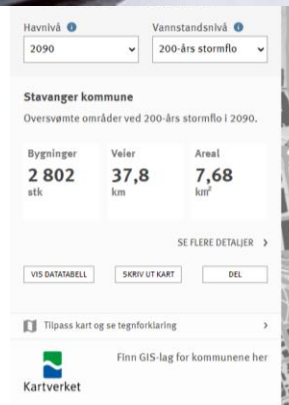
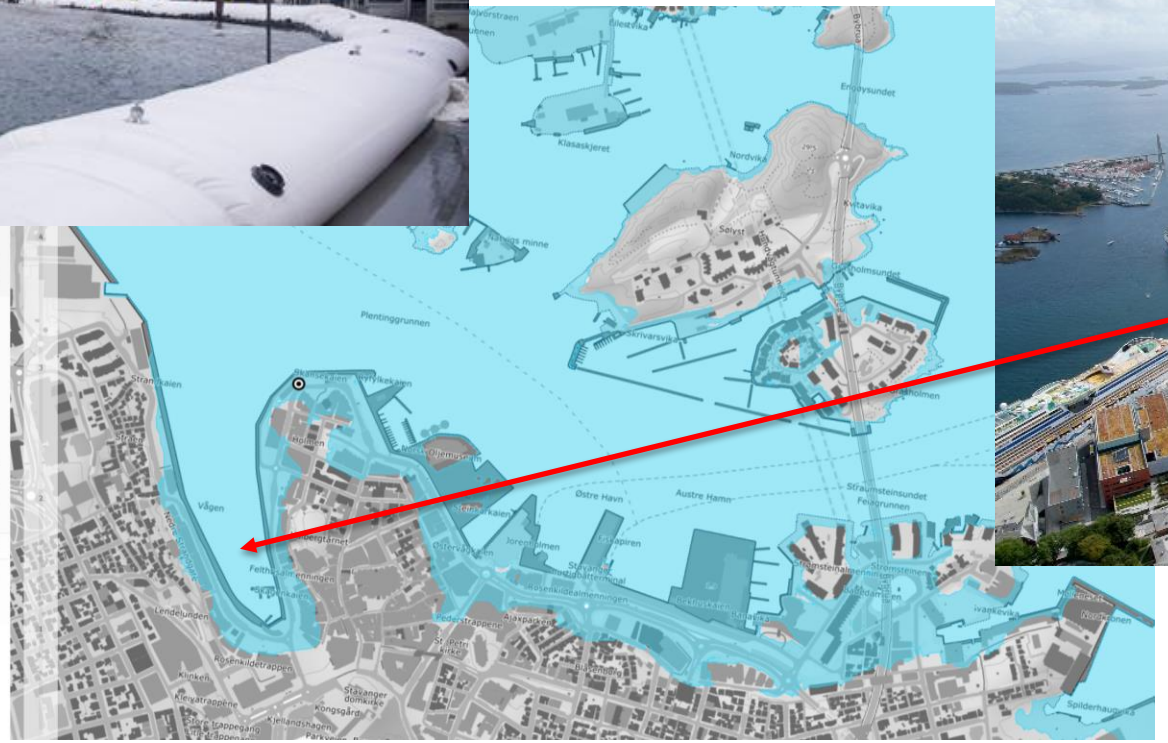
Adaptation in Norway

150,000 buildings, 1500 km roads, and area 800 km2 exposed to storm surge by 2100





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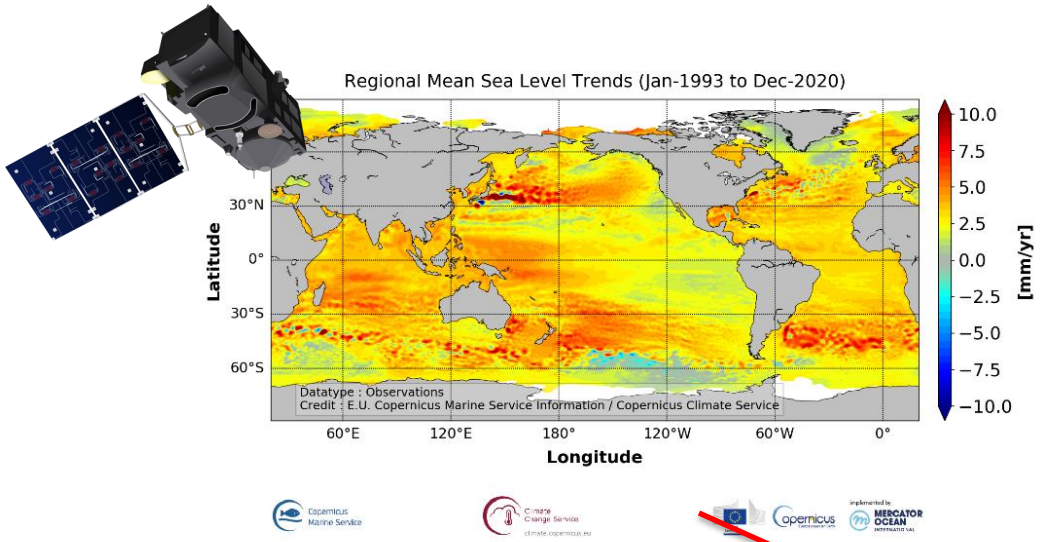

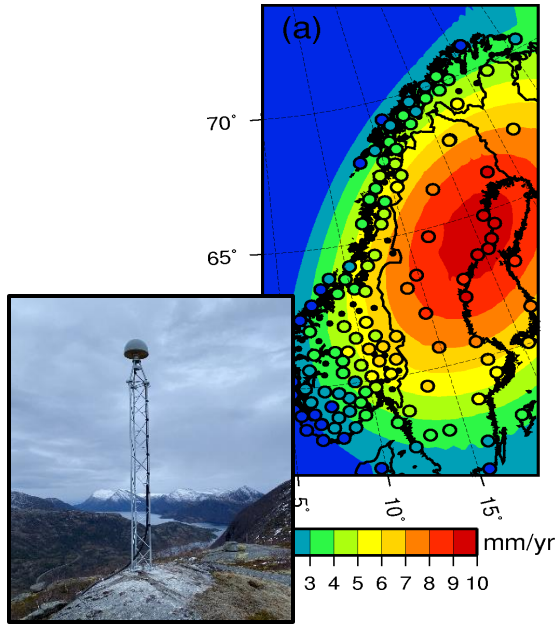

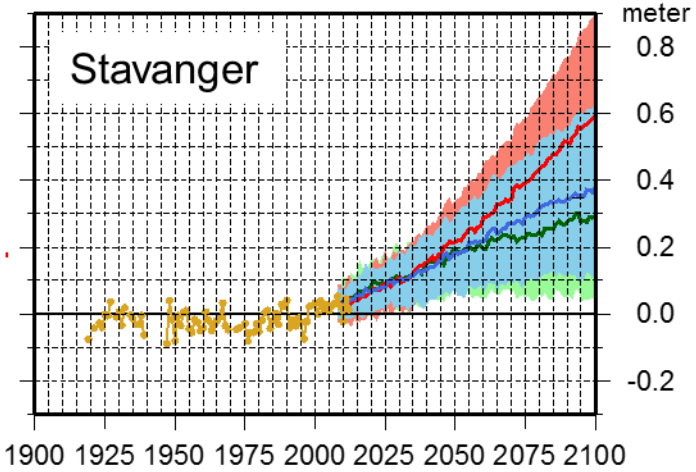

Long-term observations in a stable geodetic reference frame

Understand climate system and make accurate projections

Develop mitigation and adaptation strategies

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