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The Ocean and Cryosphere in a Changing Climate

17 December 2019

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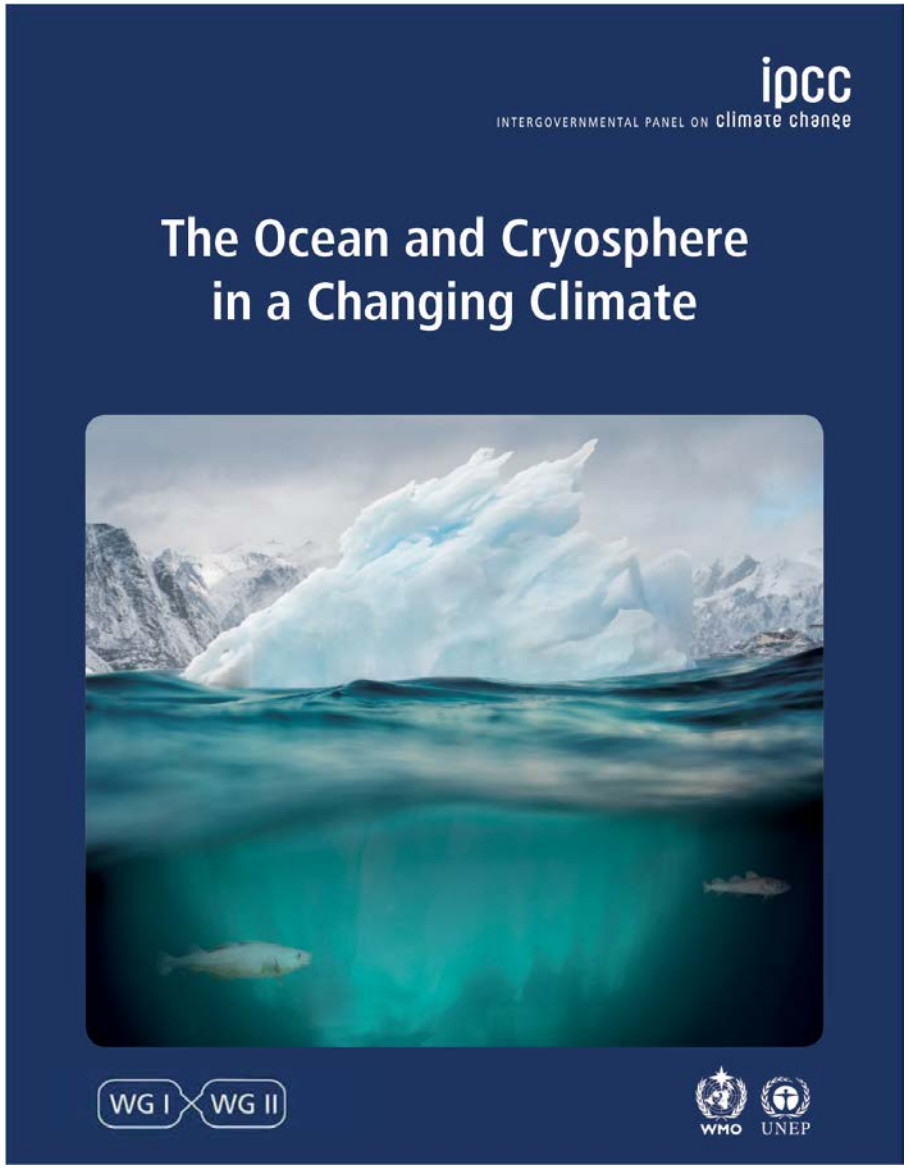

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The world's ocean and cryosphere have been 'taking the heat' from climate change for decades.

Consequences for nature and humanity are sweeping and severe.

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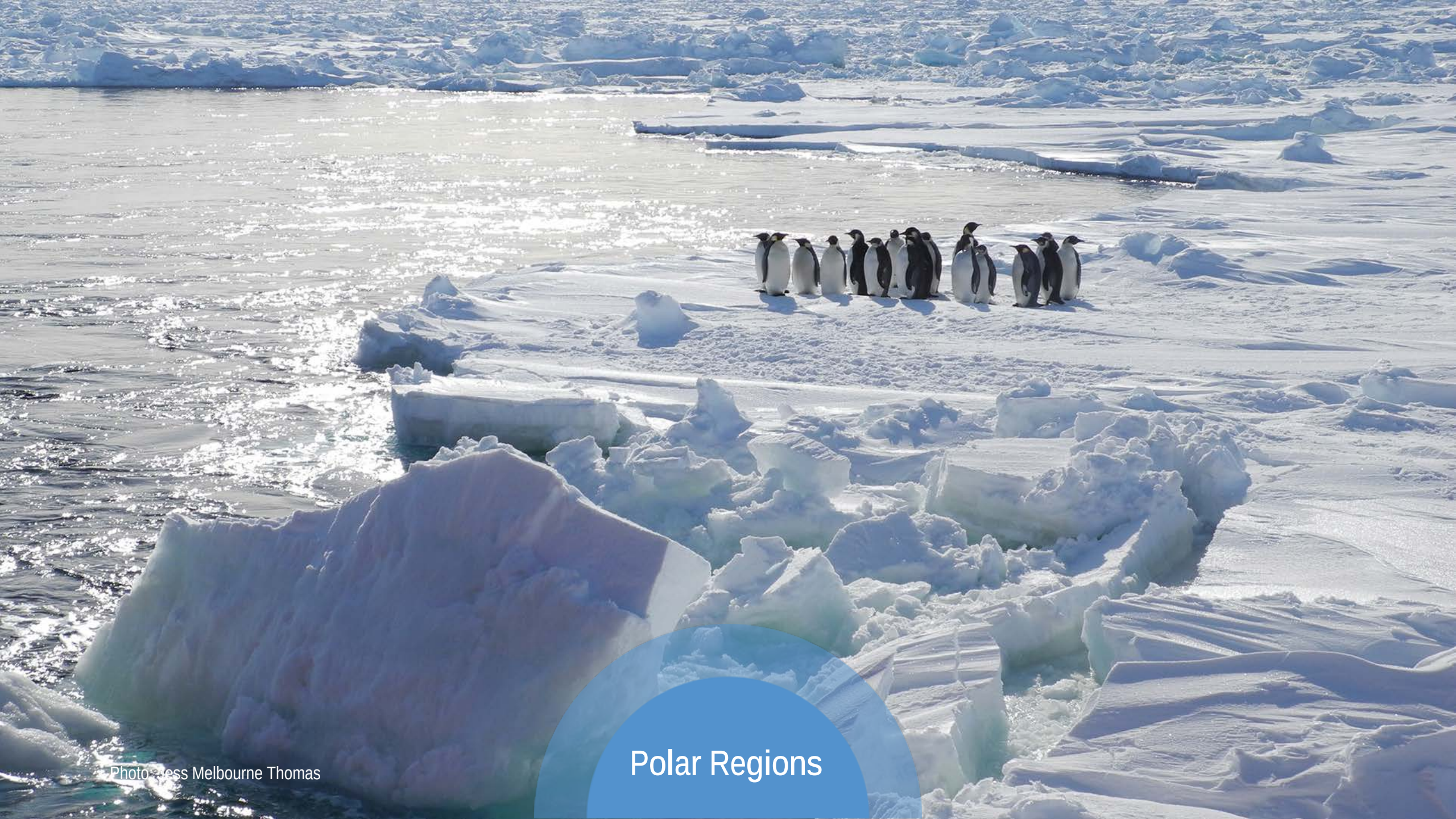
Photo: Yungdrung Tsewang

Changes in the mountain cryosphere

- **Smaller glaciers** found, for example, in Europe, eastern Africa, the tropical Andes and Indonesia are projected to lose **more than 80%** of their current ice mass by 2100 if emissions continue to increase strongly.
- As glaciers melt and snow cover shrinks, warm-adapted plant and animal species migrate upslope. Cold- and snow-adapted species decrease and risk eventual extinction, especially without conservation.
- The retreat of the cryosphere will continue to adversely affect recreational activites, tourism and cultural assets.
- Hazards for people, for example through **landslides, snow avalanches or floods** will increase as glaciers and permafrost decline.
- **Changing water availability and quality** affects households, agriculture, energy systems, and people both in the region and beyond.



Polar Regions

Photo - Jess Melbourne Thomas

Changes in polar regions

- The Greenland and Antarctic ice sheets are losing mass, accelerating global sea level rise. They will continue to melt, committing the planet to **long-term** global sea level rise.
- **Arctic sea ice is declining in every month of the year**, and is getting thinner.
- Permafrost is **thawing**, with the potential of **adding more greenhouse gases to the atmosphere**.
- People living in the Arctic, especially Indigenous peoples, are already **adjusting their travel and hunting activities** to the seasonality and safety of land, ice and snow conditions. Their success in adapting depends on **funding, capacities and institutional support**.

Photo: Glenn R. Specht

Sea Level Rise

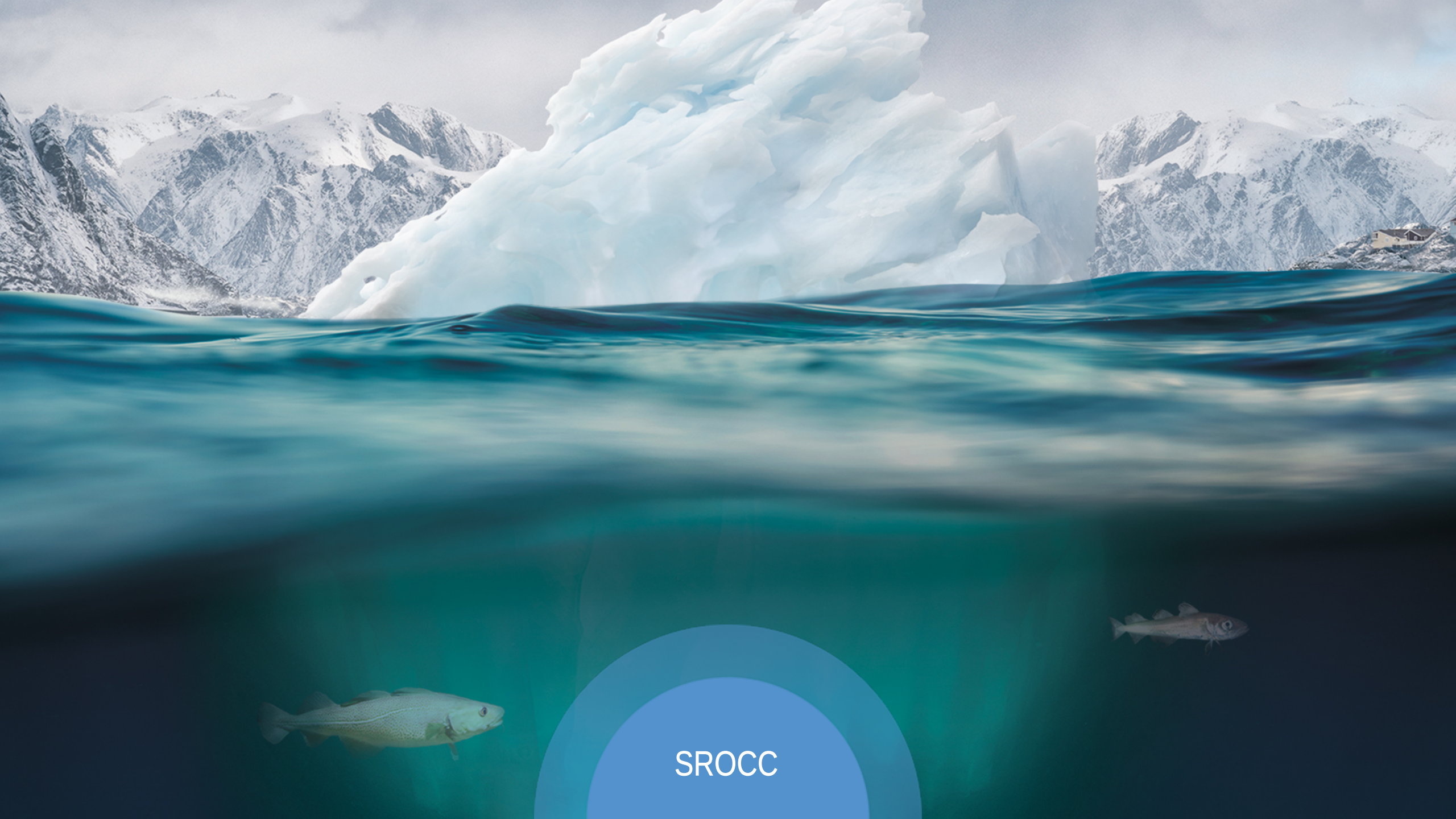
Sea level rise and coastal extremes

- During the 20th century, the global mean sea level rose by about **15cm**.
- Sea level is currently rising **more than twice as fast** and will further **accelerate** reaching up to 1.10m in 2100 if emissions are not sharply reduced.
- Extreme sea level events which now occur rarely during high tides and intense storms will become more common.
- Many low-lying coastal cities and small islands will be exposed to risks of flooding and land loss annually by 2050, especially without strong adaptation.
- Various adaptation approaches are already being implemented, including: protection, accommodation, ecosystem-based adaptation, coastal advance, and managed relocation


Ocean and
Marine Life

Changes in the ocean

- To date, the ocean has taken up **more than 90%** of the excess heat in the climate system. By 2100, the ocean will take up **2 to 4 times** more heat if global warming is limited to 2°C and **up to 5 to 7 times** at higher emissions.
- **Marine heatwaves** are becoming more frequent and severe, especially harming warm-water corals, kelp forests and the distribution of marine life.
- By absorbing human-induced carbon emissions, the ocean is becoming **more acidic.** It has taken up 20 to 30% of these emissions and continued uptake will exacerbate this.
- Changes in the ocean cause **shifts in fish populations.** This has reduced the global catch potential. In the future some regions will see further decreases but there will be increases in others.
- Communities that depend highly on seafood may face **risks to nutritional health and food security.**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The more decisively and earlier we act, the more able we will be to address unavoidable changes, manage risks, improve our lives and achieve sustainability for ecosystems and people around the world – today and in the future.

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