

#SROCC

The Ocean and Cryosphere in a Changing Climate

Musée Océanographique de Monaco

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ipcc

INTERGOVERNMENTAL PANEL ON climate change



The Ocean and Cryosphere in a Changing Climate

This Summary for Policymakers was formally approved at the Second Joint Session
of Working Groups I and II of the IPCC and accepted by the 51th Session of the IPCC,
Principality of Monaco, 24th September 2019

Summary for Policymakers



WG I × WG II



WG I × WG II



SROCC Report by the numbers



104 authors



31% of authors
are women




36 countries



6981 studies



31,176
comments



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.



High Mountains

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 activities, tourism and cultural assets.



Changes in the mountain cryosphere

- 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.
- Limiting warming to 1.5°C would help people to adjust to changes in **water supplies** and **limit risks related to mountain hazards**.
- **Integrated water management and transboundary cooperation** provide opportunities to reduce the impacts of climate-related cryosphere changes on water resources.

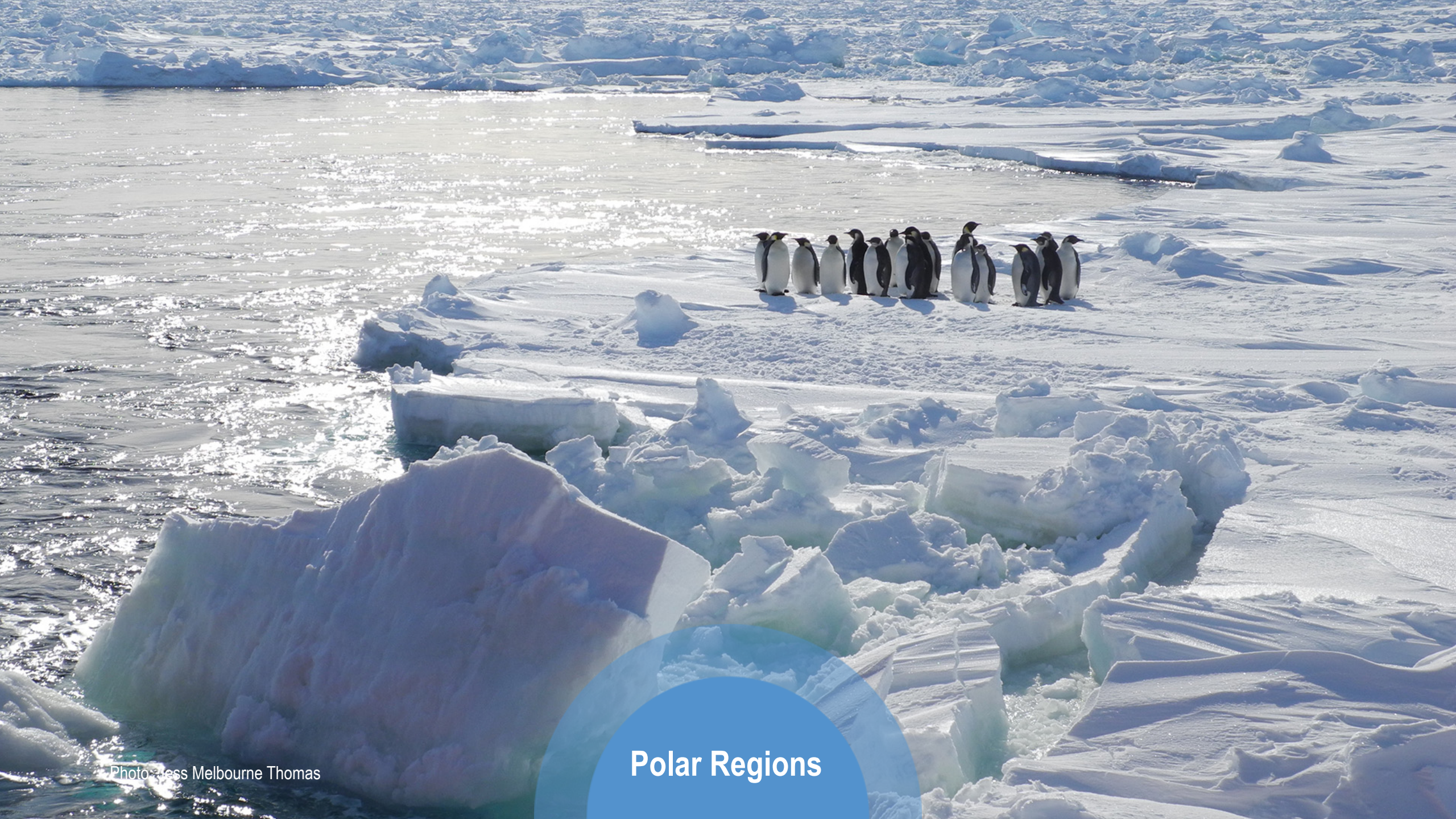


Photo: Jess Melbourne Thomas

Polar Regions



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.
- At global warming of 1.5°C, the Arctic Ocean will **rarely be free of sea ice** in September. At 2°C warming, this will occur **up to one year in three**.



Changes in polar regions

- Permafrost is **thawing**, with the potential of **adding more greenhouse gases to the atmosphere**.
- With global warming limited to well below 2°C, **around one quarter** of near-surface permafrost will thaw by 2100. If emissions continue to increase strongly, **around 70% near-surface permafrost could be lost**.
- 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.



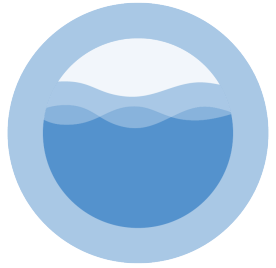
Sea level rise and coastal extremes

- Various adaptation approaches are already being implemented, including:
 - protection
 - accommodation
 - ecosystem-based adaptation
 - coastal advance
 - managed relocation
- People with the highest exposure and vulnerability are often those with the lowest capacity to respond.



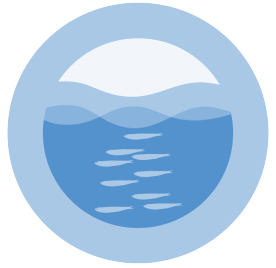
Photo: Mr. JK

Ocean and
Marine Life



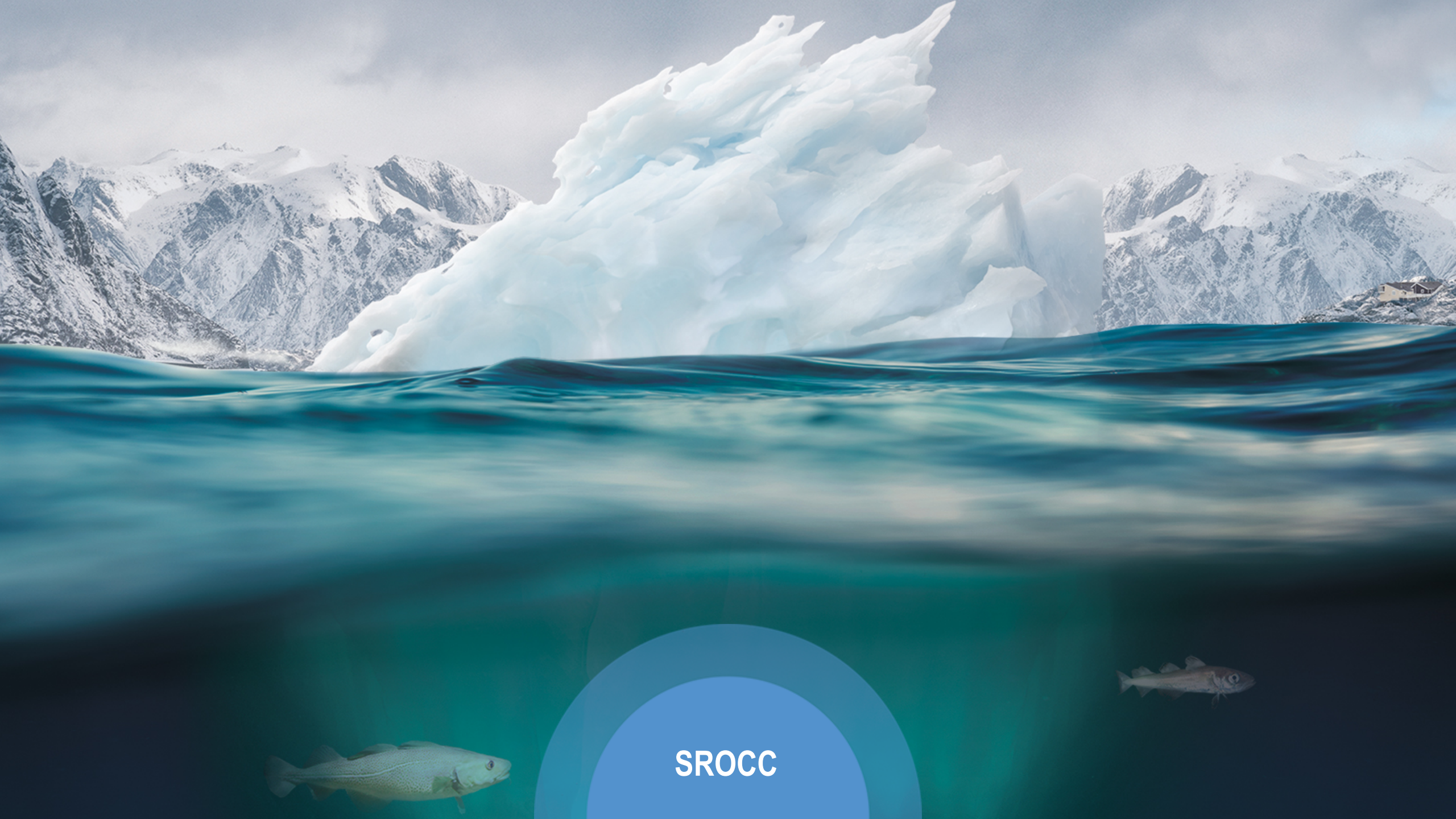
Changes in the ocean

- 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.
- Ocean warming reduces mixing between water layers and therefore the supply of **oxygen and nutrients for marine life**.
- **Marine heatwaves** are becoming more frequent and severe, especially harming warm-water corals, kelp forests and the distribution of marine life.
- The ocean takes up human-induced carbon emissions. This increases ocean acidity. It has taken up 20 to 30% of these emissions and continued uptake will exacerbate this.

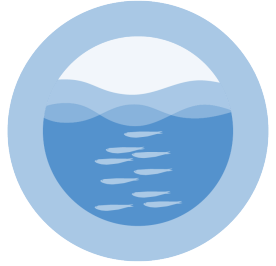


Changes in marine life

- 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**.
- Reducing other pressures such as **pollution** will further help marine life deal with changes in their environment.
- Policy frameworks for **fisheries management** and **marine protected areas** offer opportunities for people to adapt.



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Knowledge for action

The IPCC Special Report on the Ocean and Cryosphere in a Changing Climate

- highlights **the urgency** of prioritizing **timely, ambitious and coordinated action** to address **widespread and enduring changes** in the ocean and cryosphere;
- empowers people, communities and governments to tackle the unprecedented transitions in all aspects of society;
- provides evidence of the benefits of combining scientific with local and indigenous knowledge;
- focuses, for the first time, on the importance of education and climate literacy.

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.

The background is a solid blue color. At the top, there are stylized mountain peaks in various shades of blue. In the middle-right area, there is a school of small, light blue fish swimming towards the left. At the bottom-left, there are stylized coral reef structures in a darker shade of blue.

Our ocean and cryosphere –

They sustain us.

They are under pressure.

Their changes affect all our lives.

The time for action is now.

More Information:

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