

# Our changing oceans and snow: what do we know?

Everyone depends, directly or indirectly, on Earth's oceans, poles, and mountains. Nearly one out of every 10 people living on Earth today lives in a low lying coastal area. Four million people live in the Arctic, 65 million people live in Small Island Developing States, and 670 million people live in high mountain regions. The state of the ocean and cryosphere interacts with each aspect of sustainability reflected in the United Nations Sustainable Development Goals (SDGs).

More than 104 scientists from 36 countries worked together over 2 years to assess knowledge on climate change.

**The question:** What is happening in the oceans, coasts, poles, and mountains, and what is happening in the communities that depend on them? -

**Their answers** can be found in the [Special Report on the Ocean and Cryosphere in a Changing Climate](#) (SROCC) by the Intergovernmental Panel on Climate Change (IPCC).

Here is our summary.



*“What’s that, girl? Melting ice are shifting water systems causing fish to change habitats, threatening coastal communities with rising sea levels, and causing permafrost in the Arctic to release more greenhouse gas?”*

[Cartoon by Kaamran Hafeez / CartoonCollections.com](#)

## The world's oceans will never be the same.

Marine heatwaves have become more common, and these drastic increases in ocean temperatures will be 20 to 50 times more frequent by the end of the century (depending on how quickly we reduce greenhouse gas emissions). The oceans are rapidly becoming more acidic and are holding less oxygen. Almost all warm water coral reefs will continue to decline, along with the food, protection, and tourism they provide.



*"That can't be good."*

CartoonCollections.com

[Cartoon by Danny Shanahan / CartoonCollections.com](https://www.cartooncollections.com)

### **Storm-related disasters are getting worse.**

Climate change has increased the height of extreme sea level events that happened during several cyclones, and cyclones are expected to intensify with further climate change. With sea level rise, annual coastal flood damages are expected to be 100 to 1,000 times worse by the end of the century.

By the end of the century, if you lived at sea level, rising oceans could put your bed under water (0.4m/1.3ft). With higher emissions, it could be your kitchen table (0.7m/2.3ft). This is the global average sea level rise; the actual rise will be higher and lower than this in different parts of the world.



CartoonCollections.com

[Cartoon by Drew Dervavich / CartoonCollections.com](https://www.cartooncollections.com)

## Our infrastructure is severely threatened.

Melting permafrost is causing land to subside and collapse, which threatens infrastructure and transport networks in the Arctic and in high mountain areas. Melting glaciers are causing floods and landslides in areas that have never experienced this before. Ski resorts are becoming water slides. In the future, there will be less water flowing down in rivers that are fed by glaciers and snow melt in mountains, threatening for instance water supply in High Mountain Asia.

All of these impacts will worsen as the climate continues to change.



*“Try honking again.”*

CartoonCollections.com

[Cartoon by Drew Dervavich / CartoonCollections.com](https://www.cartooncollections.com)

**Dealing with these changes is very difficult.**

People have already been facing the impacts of climate change: water scarcity, food insecurity, changing shipping routes, reduced fishery catches, and others. Disaster risks mountain areas and the Arctic are expected to increase, due to floods, fires, landslides, avalanches, unreliable ice and snow conditions, and increased exposure of people and infrastructure.

People are adapting to the changing climate, and this can significantly reduce some of the impacts. Nevertheless, some losses will occur even with major adaptation. Given the magnitude of these impacts, there are mental health challenges in many affected communities.

**MORE ANXIETY**



©STEINBERGDRAWINGSCARTOONS

## What can we do about this?

One option is to invest in expensive hard barriers, such as dikes around coastal cities. Ecosystem-based adaptations can also be effective for low levels of warming, but there is limited evidence on the benefits vs the cost of these options. In order to protect ecosystems, we can reduce non-climate stressors (e.g. invest in sustainable fisheries management).

Beyond protection, people can accommodate the “new normal” (e.g. by flood-proofing buildings). However, this works only for small amounts of sea level rise, and many governance systems are too fragmented to address large and cascading risks.



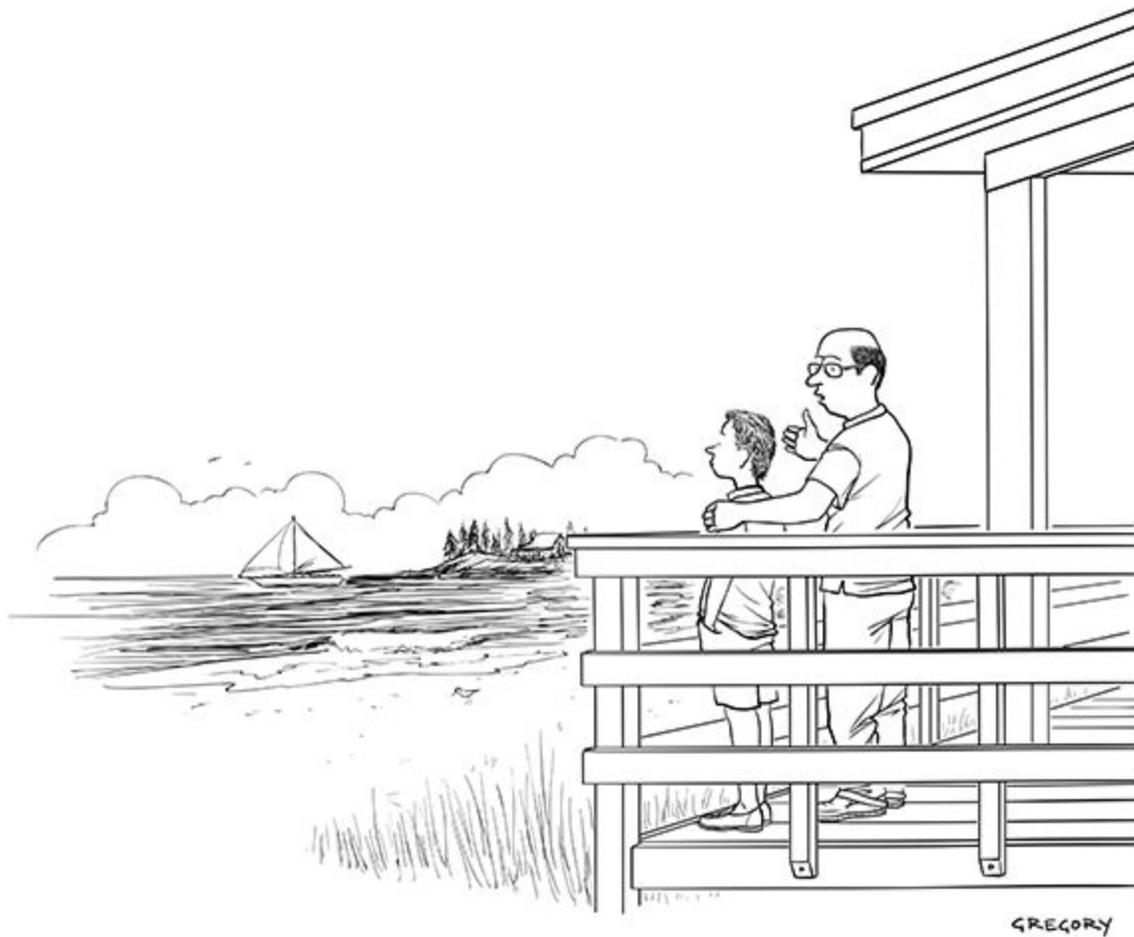
“We look for people who can quickly adapt to changes in the workplace.”

CartoonCollections.com

**In some areas, people will need to move.**

Some areas are likely to become uninhabitable due to climate change. By 2050, people will start seeing extremely high sea level events happen every year, especially in tropical regions; these events used to happen only once in about 100 years.

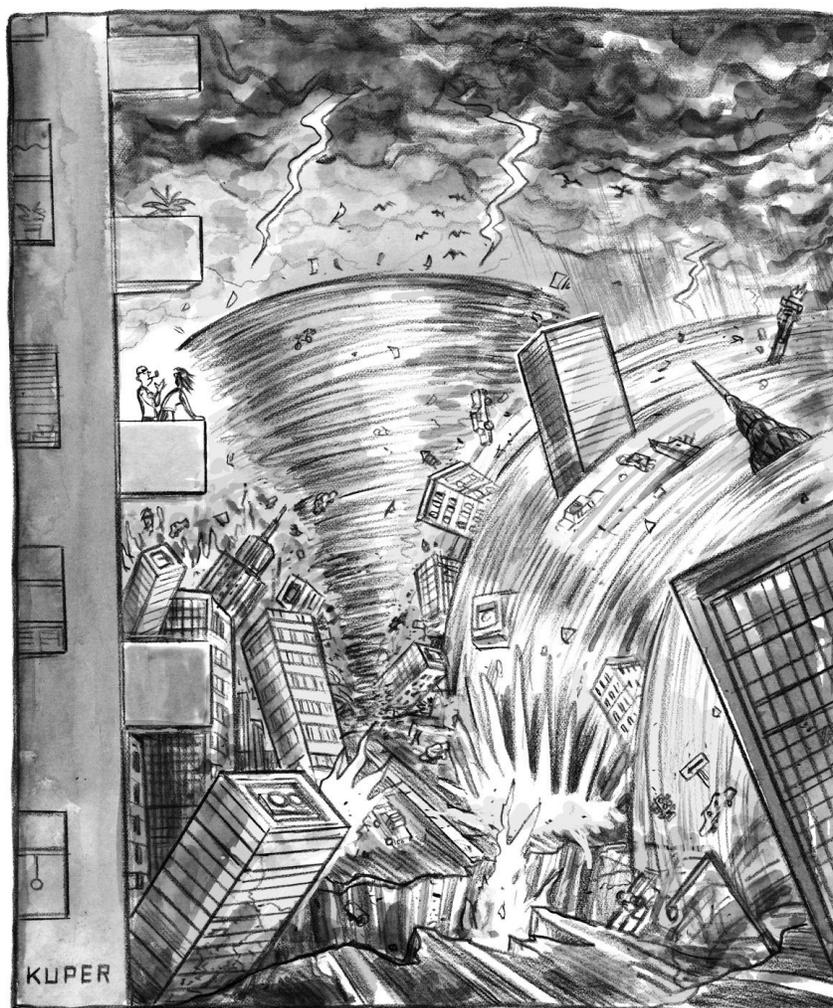
People are already retreating. In the case of managed retreat, prioritizing considerations of social vulnerability and equity promotes sustainable development.



*“Someday, son, this will all be yours—and underwater.”*

## Early warning systems can be an effective adaptation.

Early warning systems can manage some negative impacts, and offer high economic efficiency as an adaptation to climate change. However, they require effective institutional arrangements. People can make ongoing decisions to manage impacts based on monitoring and early warning, by using predictions of climate anomalies such as more extreme El Niños or marine heatwaves.



*“Bernard, nobody likes an ‘I told you so.’”*

CartoonCollections.com

[Cartoon by Peter Kuper / CartoonCollections.com](https://www.cartooncollections.com)

# Our changing oceans and snow: what do we know?

IPCC SROCC makes it clear that climate change is posing major risks, and these may get much worse in the near future. Though there are some ways that humans will be able to adapt, many ecosystems are under severe threat, and severe impacts are expected on human systems. Action is needed urgently to reduce greenhouse gas emissions and manage the rising risks in a changing climate.

To learn more, the full report is available [here](#).

