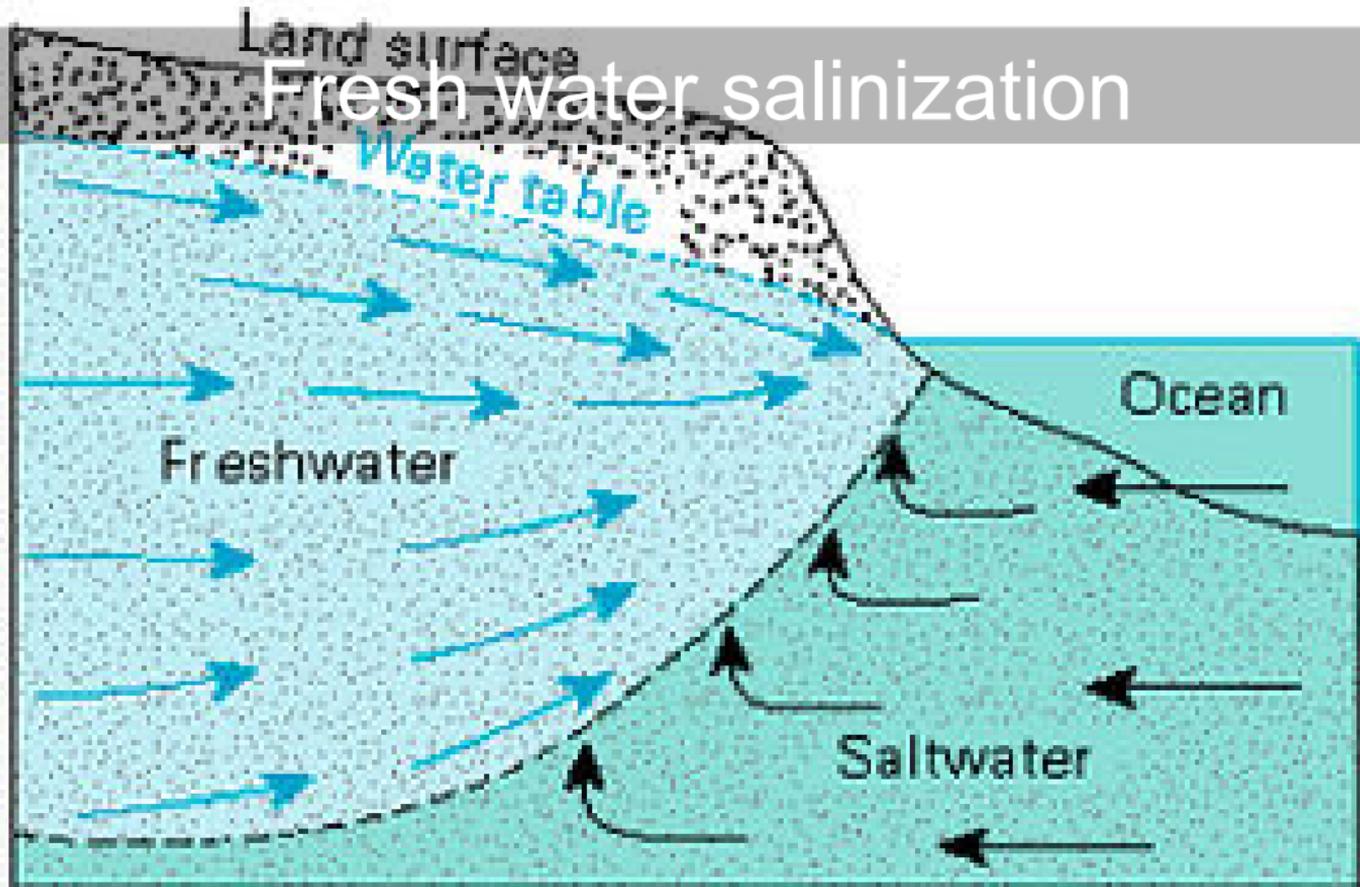


Coastal erosion

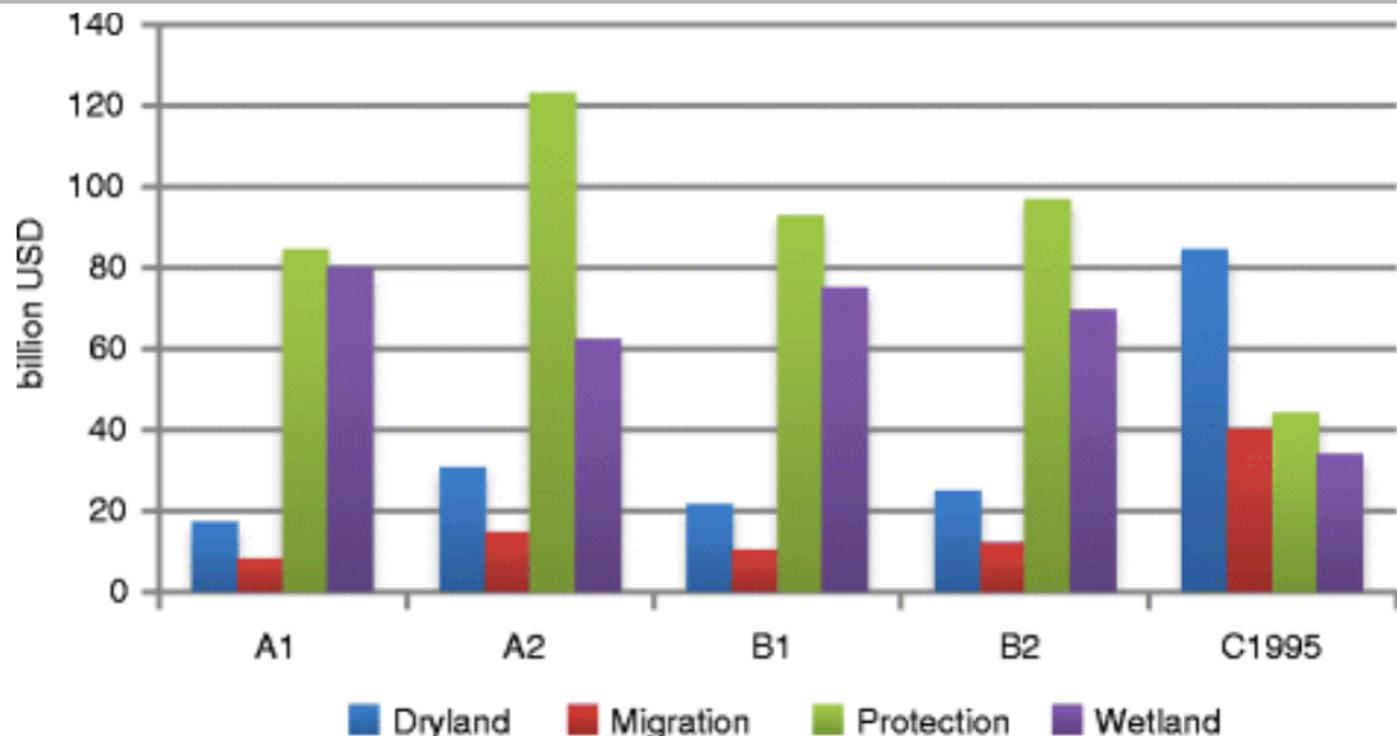


Natural Conditions



Fresh water salinization

Economic consequences



Coastal erosion, exacerbated by sea level rise, poses a grave threat to vulnerable shorelines worldwide. As sea levels continue to increase, the relentless power of waves and storms erode coastal areas, leading to the loss of valuable land and ecosystems. Urgent measures are required to mitigate the devastating impacts of this combined force on coastal communities and protect our fragile coastlines for future generations.

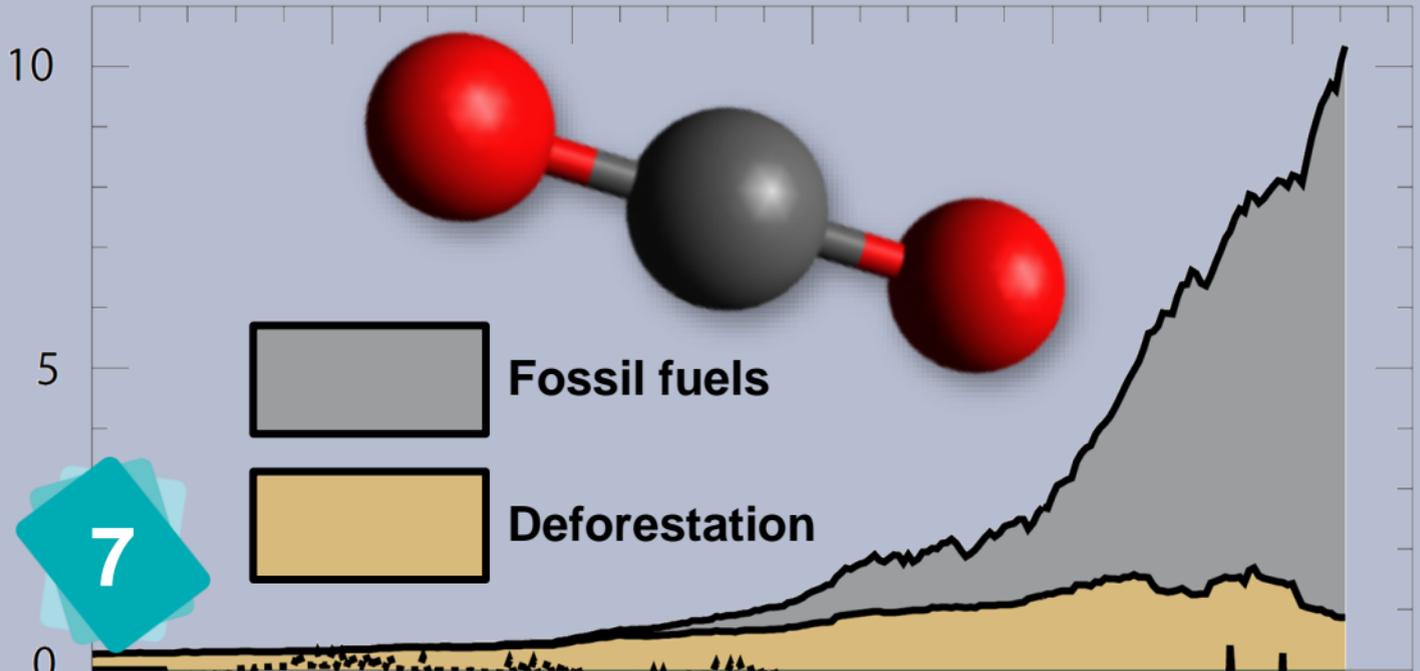
The phenomenon of fresh water salinization is closely intertwined with sea level rise. As ocean waters encroach upon coastal regions, saline intrusion infiltrates freshwater sources, contaminating essential supplies. This accelerating problem poses significant challenges for agriculture, ecosystems, and human populations, necessitating comprehensive strategies to monitor and mitigate the impacts of sea level rise on freshwater resources.

Sea level rise carries significant economic consequences, particularly for coastal communities.

Increased flooding and storm surges damage infrastructure, disrupt trade and transportation, and devalue coastal properties. Businesses reliant on tourism, fishing, and shipping suffer losses, while insurance costs skyrocket. Adequate planning, investment in resilient infrastructure, and adaptation strategies are vital to minimize the economic toll of sea level rise.

CO₂ Emissions

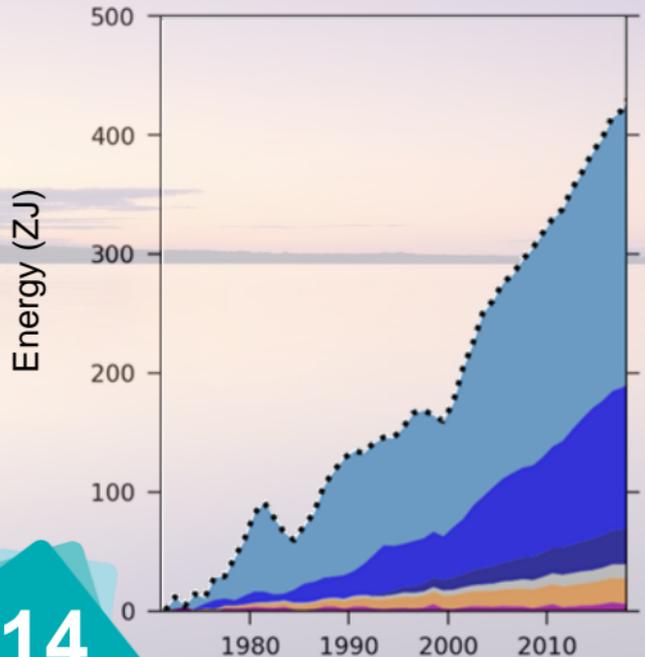
Anthropogenic CO₂ emissions (GtC/yr)





CO₂, or carbon dioxide, is the main anthropogenic (produced by human activities) greenhouse gas in terms of emissions. These emissions come from our use of fossil fuels and from deforestation.

Energy Budget



91 %

Ocean

3 %

Melting ice

5 %

Soil

1 %

Atmosphere

Source: IPCC

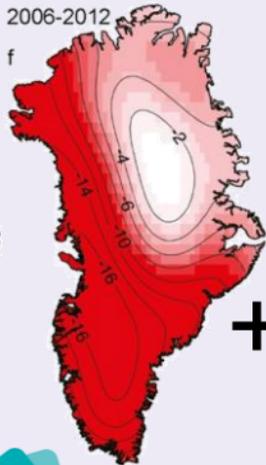


This graph explains where the energy accumulated on Earth due to radiative forcing goes. It warms up the ocean, melts ice, dissipates into the ground and warms up the atmosphere.

Melting Ice Sheets

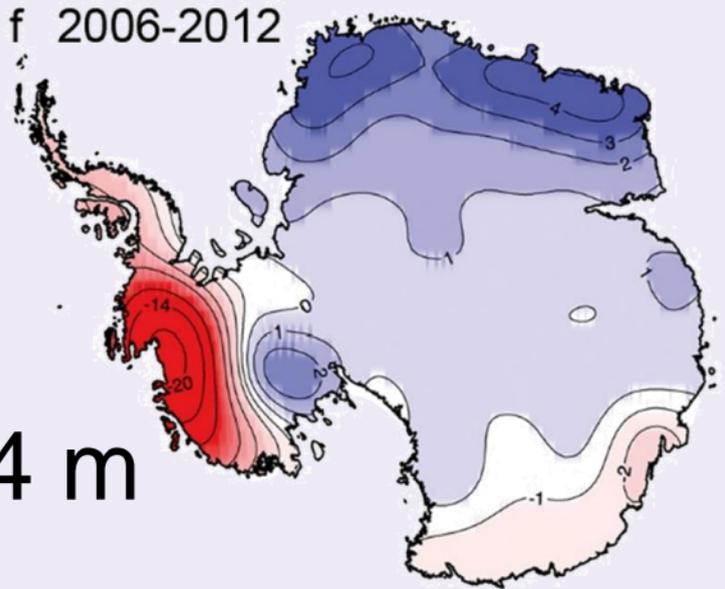
2006-2012

f



+ 7 m

f 2006-2012



+ 54 m

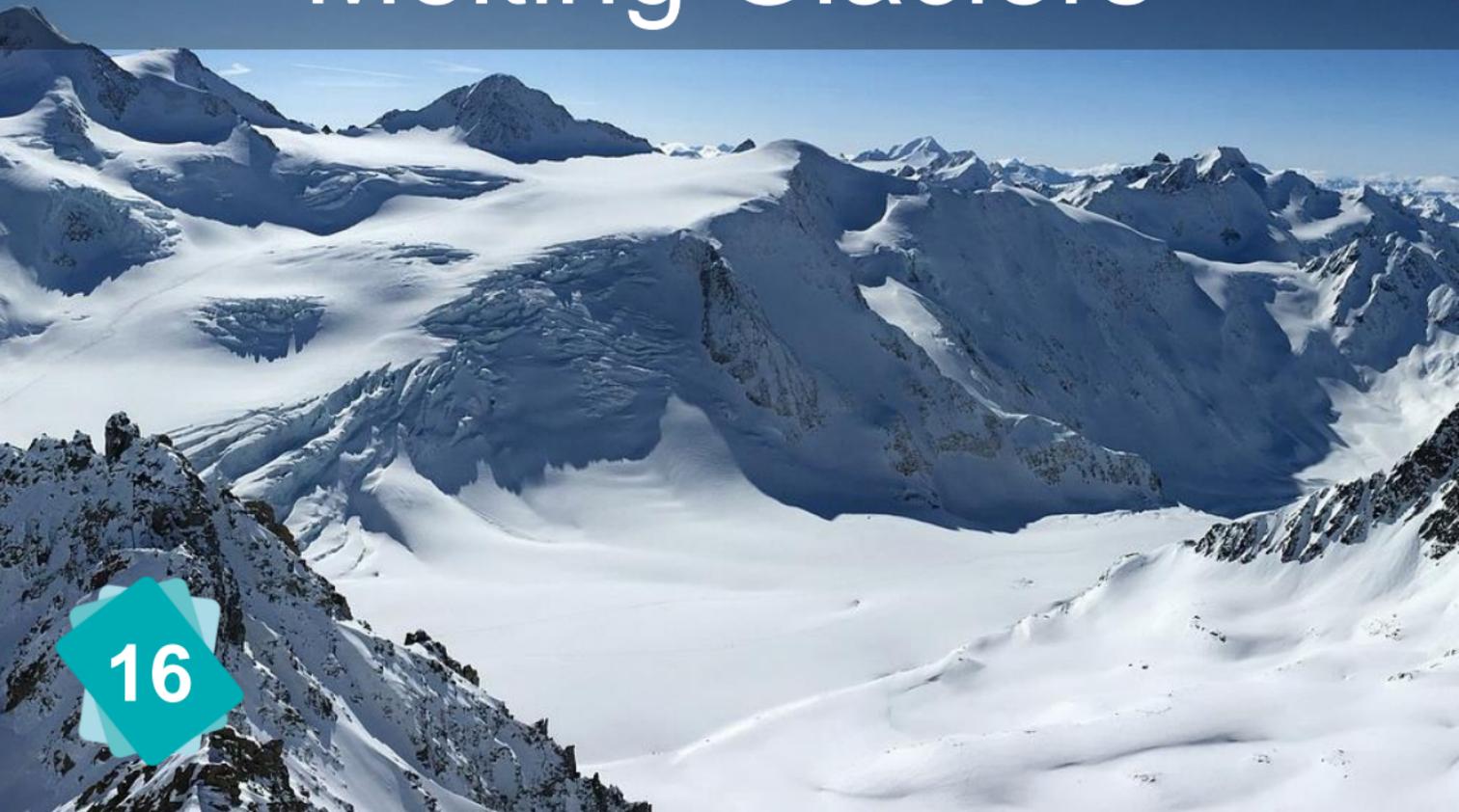
19

Source: IPCC



Greenland and Antarctica are ice sheets (or continental glaciers). If they were to completely melt, they will cause the sea level to rise by 7 metres for Greenland and 54 metres for Antarctica. During the last ice age, ice sheets were so much larger that the sea level was 120 metres lower than today.

Melting Glaciers



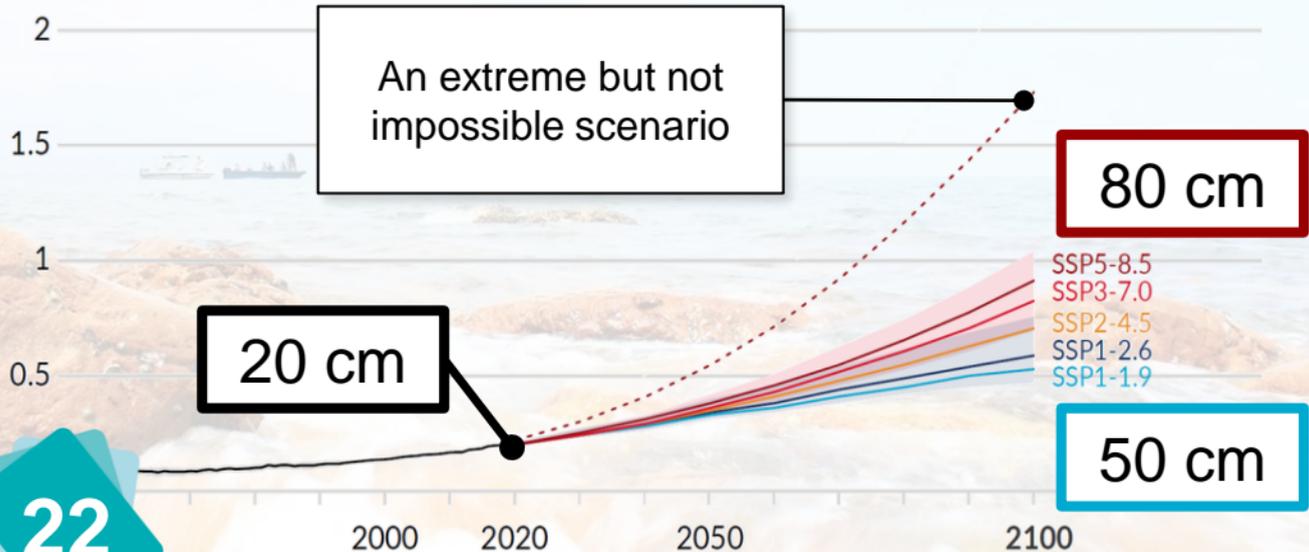
16



Almost all glaciers have receded, and hundreds of them have already disappeared. Glaciers are important because they regulate and provide freshwater.

Rising Sea Levels

Global mean sea level rise from 1900



Source: IPCC



Since 1900, sea levels have risen by 20 cm. This is caused by the thermal expansion of ocean waters and the melting of glaciers and ice sheets.

Rising Water Temperatures





Oceans absorb 91% of the energy accumulated on Earth. The water temperature has therefore increased, especially close to the surface. Water expands as it warms.

Coastal flooding is a flood that occurs when land that is usually dry is flooded with seawater. This happens because, for some reason, the sea level rises, and it will spill onto the land. Sea level rise directly contributes to coastal flooding, which poses significant risks to coastal communities and the environment. Saltwater intrusion, erosion, and infrastructure damage are among the many impacts of rising sea levels.

Coastal flooding



Destruction of farmland



Climate migration due to sea level rise is a significant issue affecting coastal communities and low-lying areas worldwide. Rising sea levels caused by the melting of ice caps and glaciers are contributing to climate-induced migration. In the coming decades, sea level rise is expected to displace millions of people, especially in vulnerable regions. To address this issue, reducing greenhouse gas emissions is crucial. Supporting climate migrants and protecting their rights are also essential.

Climate migration



Sea level rise can damage or destroy farmland in low-lying coastal areas by causing flooding and saltwater intrusion into freshwater resources. This can make soil too salty for crops to grow and disrupt food production, leading to serious consequences for food security and economic stability. To mitigate the impacts, adaptation strategies may include building sea walls, using salt-tolerant crops, and implementing water management techniques.

Thermal expansion of ocean



Thermal expansion of ocean is the process by which seawater expands in volume as the temperature of water increase. Thermal expansion is a major contributor to global sea level rise (almost 50%). The rate of thermal expansion has been increasing in recent decades due to rising global temperatures, and is expected to continue in the future.

Deforestation and mangrove destruction



Deforestation and mangrove destruction are responsible directly and indirectly of the rising of sea levels. Indirectly because forests absorb huge amounts of CO₂ and their quick decline rises even more CO₂ quantity in the atmosphere and its temperature. Directly because forest and mangrove capture much water (act like natural sponge), and without them the water flow much quicker to rivers and then ocean, especially during floods.