



SEAS AND GLACIERS ARE HIT BY CLIMATE CHANGE

Seas are important sinks for CO₂

Seas make up 2/3 of the carbon sinks on earth. Vegetation, mainly forests, represent the remaining 1/3. The amounts of CO₂ in the atmosphere and in the seas are directly dependent on each other. This means that the more CO₂ that has been released to air, the more of it has been dissolved in the water. This explains why nature's capacity to process CO₂ so far has been growing with increasing emissions.

CO₂ increases acidification, which destroys vital functions in ecosystems

CO₂ and water form carbonic acid. This contributes to acidification of the seas. A change of 0,2 units in pH may have disastrous consequences for vital functions like choral and plankton. Seas are very sensitive ecosystems.

Warming leads to decrease in plankton amount

Living plankton is an important nutrient for various animals in the sea. It also plays a role in the CO₂ balance. The effectiveness of the photosynthesis of plankton is as good as the one of plants. It uses the carbon in CO₂ to build its shell. Plankton also produces DMS (Dimethylsulfide) needed in the formation of clouds. When sea temperatures increase, the amount of plankton decrease. This has already happened.

Warming + CO₂ + glacier melting may turn seas from CO₂ sink to source

Areas of deep waters in the seas, nearby Greenland and the Antarctic, are crucial. They are important for the storage of inorganic carbon. They are also important as pumps for the Thermohaline Circulation (THC, also called Ocean Conveyor Belt). The colder and more salty the water the bigger CO₂ absorption and, the better pump function.

The carbon sink capacity has decreased, and the pumps have become "lazier". A warming earth has increased the temperatures of the seas, and melting inland glaciers have reduced the saltiness of the water. This leads to a change for the worse in the mixing of seawater. It prevents oxygen to reach bottom layers of the sea and increases the surface temperature of the sea. This will further degenerate the carbon sink capacity. At some stage the CO₂ storage turns into a CO₂ source. This has already started to happen in Antarctic seas.

A warming sea will expand and bring coastal erosion, then flooding, inundation and ...

A warming sea will expand. That contributes to the volume increase caused by melting inland glaciers. As a consequence sea levels will rise, causing coastal flooding and inundation. In the beginning the main problem is not the absolute sea level rise but the variations between extreme low and extreme high sea levels. This causes severe coastal erosion. It includes both salty water sipping into fresh water wells and, seawater causing infertile cultivations. When the average sea level rises, large areas will become impossible to live in.

Glacier melting contributes to sea level rise

When ice sheets melt (inland ice) sea levels will rise. If all Greenland's inland ice would melt the sea level would rise with 7m. If all inland ice on Antarctica would melt sea level would rise with 60m. This will not happen overnight. The Greenland ice sheet decreases with ca. 250 km³ /a, and at Antarctica with ca. 150 km³ /a. The estimated sea level rise due to glacier melting because of a global temperature increase is very difficult to predict. But, together with thermal expansion of the seas scientists assume a possible rise of at least 1-1,5 m during this century.

Glacier melting speeds up warming, and cause severe problems for many animals





Snow and ice reflects back to space 80 % of the solar radiation reaching it. The surface of an open sea reflects back only 4 %. This explains why melting of glaciers (also mountain glaciers) cause a decrease in the reflectivity of our planet and, further accelerates warming. It says itself that melting of the glaciers speed up when temperatures increase.

Melting glaciers have detrimental effects on many organisms including migratory birds, mammals (i.e. ice bears) and higher predators.

Decreasing glaciers risk important heat regulation and water supply

Millions of people are dependent on mountain glaciers as sources for drinking water, irrigation and electricity. As mountain glaciers melt faster than new ice is formed, water shortage will be a consequence. Furthermore thawing of permafrost on mountains leads to land slides that can be disastrous. Even worse, a collapsing ice sheet could be creating a mega tsunami.

SOURCES

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http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr_spm.pdf IPCC synthesis report 2007, summary for policymakers



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