

Today, the impact of global change on the oceans is a reality...

►► Increase in the level of the oceans

Since 1880 the mean sea level has increased by 17 cm (an average of 0,13 mm per year). This increase is mainly due to expansion of the sea water mass, the addition of fresh water from melting permafrost (portion of ground frozen permanently in the cold areas) and fresh water ice (continental glaciers and ice cap of Greenland) under the influence of global warming. According to various scientific models, the level of the oceans could increase by 18 to 59 cm by 2100. Such a rise would have a considerable impact on coastal zones with large human populations, like the Nile delta, the coasts of India and certain small islands of the Pacific.

►► Potential disturbance to the circulation of the oceanic water masses

Global warming and the melting of fresh water ice (modifying the density of surface sea water) may over the long term cause a disturbance and modification to the circulation patterns of large oceanic currents.

►► Reduction in the Arctic ice cover

In the second half of the 20th century, Arctic ice cover has lost 40% of its thickness and the area occupied by summer ice cover is under constant reduction. Since 1978 measurements taken at the end of each summer, show an average loss of 8% every ten years. Beyond the impacts on animals living in these areas (e.g.: the polar bear), this new situation raises questions about the major socio-economic impacts of navigation and exploitation of resources in zones that were previously inaccessible. It also raises new questions about the political status of the Arctic.

►► Amplification in warming by feedback effect

White or clear surfaces such as ice and snow reflect more of the sun's rays than dark surfaces such as the land and water. A reduction in ice cover results in greater warming as more energy is absorbed by the earth's surface. This phenomenon can have a feedback effect on warming. While melting, ice surfaces also release strong greenhouse gases like methane.

►► Migration and displacement of species, disturbance of the food web

Global warming has already caused migration and displacement of marine species in certain areas. These changes modify the balance of food chains and webs. Those species which are unable to migrate or adapt to this increase in temperature and competition are likely to disappear.

►► Acidification of the oceans and threats to biodiversity

Another impact recently noted, is the increased carbon dioxide concentration (CO₂) in the atmosphere. This increase has affected the chemistry of the oceans by reducing its pH, making it more acidic. This phenomenon has begun to affect the growth, reproduction and survival of certain aquatic organisms, like coral or molluscs, which use calcium carbonate to form their skeleton or their calcareous shell. If the production of CO₂ continues to increase, as seems likely based on current projections, these organisms could be seriously threatened which would have a knock-on effect for the entire marine ecosystem.

Reference : IPCC (Intergovernmental Panel on Climate Change) report 2007, NSIDC (World Data Center for Glaciology, Boulder, USA)