Press Release No. 34/2009

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Für Mensch und Umwelt

Climate protection through protection of the oceans

Federal Environment Agency brochure examines impact of global warming on marine ecosystems

Global warming is changing our oceans. Polar bears who can no longer hunt on isolated icepacks are but one sad consequence that global warming might have on the complex interdependencies that exist in marine ecosystems. Oceans are warming up, with the measuring site at Helgoland Reede registering a 1.5 °C increase in water temperature since recording began in 1962. The mean sea level worldwide is on the rise, at a rate of 3.1 millimetres per year in the 1993-2003 period. Oceans are also acidifying as the increasing carbon dioxide concentration and declining pH value of waters exacerbate the formation of limestone vital to life for algae and corals. "As a result of the global rise in temperature, marine food chains are being disturbed or even harmed. Only intact marine ecosystems dispose of the resistance necessary to withstand the consequences of climate change. Therefore, protection of our oceans is particularly important", said Dr. Thomas Holzmann, Vice President of the Federal Environment Agency (UBA), on the occasion of the United Nations' sponsored World Oceans Day that was launched on 8 June 2009.

A new brochure published by UBA describes the critical situation in marine ecosystems and examines the effects of global warming on the conditions in oceans and seas, on their inhabitants, and on their use.

The world's oceans and seas absorb the lion's share (more than 80 percent) of the heat emitted to the climate system. This has in the meantime resulted in a tangible average temperature rise of the oceans at depths of up to 3,000 metres. The resulting thermic expansion and dilution of ocean waters with freshwater from heavier precipitation and meltwaters have caused sea levels to rise and influenced ocean currents.

What exactly happens when the circulation of the world's oceans changes is one of many unanswered questions and uncertainties. Yet the facts already proven, for example that the oceans are acidifying, are reason enough to take immediate action. The oceans absorb about 30 percent of all man-made carbon dioxide per year. They store about 50 times the volume stored in the atmosphere and are also the most critical long-term sink for carbon dioxide. There has been a perceptible increase in the carbon dioxide concentrations in the upper layers of the ocean in recent decades, and this has led to acidification of the oceans of 0.11 pH points. The impact on e.g. calcifying species' capacity to lay down limestone is

thus exacerbated. Corals are accompanied by symbiotic algae that are shed through heat stress, whereby the corals bleach out. If the sea level rises at a faster pace than corals' maximum vertical growth of 10 millimetres per year, the algae do not get enough light and die along with the coral.

Two specific examples of the impact of global warming are:
Average temperature in the Arctic rose at nearly twice the rate as the global average in recent years. Arctic ice has melted by an average 2.7 percent per decade since 1978. In September 2007, the 4.28 million km² ice-covered area was the smallest it has ever been. The Northwest Passage connecting the Atlantic and the Pacific—considered impassable for most ships up until now- was free of ice for the first time. The surrounding regions of Arctic ice provide the primary habitat for Arctic plants and animals.
The Baltic Sea ringed seal has adapted to life in the polar sea. Seal pups are born and nursed in snow caves. The winter of 2008/09 had the least ice cover since the beginning of data recording, and most of the seals' young did not survive. With a current population of merely 7,000 to 10,000, the Baltic Sea ringed seal is already on the International Union for Conservation of Nature and Natural Resources (IUCN) Red List.
Human activities such as overfishing, pollutant and excess nutrient inputs, the destruction of coastal and marine habitats, as well as the spread of alien species, have brought the world's oceans to the brink of their resilience. Global warming introduces yet one additional "stress factor". The changes occurring in the marine environment can also have a considerable impact on humans. Dramatically reduced fish stock as a result of overfishing, for example, might reach more sensitively to global warming than sustainably managed stocks. Genetically diverse populations and ecosystems with a large number of species have a greater potential to adapt to climate change. Overfishing stocks of tuna fish, the jellyfish's major natural predator, has given rise to massive growth in the latter's populations in some ocean areas. As food competitors and predators of fish, jellyfish can decimate entire stocks of fish in the food system and even affect biodiversity. Jellyfish plague, which is sometimes toxic, as well as algal bloom, have increasingly become a hazard to human health and, moreover, can have a negative effect on tourism.
"It behooves us all to slow global warming and take up measures to reduce carbon dioxide emissions", said Dr. Thomas Holzmann. "By using renewable energies, heat insulating housing structures, and switching to motor vehicles with low pollutant and CO_2 emissions, we can do our bit to protect natural resources and our climate. These and other measures to protect the climate will also protect our oceans and seas."
The publication *Klimawandel und marine Ökosysteme – Meeresschutz ist Klimaschutz* (in German) on climate change and marine ecosystems is available on the Internet at http://www.umweltbundesamt.de/uba-info-medien/mysql_medien.php?anfrage=Kennummer&Suchwort=3805.
Information on the United Nations World Oceans Day is available here:
http://www.un.org/Depts/los/reference_files/worldoceansday.htm

Dessau-Roßlau, 8 June 2009