

14 December 2009

## 'Acidifying oceans' threaten food supply, UK warns

By Richard Black

Environment correspondent, BBC News website, Copenhagen



Acidification of the oceans affects marine life

Acidification of the oceans is a major threat to marine life and humanity's food supply, Hilary Benn is to warn as the UN climate summit resumes.

The UK environment secretary will say that acidification provides a "powerful incentive" to cut carbon emissions. Ocean chemistry is changing because water absorbs extra CO<sub>2</sub> from the air.

Some believe this could be as big an impact of rising CO<sub>2</sub> levels as climatic change, though it is rarely discussed within the UN climate convention.

The UN summit in Copenhagen, which started a week ago, is scheduled to conclude on Friday, when more than 100 world leaders will attend in an effort to agree a new global treaty on climate change.

'Really important'

### OCEAN ACIDIFICATION

Up to 50% of the CO<sub>2</sub> released by burning fossil fuels over the past 200 years has been absorbed by the world's oceans

This has lowered the pH value of seawater - the measure of acidity and alkalinity - by 0.1

The vast majority of liquids lie between pH 0 (very acidic) and pH 14 (very alkaline); 7 is neutral

Seawater is mildly alkaline with a "natural" pH of about 8.2

The IPCC forecasts that ocean pH will fall by "between 0.14 and 0.35 units over the 21st Century, adding to the present fall of 0.1 units since pre-industrial times"

Natural lab shows sea's acid path

What is ocean acidification?

'Coral lab' offers acidity insight

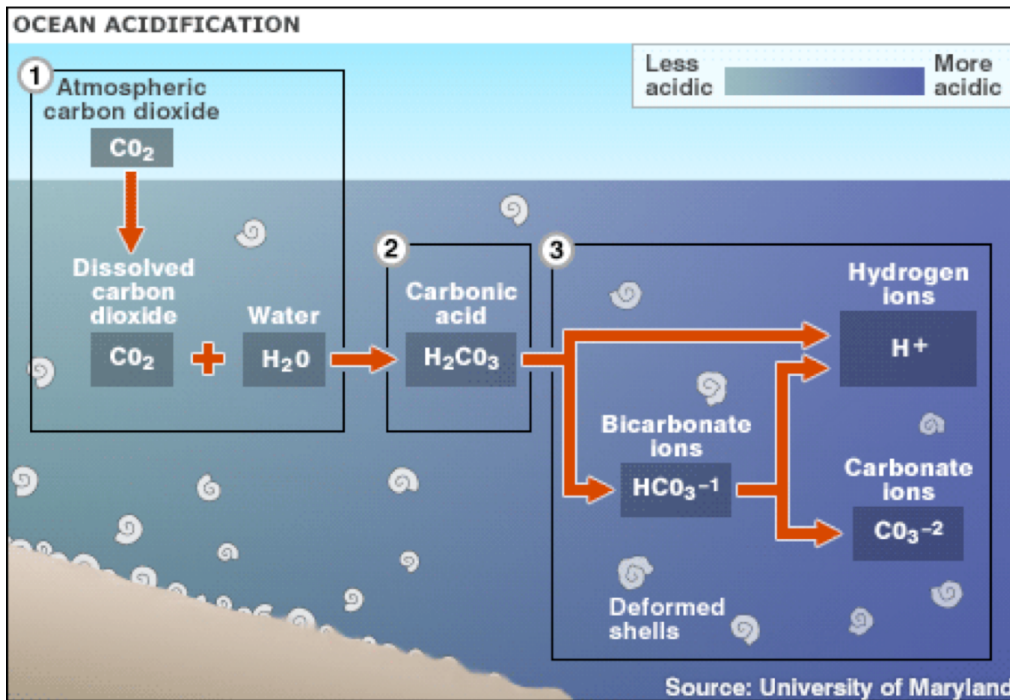
The science has come to prominence only within the last five or six years, and most of the details were not available when the convention was signed in 1992.

"We know that the increasing concentration of CO<sub>2</sub> [in the air] is making the oceans more acidic," Mr Benn told BBC News.

"It affects marine life, it affects coral, and that in turn could affect the amount of fish in the sea - and a billion people in the world depend on fish for their principal source of protein.

"It doesn't get as much attention as the other problems; it is really important."

In September, the UN-backed study into The Economics of Ecosystems and Biodiversity (Teeb) concluded that the widely-endorsed target of trying to stabilise atmospheric concentrations of CO<sub>2</sub> or their equivalent to around 450 parts per million (ppm) would prove lethal to much of the world's coral.



1. Up to one half of the carbon dioxide ( $\text{CO}_2$ ) released by burning fossil fuels over the past 200 years has been absorbed by the world's oceans
2. Absorbed  $\text{CO}_2$  in seawater ( $\text{H}_2\text{O}$ ) forms carbonic acid ( $\text{H}_2\text{CO}_3$ ), lowering the water's pH level and making it more acidic
3. This raises the hydrogen ion concentration in the water, and limits organisms' access to carbonate ions, which are needed to form hard parts

Mr Benn will be speaking during the summit's "oceans day" at a meeting organised by Stanford University and Scripps Institution of Oceanography, both based in California.

"Unlike global warming, which can manifest itself in nuanced, complex ways, the science of ocean acidification is unambiguous," said Andrew Dickson, a Scripps professor of marine chemistry.

"The chemical reactions that take place as increasing amounts of carbon dioxide are introduced to seawater have been established for nearly a century."

#### CLIMATE CHANGE GLOSSARY

Select a term from the dropdown:

Glossary  
 Adaptation  
 Annex I countries  
 Annex II countries  
 Anthropogenic climate change  
 Aosis  
 AR4  
 Atmospheric aerosols  
 Bali action plan  
 Bali roadmap  
 Baseline for cuts  
 Biofuel  
 Black carbon  
 Boxer-Kerry bill  
 Business as usual  
 Cap and trade  
 Carbon capture and storage (CCS)  
 Carbon dioxide ( $\text{CO}_2$ )  
 Carbon dioxide ( $\text{CO}_2$ ) equivalent  
 Carbon footprint  
 Carbon intensity  
 Carbon leakage  
 Carbon neutral  
 Carbon offsetting  
 Carbon sequestration  
 Carbon sink  
 Certified Emission Reduction (CER)  
 Clean Coal Technology  
 Clean Development Mechanism (CDM)  
 Climate change  
 CFCCO2  
 Commitment period  
 COP15  
 Country in transition  
 Dangerous climate change  
 Deforestation  
 Emission Trading Scheme (ETS)  
 EU Burden-sharing agreement  
 Feedback loop  
 Flexible mechanism  
 Fossil\_fuels  
 Geological sequestration  
 Global average temperature  
 Global energy budget  
 Global dimming  
 Global warming  
 Global Warming Potential (GWP)  
 Greenhouse gases (GHGs)  
 Greenhouse effect  
 Hockey stick  
 IPCC  
 Joint implementation  
 Kyoto Protocol  
 LDCs  
 LULUCF  
 Major Economies Forum on Energy and Climate  
 Methane  
 Mitigation  
 Nairobi work program  
 Natural greenhouse effect  
 Non-annex I countries  
 Ocean acidification  
 ppm (350/450)  
 Per-capita emissions  
 Pre-industrial levels of carbon dioxide  
 REDD  
 Renewable energy  
 Stern review  
 Technology transfer  
 Tipping point  
 Twenty-twenty-twenty (20-20-20)  
 UNFCCC  
 Waxman-Markey energy bill  
 Weather

Suggest additions

Glossary in full

The oceans and atmosphere are constantly exchanging  $\text{CO}_2$ .

Concentrations in the atmosphere are now about 30% higher than in pre-industrial times; a proportion of this is absorbed by seawater, which results in rising concentrations of carbonic acid.

As a result, the pH of seawater has fallen by about 0.1, and a further change of 0.3-0.4 is expected by the end of the century.

This is likely to affect the capacity of organisms including molluscs, coral and plankton to form "hard parts" of calcium carbonate.

A 2007 study showed that rates of coral growth on the Great Barrier Reef had fallen by 14% since 1990.

Mr Benn will say that the Intergovernmental Panel on Climate Change (IPCC) should investigate ocean acidification during its next major assessment of the Earth's climate, scheduled for release in 2013.