

### **It is written in Malachi 4:1-3**

*1 ¶ For, behold, the day cometh, it burneth as a furnace; and all the proud, and all that work wickedness, shall be stubble: and the day that cometh shall burn them up, saith the LORD of hosts, that it shall leave them neither root nor branch. 2 But unto you that fear my name shall the sun of righteousness arise with healing in his wings; and ye shall go forth, and gambol as calves of the stall. 3 And ye shall tread down the wicked; for they shall be ashes under the soles of your feet in the day that I do make, saith the LORD of hosts.*

### **A world dying, but can we unite to save it the Nations ask?**

Pollution in the seas is now speeding global warming, says a devastating new climate report. 'IoS' Environment Editor Geoffrey Lean reports from Valencia, **Published: 18 November 2007.**

Humanity is rapidly turning the seas acid through the same pollution that causes global warming, the world's governments and top scientists agreed yesterday. The process – thought to be the most profound change in the chemistry of the oceans for 20 million years – is expected both to disrupt the entire web of life of the oceans and to make climate change worse. The warning is just one of a whole series of alarming conclusions in a new report published by the official Intergovernmental Panel on Climate Change (IPCC), which last month shared the Nobel Peace Prize with former US vice president Al Gore.

Drawn up by more than 2,500 of the world's top scientists and their governments, and agreed last week by representatives of all its national governments, the report also predicts that nearly a third of the world's species could be driven to extinction as the world warms up, and that harvests will be cut dramatically across the world. United Nations Secretary- General Ban Ki-moon, who attended the launch of the report in this ancient Spanish city, told The Independent on Sunday that he found the "quickenning pace" of global warming "very frightening".

And, with unusual outspokenness for a UN leader, he said he "looked forward" to both the United States and China – the world's two biggest polluters – "playing a more constructive role" in vital new negotiations on tackling climate change that open in Indonesia next month. The new IPCC report, which is designed to give impetus to the negotiations, highlights the little-known acidification of the oceans, first reported in this newspaper more than three years ago. It concludes that emissions of carbon dioxide – the main cause of global warming – have already increased the acidity of ocean surface water by 30 per cent, and threaten to treble it by the end of the century.

Achim Steiner, the executive director of the United Nations Environment Programme (UNEP), said yesterday: "The report has put a spotlight on a threat to the marine environment that the world has hardly yet realized. The threat is immense as it can fundamentally alter the life of the seas, reducing the productivity of the oceans, while reinforcing global warming." Scientists have found that the seas have already absorbed about half of all the carbon dioxide emitted by humanity since the start of the industrial revolution, a staggering 500 billion tons of it. This has so far helped slow global warming – which would have accelerated even faster if all this pollution had stayed in the atmosphere, already causing catastrophe – but at an increasingly severe cost.

The gas dissolves in the oceans to make dilute carbonic acid, which is increasingly souring the naturally alkali seawater. This, in turn, mops up calcium carbonate, a substance normally plentiful in the seas, which corals use to build their reefs, and marine creatures use to make the protective shells they need to survive. These include many of the plankton that form the base of the food chain on which all fish and other marine animals depend. As the waters are growing more acid this process is decreasing, with incalculable consequences for the life of the seas, and for the fisheries on which a billion of the world's people depend for protein. Every single species that uses

calcium in this way, that has so far been studied, has been found to be affected. And the seas are most acid near the surface, where most of their life is concentrated.

A report by the Royal Society, Britain's premier scientific body, concludes that, as a result, of the pollution, the world's oceans are probably now more acidic than they have ever been in "hundreds of millennia", and that even if emissions stopped now, the waters would take "tens of thousands of years to return to normal". Professor Ulf Reibesell of the Leibnitz Institute of Marine Sciences in Kiel, Germany's leading expert on the process, concludes in an issue of UNEP's magazine *Our Planet*, to be published next month, that, if it continues to the levels predicted by yesterday's report for the end of the century, the seas will reach a condition unprecedented in the last 20 million years.

He recalls how something similar happened when a comet hit Mexico's Yucatan peninsula 65 million years ago, blasting massive amounts of calcium sulphate into the atmosphere to form sulphuric acid, which in turn caused the extinction of corals and virtually all shell-building species. "Two million years went by before corals reappeared in the fossil record," he says, adding that it took "a further 20 million years" before the diversity of species that use calcium returned to its former levels.

Scientists add that, as the seas become more acidic, they will be less able to absorb carbon dioxide, causing more of it to stay in the atmosphere to speed up global warming. Research is already uncovering some signs that the oceans' ability to mop up the gas is diminishing. Environmentalists point out that the increasing acidification of the oceans would in itself provide ample reason to curb emissions of carbon dioxide from burning fossil fuels and felling forests even if the dwindling band of sceptics were right and the gas was not warming up the planet. But yesterday's cautiously worded report, which was agreed by the US government, also provides ample evidence that climate change is well under way, and is accelerating. It concludes that the warming is now "unequivocal" and "evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising global average sea level".

It adds: "Eleven of the last 12 years rank among the 12 warmest years in the instrumental record of global surface temperature". It goes on: "Observational evidence from all continents and most oceans shows that many natural systems are being affected by regional climate changes, particularly temperature increases." If humanity were not affecting the climate, it concludes, declines in the sun's activity and increased eruptions from volcanoes – which throw huge amounts of dust in the air that screen out sunlight – would have been likely to "have produced cooling" of the planet.

But emissions of all the "greenhouse gas" pollutants that cause global warming increased 70 per cent between 1970 and 2004 alone, it reports, adding that levels of carbon dioxide, the most important one, in the atmosphere now "exceed by far" anything that the Earth has experienced in the past 650,000 years. And it goes on to conclude that "continued greenhouse gas emissions at or above current rates would cause further warming and induce many changes in the global climate system during the 21st century." It makes a host of specific predictions for every continent (for examples, see graphic) and warns that "impacts" could be "abrupt" or "irreversible". One example of an irreversible impact is an expected extinction of between 20 and 30 per cent of all the world's species of animals and plants even at relatively moderate levels of warming. If the climate heats further, it adds, extinctions could rise to 40 to 70 per cent of species.

The IPCC scientists and governments say that they are also more concerned about "increases in droughts, heatwaves and floods" as the climate warms. They believe that the damage to the world's economy would be even greater than they had previously predicted, and were even more certain that the poor and elderly in both rich and poor countries would suffer most. Yet the report also concludes

that, while some climate change is now inevitable, its worst effects could be avoided with straightforward measures at little cost if only governments would take action. It says that the job can be done by using "technologies that are either currently available or expected to be commercialised in coming decades". It could be done at a cost of slowing global growth by only a tenth of a percentage point a year, and might even increase it.

The missing element, virtually everyone agrees, is political will from governments. Next month they meet in Bali to start negotiations on a new treaty to replace the current provisions of the Kyoto Protocol, which run out in 2012. The timetable is desperately tight; time lags in the process of getting a new treaty ratified by the world's governments means that it will have to be agreed by the end of 2009 – and there is no sign of anything on the horizon.

Yet the treaty will have to go far beyond the protocol in order to put the whole world on track rapidly to reduce emissions if the world is to achieve the pollution cuts that the scientists say will be needed to avoid catastrophe. And it will have to ensure rapid action. Dr Rajendra Pachauri, the IPCC's chairman, yesterday repeated a consensus among experts that the world as a whole will have to start radical reductions within eight years if there is to be any hope of preventing dangerous climate change. Stephanie Tunmore of Greenpeace International said: "It is clear from this report that we are gambling with the future of the planet – and the stakes are high. This document sets out a compelling case for early action on climate change."

The UN Secretary-General, agreed. The effects of climate change have become "so severe and so sweeping" he said "that only urgent, global action will do. There is no time to waste." Mr Steiner called the report "the most essential reading for every person on the planet who cares about the future". He added: "The hard science has been distilled along with evidence of the social and economic consequences of global warming, but also the economic rationale and opportunities for action now. While the science will continue to evolve and be refined, we now have the compelling blueprint for action and, in many ways, the price tag for failure – from increasing acidification of the oceans to the likely extinction of economically important biodiversity."

And Yvo de Boer, the executive secretary of the UN Framework Convention on Climate Change – the parent treaty to the Kyoto Protocol – told the IoS that reaching agreement was "incredibly urgent". He pointed out that the world would replace 40 per cent of its power generation capacity in the next five to 10 years and that China is already building one or two coal-fired power stations a week. Those installations would last for decades – and the nations that built them would be reluctant to demolish them any earlier – so that unless the world rapidly changed direction it would be all the more difficult to avoid climate change running out of control.

**Sticking point:** It is crucial to get the US and China on board

Getting agreement on a new treaty to tackle climate change hangs on resolving an "after you, Claude" impasse between the United States and China, the two biggest emitters of carbon dioxide, the main cause of global warming. China insists – with other key developing countries like India and South Africa – that the United States must move first to clean up. It points out that, because of the disparity in populations, every American is responsible for emitting much more of the gas than each Chinese. But the US refuses to join any new treaty unless China also accepts restrictions.

There is hope of breaking the logjam. Chinese leaders know their country would be severely affected by global warming, and have done more than is generally realised to tackle it, not least by rapidly expanding renewable energy. The US will have a new leader by the time negotiations are completed, and even President Bush is backtracking, at least rhetorically. Yesterday UN Secretary-General Ban Ki-Moon said he was optimistic. "I look forward," he said, with a hint of

steel, "to seeing the United States and China playing a more constructive role in the coming negotiations."

### **Arctic**

Greenland ice sheet will virtually completely disappear, raising sea levels by over 30 feet, submerging coastal cities, entire island nations and vast areas of low-lying countries like Bangladesh

### **Latin America**

The Amazon rainforest will become dry savannah as rising temperatures and falling water levels kill the trees, stoke forest fires and kill off wildlife

### **North America**

California and the grain-producing Midwest will dry out as snows in the Rockies decrease, depriving these areas of summer water

### **Australia**

The Great Barrier Reef will die. Species loss will occur by 2020 as corals fail to adapt to warmer waters. On land, drought will reduce harvests

### **Europe**

Winter sports suffer as less snow falls in the Alps and other mountains; up to three-fifths of wildlife dies out. Drought in Mediterranean area hits tourism

### **Africa**

Harvests could be cut by up to half in some countries by 2020, greatly increasing the threat of famine. Between 75 million and 250 million people are expected to be short of water within the next 30 years.