Australian scientists call for urgent 'global cooling' to save coral reefs

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(PhysOrg.com) -- Australian marine scientists have issued an urgent call for massive and rapid worldwide cuts in carbon emissions, deep enough to prevent atmospheric CO2 levels rising to 450 parts per million (ppm).

In the lead up to United Nations Copenhagen Climate Change Conference Professors Charlie Veron (former Chief Scientist, Australian Institute of Marine Science) and Ove Hoegh-Guldberg of the ARC Centre of Excellence for Coral Reef Studies and The University of Queensland, have urged the world's leaders to adopt a maximum global emission target of 325 parts per million (ppm).

This will be essential, they say, to save coral reefs worldwide from a catastrophic decline which threatens the livelihoods of an estimated 500 million people globally.

This is substantially lower than today's atmospheric levels of 387 ppm, and far below the 450ppm limit envisaged by most governments attending Copenhagen as necessary to restrain global warming to a 2 degree rise, on average.

“This may take a long time. However, climate change is an intergenerational issue which will require intergenerational thinking,” Professor Hoegh-Guldberg said.

“If CO2 levels are allowed to continue to approach 450 ppm (due by 2030-2040 at the current rates at which emissions are climbing), reefs

will be in rapid and terminal decline world-wide from mass coral bleaching, ocean acidification, and other environmental impacts associated with climate change," Professor Charlie Veron, Professor Hoegh-Guldberg, Dr Janice Lough of COECRS and the Australian Institute of Marine Science and colleagues warn in a new scientific paper published in the Marine Pollution Bulletin.

"Damage to shallow reef communities will become extensive with consequent reduction of biodiversity followed by extinctions," they said.

"Reefs will cease to be large-scale nursery grounds for fish and will cease to have most of their current value to humanity. There will be knock-on effects to ecosystems associated with reefs, and to other (marine) ecosystems."

The researchers say that coral deaths due to bleaching were first observed when global atmospheric CO2 levels passed 320ppm in the 1970s. By the mid-1980s, at 340 ppm, sporadic, highly-destructive events were being recorded.

In the paper they argue for a long-term limit "below 350ppm" to be set.

Prof Veron told the British Royal Society recently that Australia's Great Barrier Reef would be on 'death row' unless urgent action was taken to stem global carbon emissions.

"We are tracking the IPCC's worst case scenario. The global CO2 situation, tracked by temperature and sea level rise, is now following the worst case scenario," he says. "The people meeting at Copenhagen need to hear this message."

At the same time CO2 emissions are turning the oceans more acidic, causing damage to corals and all life with a carbonate skeletons or shells

and, if unchecked, potentially leading to mass extinctions of ocean life like those of the geological past.

“We are already well above the safe levels for the world's coral reefs. The proposed 450ppm/2 degree target is dangerous for the world's corals and for the 500 million people who depend on them,” Professor Hoegh-Guldberg said.

“We should not go there, not only for reasons of coral reefs, but for the many other impacts that are extremely likely.

“We deduce, from the history of coral bleaching, that the safe level for coral reefs is probably about 320 or 325ppm.

"From fossil air taken from ice cores we know the world has not exceeded 300ppm for at least the last 760,000 years, so we are already in dangerous territory.

"We are already way outside the limits that mother earth has been operating within for millions of years.”

"Then there is sea level rise. The latest scientific consensus that the minimum sea level rise we can expect globally is 1 m. The IPCC's earlier estimates on this are now seen as far too conservative. A metre of rise will displace at least 30 million people and contaminate the underground water supplies of many coastal cities with salt.

"Tens of millions of people are going to be displaced. This is not just about corals. Big issues of food security and regional security are also at stake, and we all need to wake up to the fact that climate change is not simply about warm days.”

"It will cost less than 1 per cent of GDP growth (over the next 50 years)

to sort this problem out. In times of war individual countries have devoted anything from 40 to 70 per cent of their GDP to the war effort, so the effort required to cease emitting carbon is far, far smaller.

“It is completely affordable, completely achievable.

“The consequences of not cutting carbon emissions sharply are extremely serious for humanity. It is time all people understood this.”

More information: The paper “The coral reef crisis: The critical importance of