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# World's coral reefs could disintegrate by 2100

Researchers at Carnegie Institution say corals are being overwhelmed by rising carbon dioxide in the atmosphere

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**Ian Sample**, science correspondent, in San Diego  
guardian.co.uk, Tuesday 23 February 2010 09:38 GMT

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Coral reefs in the Red Sea, north of Jeddah. Photograph: Hassan Ammar/AFP/Getty Images

The world's coral reefs will begin to disintegrate before the end of the century as rising carbon dioxide levels in the atmosphere make the oceans more acidic, scientists warn.

The research points to a looming transition in the health of coral ecosystems during which the ability of reefs to grow is overwhelmed by the rate at which they are dissolving.

More than 9,000 coral reefs around the world are predicted to disintegrate when atmospheric carbon dioxide levels reach 560 parts per million.

The amount of carbon dioxide in the atmosphere today stands at around 388ppm, but is expected to reach 560ppm by the end of this century.

Coral reefs are at the heart of some of the most biodiverse marine ecosystems in the world. They are home to more than 4,000 species of fish and provide spawning, refuge and feeding areas for marine life such as crabs, starfish and sea turtles.

"These ecosystems which harbour the highest diversity of marine life in the oceans may be severely reduced within less than 100 years," said Dr Jacob Silverman of the Carnegie Institution in Stanford University, California.

Coral reefs grow their structural skeletons by depositing aragonite, a form of calcium carbonate, from calcium ions in sea water. As oceans absorb atmospheric carbon dioxide, they become so acidic the calcium carbonate dissolves.

Silverman's team studied a coral reef in the northern Red Sea and calculated its response to increasingly acidic waters. The research showed that the ability of the coral to build new structures depended strongly on water acidity and to a lesser extent temperature.

From these data the researchers created a global map of more than 9,000 coral reefs, which showed that all are threatened with disintegration when carbon dioxide levels in the atmosphere reach 560ppm. Silverman was speaking at the American Association for the Advancement of Science meeting in San Diego.

In a separate study, Simon Donner, an environmental scientist at the University of British Columbia in Canada, warned that carbon dioxide in the atmosphere is already at a high enough level to cause devastating coral bleaching.

Corals have a symbiotic relationship with microscopic algae that live on them. The algae give coral reefs their vibrant colours, but are also an important food source for the habitat's marine life. When sea temperatures rise, the corals expel the algae and turn white. Once this happens the coral is deprived of energy and dies.

"Even if we froze emissions today, the planet still has some warming left in it. That's enough to make bleaching dangerously frequent in reefs worldwide," said Donner.

Bleaching had become increasingly widespread in recent years, Donner said. In 2006, severe bleaching struck the southern part of Australia's Great Barrier Reef, the largest coral reef system in the world. Last year scientists reported that a "lucky combination" of circumstances had allowed the coral to recover from the disaster.

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**therealmrfish**

23 Feb 2010, 11:14AM

"Coral reefs have always disintegrated ... It's the nature of the Earth ... ice ages ... nothing to do with man ... vegetarian liberals .... etc ..."

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**rollmop**

23 Feb 2010, 11:15AM

After the last Climate Change Emailgate I think I'll reserve judgement on this until I see something more objective.

Algae evolves, by the way.

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**JodienAaron**

23 Feb 2010, 11:16AM

As someone who has a massive fascination with coral reefs and inhabitants, all this news is gutting.

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**epeeist**

23 Feb 2010, 11:17AM

@rollmop

After the last Climate Change Emailgate I think I'll reserve judgement on this until I see something more objective.

So what would you consider to be more objective?

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**rollmop**

23 Feb 2010, 11:18AM

What ever happened to the good old Crown of Thorns starfish threat to the Great barrier reef in the 1970's? And the ozone hole caused by Chinese CFCs in old refrigerators?

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23 Feb 2010, 11:19AM

Algae is not based upon a hardened skeletal-type structure which is easily damaged by acidic environments, eh?

Do some reading.

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23 Feb 2010, 11:23AM

@epeeist

A wider study, not just extrapolating the Red Sea investigation, knowledge of who sponsored the study, information as to the basis of the CO<sup>2</sup> increase assumption, information as to peer review etc.

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23 Feb 2010, 11:24AM

@rollmop

What ever happened to the good old Crown of Thorns starfish threat to the Great barrier reef in the 1970's? And the ozone hole caused by Chinese CFCs in old refrigerators?

Ah, no answer to my first question so on to a bit of whataboutery in the hope that nobody will notice.

Here is Silverman's paper on the subject by the way - [http://www.stanford.edu/~longcao/Silverman\(2009\).pdf](http://www.stanford.edu/~longcao/Silverman(2009).pdf) as well as a [list of his other publications](#). It obviously isn't going to convince you, but other people might be interested.

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23 Feb 2010, 11:27AM

I'm suprised there isn't a whole series of programs about coral reefs on TV.

Homes under the Coral.

The Coral Ladder

Coral Coral Coral!

Re-coral, re-coral!

Grand Coral.

Oh no, that'll be because the TV channels only like making property programs to ramp their own property portflios.

Someone give Sir David's team a shed load of money to go and record everything that goes on in these Coral Reefs.

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23 Feb 2010, 11:32AM

Bang on cue along comes the next carbon scare. Bearing in mind the current global caning of all things AGW some of a suspicious disposition may be inclined to wonder if 'carbon dioxide induced coral reef collapse' was pre-planned.

Perish the very thought.

Still, it's a good job 'they' haven't wrapped 'coral reef collapse' up with something equally

scary-sounding like, say, 'ocean acidification' isn't it? That really would sound *catastrophic*.

Oh, hold on.

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**Autonova1**

23 Feb 2010, 11:33AM

They're clearly lying to get more funding. The media keep ramming down my throat that there's a debate about anthropogenic global warming, and I have no choice but to believe them and their more convincing scientific credentials. Plus there was that dodgy email that bloke sent which disproves the whole thing. Coral reefs are therefore fine.

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**Autonova1**

23 Feb 2010, 11:36AM

Still, it's a good job 'they' haven't wrapped 'coral reef collapse' up with something equally scary-sounding like, say, 'ocean acidification' isn't it?

That's the thing with truth- it doesn't give a fuck if you're scared. The ocean is getting more acidic, therefore it's undergoing ocean acidification. Unless you want the scientists to sugarcoat it for you?

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