

# ARC Centre of Excellence for Coral Reef Studies Media Release

July 8, 2008

## CORALS DELIVER ACID SHOCK

The world's oceans may be acidifying far more rapidly than scientists expected, with serious implications for the future of corals, reef algae, shell fish and some ocean food chains.

New coral evidence suggesting the oceans may have acidified by almost a third of a unit of pH as a result of human emissions of CO<sub>2</sub> will be presented today to the International Coral Reef Symposium, at Fort Lauderdale, Florida, in a keynote paper by Australian earth scientist Professor Malcolm McCulloch of the ARC Centre of Excellence for Coral Reef Studies and Australian National University.

"We've measured an increase of almost 0.3 of a pH unit in acidity in corals – which is much higher than has been detected so far in ocean water itself," Prof. McCulloch says.

"This suggests either that the corals are somehow amplifying the effect – or else that we may have gravely underestimated the rate at which the burning of fossil fuels is turning the oceans acidic."

Acidic oceans have two important implications, Prof. McCulloch says. First, they may cause living creatures which depend on an alkaline environment to cease forming their shells and skeletons – this applies to about a third of sea life.

Second, as the oceans become saturated with CO<sub>2</sub> their ability to absorb carbon from the atmosphere is expected to decline, leaving more CO<sub>2</sub> in the air to insulate and accelerate the pace at which the planet warms.

"We are unsure of the explanation for why the corals are showing these high levels of acidification – but we need to find out, and quickly," he says. "Clearly something is happening in the oceans, and we need to understand whether it is a major problem or not."

There is also emerging evidence that coralline algae, which are the 'cement' that binds together the fronts of coral reefs against the ocean's power, will be more seriously affected than even the coral itself, causing reefs to crumble away.

How serious the impact of ocean acidification will be on corals themselves is not yet clear he says. "If half the data obtained by scientists in tank experiments is correct, then coral reefs are in a lot of trouble. However in the sea itself, the corals may be able to adjust. New experiments into acidification being conducted on actual reefs will give us a clearer picture."

On a more encouraging note, new evidence suggests that coccoliths – marine plankton with chalky skeletons which make up an important part of the ocean food chain – may initially benefit from the changes in ocean acidity levels which will favour organisms which use bicarbonate (rather than carbonate) to form their skeletons. However higher levels of acidification would eventually shut down even these.

Prof. McCulloch will also tell the ICRS meeting that there is a growing scientific consensus that sea levels are rising faster than expected.

“We know that sea levels have been rising due to thermal expansion, but there is now mounting evidence that the melting of the Greenland and Arctic icecap could lead to the same sort of catastrophic deglaciation as occurred at the end of the last Ice Age, several thousand years ago when the climate warmed dramatically.”

Prof. McCulloch says there are fossil coral reefs at Margaret River, Western Australia, which now lie about three to four metres above the current sea level. These date back to this era of higher sea levels, and provide an indicator of how high they rose when the major ice caps last melted extensively.

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