(Originally posted on the Jennifer Marohasy web blog, 12 April 2006)
http://www.jennifermarohasy.com/blog/archives/001307.html#comments

Coral Bleaching & The Reef: Walter Starck

> There is a widespread belief, cultivated at least in part by Prof Ove Hoegh-Guldberg that global warming has resulted in more coral bleaching.
>
> Given the interest in the subject, I have copied the following comment from Dr Walter Starck, from yesterday's rather long and tedious thread: - Jennifer Marohasy

"**B**leaching events result from extended periods of calm weather during which mixing from wave action ceases and surface water becomes exceptionally warm. Such warming is especially marked in very shallow water such as on reef flats. At the same time the absence of waves also eliminates the wave driven currents that normally flush the reef top. Bleaching conditions require at least a week or more of calm weather to develop and this may happen every few years, only once in a century, or never, depending on geographic location. On the outer GBR it is uncommon due to ocean swell and currents even in calm weather. In the mid-shelf and inshore areas it is much more common due to the absence of swell and reduced currents.

Characteristic bleaching scars and isotope temperature records from coral cores commonly show evidence of past bleaching events going back thousands of years. There is no evidence for a recent increase in frequency and/or severity of bleaching events and nothing to link extended periods of calm winds with global warming.

In past geologic periods when global climate was warmer than at present corals enjoyed greater latitudinal distribution. The most likely effect of a warming climate on reefs would seem to be an expansion of their geographic distribution and there is some evidence this is already happening. In Florida recent growth of coral has occurred farther north than it did a few decades ago and in the same areas sub-fossil corals indicate previous such advances in the recent geologic past.

Hoegh-Guldberg has found an attractive GW niche in the well established guild of GBR doomscryers. It has provided notoriety, acclaim and generous research support. Whether his prophesies will stand up to the reality test remains to be seen. Based on the track record of science based doomscrying his odds don't look too good. In fact sheep's entrails and tea leaves seem to produce better results, probably because they at least incorporate some element of intuitive judgment."

(Additional replies to responses on the above post.)

The same coral species that have bleached on the GBR thrive elsewhere at considerably higher temperatures and in some bleaching locations subsequent events have shown less effect even at higher temperatures. The reason is believed to lie in differing clades of algal symbionts adapted to different temperatures. How far such adaptation can go is not known but species distributions of corals and associated water temperatures indicate that the temperatures associated with bleaching events on

the GBR are several degrees below what the same coral species routinely survive elsewhere.

Combined with the AGW climate predictions of less warming at lower latitudes and past distributions of reefs in much warmer geologic periods a hollowing out in the middle seems unlikely. In any event it is wind (or rather lack of it) plus local geography and currents, not air temperature that is the key factor in bleaching events. On the GBR they are more likely to occur at the southern end of the reef than at the top where the strong currents of Torres Strait assures mixing and the flushing of reef tops even in calm weather.

Posted by: Walter Starck at April 12, 2006 03:36 PM

Indeed storms do prevent bleaching. The recent storm up here (Cyclone Larry) has already been accredited with saving the reef from this years bleaching that had been predicted by OH-G. However we were already past the time of highest temperatures and calmest weather and temperatures were falling but, any storm in a punt.

Posted by: Walter Starck at April 12, 2006 03:46 PM

I realize that no matter what reason and evidence may be presented rarely will anyone ever change their mind. Even if presented with irrefutable evidence that negates a given point it is simply dropped and others raised. Although those who choose to believe that the GBR is doomed express great concern their commitment is clearly more to the doom than to the health of the reef and any argument that the situation isn't as bad as they fear/hope is met with rejection, not hopeful interest.

Rather than continuing to address an endless litany of mis-informed objections I will close with a few general comments.

* About 25% of reefs globally have been estimated to be heavily impacted. About 75% have not. Whether this situation will improve or grow worse in the future is unclear. There is evidence in both directions.

* The GBR comprises almost 30% of the global reef area and is in near pristine condition. Over most of the reef you can spend days and rarely or never see another boat.

* No evidence of adverse effects from land runoff has been detected on the main body of the reef.

* Nutrients from farm runoff amount to only a few percent of the natural nutrient flux and fertiliser use has decreased in recent years, not increased.

* The commercial fishing catch on the GBR is now limited by quota to 3061 tonns per year. This comes to 9 kg/square km/year of reef and lagoon area. The sustainable harvest rate for reef fisheries is estimated to average 4000 kg/square km/year.

*The 0.7 C. increase in temperature over the past century and a half coming out of the LIA is comparable to the rate of decrease entering into it.

* Corals can and do change their algal clades from one bleaching event to the next. They even do so seasonally without apparent bleaching.

*In a number of areas healthy corals tolerate seasonal temperature ranges of as much as 15 C. and at the high end this may regularly be 3-4 C higher than those on the GBR.

* Although bleaching does result in a temporary growth hiatus in corals the increased water temperatures over the past century has been associated with substantially increased growth and calcification.

* Intense tropical cyclones do immense damage to reefs but they are a natural element in many reef areas. Whether they will increase in frequency and intensity due to GW is unclear. Proponents of AGW claim they have. Storm experts say they there is no evidence for this. A storm like the recent one hitting the coast every few years would be far more devastating to humans than to the reef.

Posted by: Walter Starck at April 13, 2006 08:43 AM