

GLOBAL CLIMATE CORNER

RISING SEA LEVEL FORECASTS: FACT OR FICTION?

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(Editor's note: The following article was recaptured from <http://www.principia-scientific.org/rising-sea-level-forecasts-fact-or-fiction.html> with permission of the author. It also appeared in Council for the National Interest, Western Australian Committee, Winter Newsletter, July 2014, www.cniwa.com.au)

Australia is a great place to study sea level at the present time. Fremantle, along with Sydney has the longest record of sea level measurements in Australia, going back to 1897.

Nearby Rottnest Island is the site of famous studies of sea level variation over the past few thousand years, including some sea levels a few metres higher than present.

In the last two years several papers have been published showing there is no reason to be alarmed over sea level rise and several alarmist papers also appeared (see references). Some alarmists claim there will be a rise of several metres by the end of the century. In this article, prepared for **The Council for the National Interest WA (CNI)**,* we see why cherry-picking of data is a real cause for concern.

There are two basic methods of estimating future changes in sea level: direct **observation** by tide gauges or by satellites, and computing by **models**.

Tide gauges are set up at stations to measure sea level at regular intervals. Technology has improved over time. While it is commonly assumed adjacent land is stable, it is known that some land is moving either up or down relative to the sea. The longer and more complete the record the better. The Fremantle record starts in 1897. Another station was set up at Hillarys in 1992. The records are shown in Figs. 1 and 2 (bottom of article).

Without statistical manipulation the Fremantle data appears to show a slight rise but nothing alarming, although there are some exceptionally high tides, and low tides (note 1941 and 1993).

Direct studies of sea level are showing only small rises. Sea level data for the United States and a few other countries can be sighted at: <http://tidesandcurrents.noaa.gov/sltrends/sltrends.shtml>. Most stations show a rise of sea level of about 1.7mm per year, but there is considerable variation even within a single state. Australian records can be sighted in Parker et al. 2013.

Several satellites measure the global sea level elevation. The European satellite, Evisat, provided possibly the best available data. It showed *falling* sea level since its launch in 2002, and for the last two years the decline was 5mm/yr. Unfortunately, Evisat broke down on April 8th 2012.

A recent review of sea level change is provided by Morner (2012), including analysis of satellite data. He writes that the raw data from the TOPEX/POSEIDON sea-level satellites, which operated from 1993-2000, show a slight uptrend in sea level, but if the distorting effects of the Great El Niño Southern Oscillation of 1997/1998 are excluded the sea-level trend is zero. The GRACE gravitational-anomaly satellite data shows that sea level fell slightly from 2002-2007.

Models, predictions and projections

The public think political decisions concerning climate are based on scientific predictions. This is untrue: what the politicians get from IPCC and CSIRO are *projections* based on models. Models depend on assumptions, what you put in (data), the program, and conclusions drawn from the output.

The UN's main adviser, the Intergovernmental Panel on Climate Change uses adjusted data for the input (mostly from the UK University of East Anglia's discredited Climate Research Unit), and their computer models and codes remain secret – not a scientific procedure. How does the IPCC get a runaway greenhouse effect? It assumes an enormous amount of compounding feedback to make CO2 warming heat water vapour, turning one Centigrade degree of heating into 6.4 degrees.

A 2009 CSIRO report "The Effect of Climate Change on Extreme Sea Levels in Port Phillip Bay" for the

Victorian government's *Future Coasts Program* is an example of its modelling. The model is based on temperature projections to 2100 of up to 6.4°C. That comes from the most extreme scenario of the IPCC with unbelievable CO₂ concentration of 1550 parts per million. Using up all known fossil fuel reserves would achieve only half this amount. The result was a projected sea-level rise for Port Phillip Bay by 2100 of 82cm. With the help of the Bureau of Meteorology, a further increase due to wind raised it to 98cm.

Cherry picking scares

An example of how to scare people by 'cherry picking' - the use of selected data - is shown in The Department of Infrastructure's *State of Australian Cities Report*, which claimed that the ocean near Perth was rising at "three times the global average". They did not use all the data available (from 1897), but from 1993, which happens to be the lowest level in local tide gauges since 1941. This is shown on Fig. 1, but it is clearer on Fig. 2 for Hillarys. If it had used 1999 instead of 1993, it would show that sea level was falling. By cherry picking suitable dates you can get any rate – and outcome - you want.

Stability of the land, and GPS

Sea level does not just rise and fall relative to a dipstick of stable coast. Earth movement can also have an effect, so we have to try to separate local effects from global (eustatic) effects. The sea level of the last interglacial(about 120,000 years ago) is generally around 2 m a.s.l. in Australia, but is raised to 26 m at Mount Gambier and lies below sea level at Adelaide indicating tectonic movement both up and down.

Baker *et al.* (2004) found notches on Rottnest Island marking former high sea levels. Calcareous organisms left deposits within a narrow range that could be carbon dated. The higher notch at about 1.8 m is about 3600 yr BP.

The lower notch at about 1 m is about 2000 yr BP. This level can be found elsewhere, including China and Brazil.

Parts of the Perth region are subsiding due to groundwater extraction (Featherstone *et al.*, 2012). Records from a GPS receiver at Gnangara and nearby artesian boreholes show that the land subsidence rate has slowed from about -6 mm/yr to about -2 mm/yr since the reduction of groundwater extraction from the Yarragadee Aquifer around 2005. Hillarys and Fremantle are only 20 km apart but have quite different rates of sea level rise. Part of the apparent sea level rise is due to gauge sinking. The accuracy of estimates of vertical velocities of the GPS domes is still above 1 mm/year, very close to the average relative sea level velocity.

Geological studies

Jones (2005) examined the geological (and other) aspects of coastal erosion in the region. He concluded:

"The majority of the Mandurah to Fremantle sector does not appear to be susceptible to coastal erosion over the next century, despite the fact that the Tamala Limestone is preserved below sea level across the majority of the area. This is due to the fact that this sector has been the primary depositional province for the Swan coast over the last 8,000 years".

"The Hillarys to Yanchep sector does not appear to be susceptible to erosion over the next century as Tamala Limestone is preserved above sea level along the majority of the coast, and the beaches are well sheltered by three lines of offshore reefs".

The cause of sea level rise

There are many possible causes of sea level rise, including tectonic deformation of the sea floor, or production of new water at the hundreds of undersea volcanoes, but it is generally attributed to two mechanisms.

1. Warming of the ocean causes expansion of water and therefore a sea level rise. Since 2004 we have the ARGO scheme where over 3,600 buoys measure temperatures down to a depth of two km. They reveal no warming of the oceans. This, of course, is consistent with the lack of global warming over the past 17 years.
2. Melting of the icecaps – yet the icecaps in Antarctica and Greenland are actually increasing. Sea ice does not affect global sea level as it floats (Archimedes Principle). But the fact that Antarctic sea ice reached the greatest extent ever recorded in June 2014 suggests that this part of the world at least is *getting colder, not warmer*.

It takes a further act of faith to think that ocean temperature and icecap melting are in any way related to carbon dioxide.

The sun

It used to be thought that the sun controlled the Earth's climate, but the IPCC and the CSIRO ignore the sun and relate climate change to CO₂ and so-called greenhouse gases. Outside that group many still think that the sun controls climate. There is a very good correlation between sunspot cycles and climate. We have entered sunspot cycle 24, and if things happen as they did in the past we are in for global cooling, which could lead to a fall in sea level. For those keen on the 'precautionary principle', we should take the necessary precautions for cooling and a drop in sea level.

Outside our region

Two favourites of sea level alarmists are the coral islands of Tuvalu and the Maldives. Sea level measurements for Tuvalu (and ten other stations) can be seen on Fig. 13 on the Australian Bureau of Meteorology website at:

<http://www.bom.gov.au/ntc/IDO60101/IDO60101.200809.pdf>">website <http://www.bom.gov.au/ntc/IDO60101/IDO60101.200809.pdf>.

You can see that sea level here is virtually stable. Yet as they are close to sea level it was repeatedly claimed that these islands are in imminent danger of drowning. Webb and Kench (2010) presented the first quantitative analysis of physical changes in 27 atoll islands in the SW Pacific (including Tuvalu) over a 19 to 61 year period. They found that 43% of islands remained stable and 43% *increased* in area. Coral islands are increasing in size because coral grows: the reef is a living thing. Affected by erosion and deposition the coast is modified, but there is no danger of drowning. The Maldives were studied by a team of geomorphologists led by the doyen of sea level studies, Niklas Axel-Morner, and they found no evidence of sea level rise (Morner et al., 2004).

Responsibility

The IPCC does not give genuine *predictions*, only computer *projections*. Furthermore, it does not assume any responsibility for its alarmism.

Australia's CSIRO has legal disclaimers for its scary projections:

"This report relates to climate change scenarios based on computer modelling. Models involve simplifications of the real processes that are not fully understood. Accordingly, no responsibility is accepted by the CSIRO for the accuracy of forecasts or predictions inferred from this report or for any person's interpretations, deductions, conclusions or actions in reliance on this report".

Any allegedly scientific document that needs this kind of legal disclaimer is clearly not science. Australian government ministers (and their advisers) claim that their decisions are based on a scientific "consensus", yet they only use the advice of IPCC and CSIRO. But both these organisations deny making predictions, and refuse to be responsible for their computer projections. Computers cannot take responsibility, so presumably it is the government, through lack of due diligence, that is responsible for the expensive and ineffective actions it is now implementing to *combat* the alleged *human-induced dangerous global warming or climate change*. The argument can be extended to local governments that may be impoverishing citizens by their lack of due diligence and imposing extravagant policies based on a very partial view of the available evidence.

The references in *The City of Joondalup Climate Change Strategy: 2014 – 2019*, for example, suggest that the data here is almost entirely from IPCC and CSIRO, and a few other alarmist sources. I suggest it would be wise to have broader sources of information. Direct action against an alleged sea level threat should be delayed until the authorities have examined all the data, not just that provided by modellers.

Conclusions

Mörner and Parker conclude that the Fremantle tide gauge is likely to include a local subsidence factor of about 1.4 mm/year so there is not much left for sea level rise. They claim virtually stable conditions over the last 60 years and full stability over the last 14 years, implying there are no traces of any present day acceleration.

Carter and de Lange conclude that policy guidelines should include (1) abandoning 'let's stop global sea-level rise' policies; (2) Recognising local or regional nature of coastal hazard; and (3) flexible and adaptive planning controls.

I would only add that policy makers should show due diligence and assess the source and quality of their data.

***The Council for the National Interest WA (CNI)** is a non party political group who recently hosted Professor Cliff Ollier with a presentation titled “Rising Sea Level Forecasts: Fact or Fiction?” Professor Ollier’s address was so comprehensive and well received that his speech was the basis of CNI’s most recent newsletter. The CNI regularly promotes discussion on topical subjects covering a broad range of issues effecting Australia’s national interest. CNI prepares policy papers for distribution to influential policy makers that can be viewed at www.cniwa.com.au. For participation or commentary, contact the Executive Committee at admin@cniwa.com.au.

References and further reading

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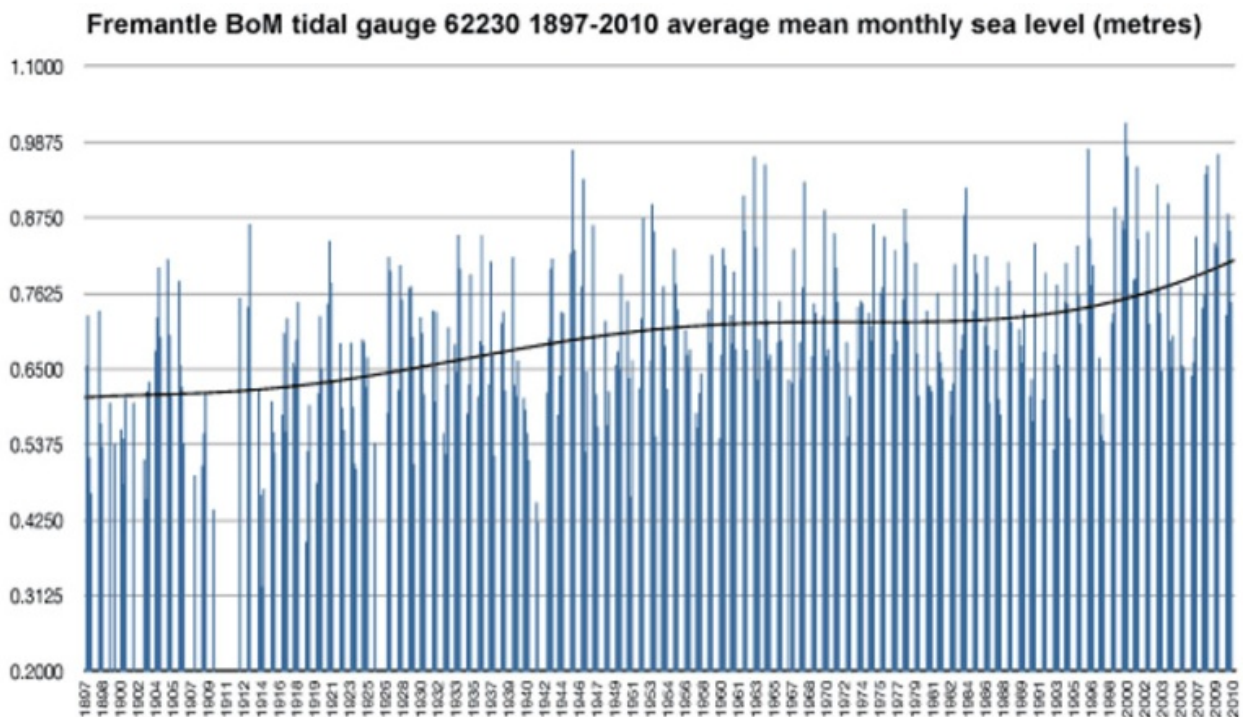


Figure 1. Tidal gauge record, Fremantle, WA

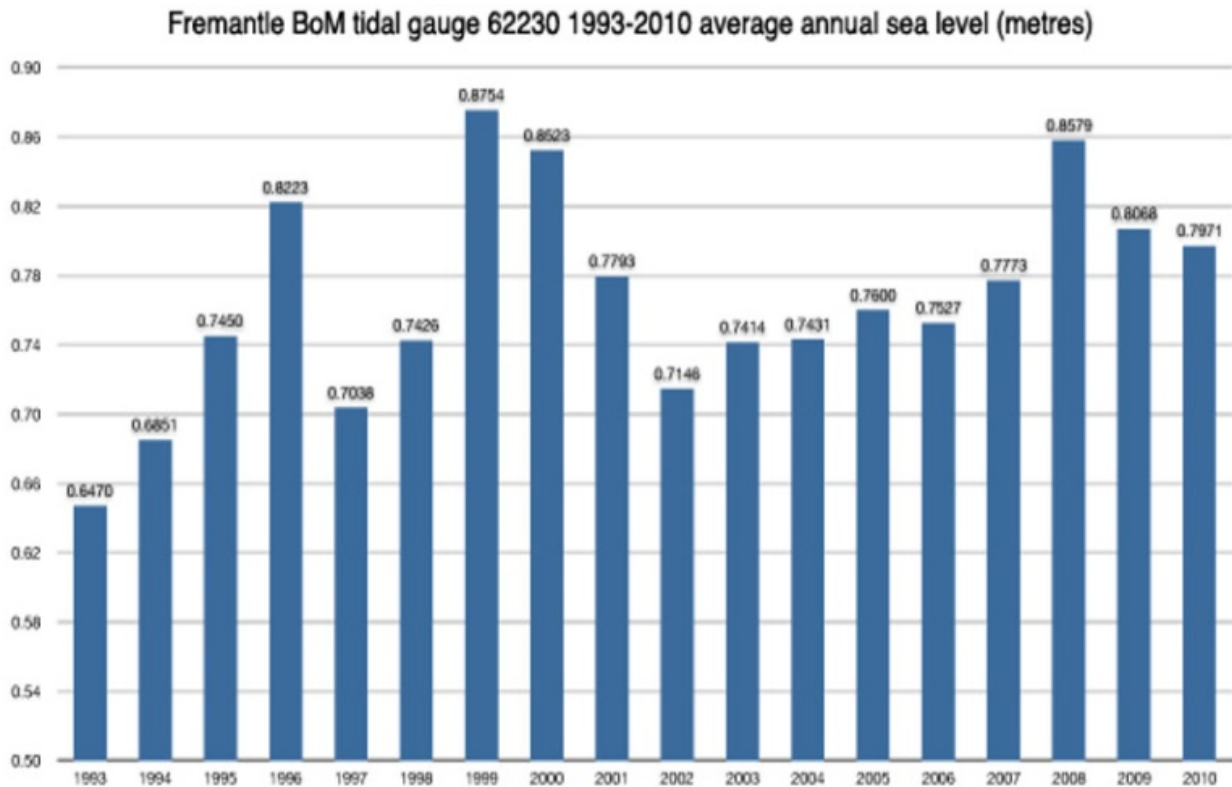


Figure 2. Tidal gauge record Hillarys WA

Summary of Sea Level Predictions by N.J. Ford

Actual sea level rises to date, may be somewhere between 1.4mm per year (Sceptic scientists) and 1.7mm per year (IPCC position). In calculating the prediction errors, the IPCC figure has been used. The errors would be larger if the sceptical scientists' figure was used. These figures assume that the natural sea rises are included in their predictions.

1. IPCC First Report (1990-1992), Summary for Policy Makers, p.52. Sea levels will rise by one metre by the year 2100 (110 years-times). This is 9.1mm per year. **Error to date is 535%**
2. IPCC Second Report (1995), Summary for Policy Makers, p.23. Sea levels will rise by 95cm by the year 2100 (105 years-times). This is 9.0mm per year. **Error to date is 532%**
3. IPCC Third Report (2001), Summary for Policy Makers, p.32. Sea levels will rise by 88cm by the year 2100 (99 years-times). This is 8.9mm per year. **Error to date is 523%**
4. IPCC Fourth Report (2007), Summary for Policy Makers, p.7-8. Sea levels will rise by 59cm by the year 2100 (93 years-times). This is 6.3mm per year. **Error to date is 373%**
5. United Nations Environmental Program (UNEP) in 1988 predicted sea levels would rise two metres by the year 2100 (112 years-time). This is 17.9mm per year. **Error to date is 1,050%**
6. Al Gore and his NASA scientific advisor James Hansen predicted sea levels would rise six metres by 2050 in 1988, a metre each decade (62 years-time), with the Florida Keys being one metre under water by the year 2000.. This is 96.8mm per year. **Error to date is 5,693%**
7. NSW Councils (e.g. Gosford, quoting the best international scientists including CSIRO and ANU) in 1995 was advising residents with water front properties that by 2015 (20 years-time) sea levels would rise by 6 metres. This is 300mm per year. **Error to date is 17,647%**
8. NSW Councils (e.g. Gosford, quoting the best international scientists including CSIRO and ANU) in 2011 was advising residents with water front properties that by 2100 (89 years-time) sea levels would rise by 90cm. This is 10.1mm per year. **Error to date is 595%%**
9. United Nations Environmental Program (UNEP) in 1995 predicted sea levels rises would result in 50 million climate refugees by the year 2010. No climate refugees by that year. **Very large Error**
10. United Nations Environmental Program (UNEP) in 2011 *re-predicted* sea levels rises would result in 50 million climate refugees by the year 2020. This is likely to be another - **Very large Error**
11. For the last twenty years the Greens and their scientists have been telling us the islands of the Tuvalu and Maldives were sinking into the ocean. In 2011 aerial photographs taken 60 years apart show the land area of all Tuvalu islands have grown by 5-30%. No discernible change in the Maldives. **Very large Error**
12. In 2005, Professor Flannery, a climate advisor to the Australian Government, predicted Sydney would be covered by 20 metres of water by the year 2050 (45 years-times). This is 444mm per year. **Error to date is 26,144%**