

Ice shelf break-up and sea level change

Cliff Ollier

The Alarmist's misuse of the break-up of the Wilkins Ice shelf seems to be very widespread, so your readers might like to know of Australian examples.

The Australian of April 29 reported "... a 13-month old photograph was published this month to support the view that a catastrophic melting of Antarctic ice was imminent." Together with the suspect use of an old photo, "Mr Garrett [the Australian Minister for the Environment] claimed the break-up of the Wilkins ice shelf in West Antarctica indicated sea level rises of 6m were possible by the end of the century, and that ice was melting across the continent."

My following letter was published by the paper the next day.

"Your front-page article states that Peter Garrett claimed the break-up of the Wilkins ice shelf in West Antarctica indicated sea level rises of 6 metres were possible. His claim includes two basic errors. Firstly, shelf ice is floating, because it is less dense than seawater. When floating ice melts, there is no change in sea level. This is a bit of elementary physics known as Archimedes' Principle.

Secondly, the breakup of ice shelves is normal and inevitable. Ice caps grow by precipitation in the uplands, flow at depth, and at the ice front the ice either melts or breaks off as icebergs. The ice is never simply keeps flowing to the equator. Icebergs are produced in both times of climate warming and times of cooling, so they tell us nothing of climate change."

The ice berg that broke off the Wilkins Iceshelf was large, with an area of 415 sq. km but very large ice bergs have been breaking off and leaving Antarctica long before coal burning was even contemplated.

Geoffrey Blainey, in his Book "*The Tyranny of Distance*" , gave an account (p. 26) of a giant iceberg that a fleet of sailing ships encountered on their voyage to Australia.

"On some days sailing ships passed more than 100 icebergs in a day, white or opaque, dark green or brown, islands of ice on which the waves dashed. In the southern summer of 1854 - 55 an enormous island of ice was afloat in the relatively warm latitude of 40 degrees south, just south west of the island of Tristan de Cunha. Lying near the sea route to Australia it was observed by a score of ships. Some of those ships saw nothing but ice for days, because the mass of ice was sixty miles long and shaped like a horse-shoe, and some emigrant ships sailed unknowingly into the icy bay, and one, the Guiding Star, did not sail out. An iceberg did not have to be a towering mountain to sink a ship."

Incidentally, Peter Garrett was on TV on the evening of 30 April. When questioned about his 6 metre sea level rise prediction, he gave his sources as IPCC and CSIRO. Yet in 2007 even the IPCC has reduced its estimate to between 18 cm and 59 cm.

By coincidence (?) *The West Australian* also had an article on the break-up of the ice-shelves of West Antarctica (May 1st). It reported David Vaughan of the British Antarctic Survey saying: "There is little doubt that these changes are the result of atmospheric warming." The same arguments used above apply here, and there is *every reason to doubt it*.

Note too that the head of the Australian Antarctic Division's glaciology program reported recently that: "sea ice losses in West Antarctica over the past 30 years have been more than offset by increases in the Ross Sea region, just one sector of East Antarctica."

Unlike Peter Garret (and many others), *The West Australian* evidently understands Archimedes' Principle and writes: "The falling away of Antarctic ice shelves does not in itself raise sea levels, since the ice was already floating in water."

Besides the failure to appreciate Archimedes' Principle, much alarm about the ice caps is based on the misconception that ice flows downhill on a base lubricated by meltwater.

In reality the Greenland and Antarctic Icecaps occupy kilometre-deep basins, and the ice has to flow uphill to reach the outflow areas where indeed glaciers can flow downhill to the sea.

Ice flows plastically (by a process called creep), both in areas below the melting point of ice and also in valley glaciers or glaciers near the ice limit where temperatures reach the melting point of ice

Direct studies of sea level are also showing little or no rise.

You can get sea level data for the United States and limited other countries, from satellite imagery, at:

<http://www.tidesandcurrents.noaa.gov/sltrends/sltrends.shtml>

The following table shows results I selected from several States.

State	rise or fall (mm/yr)		
California	2.06	±	0.20
Maine	1.62	±	0.17
New York	2.77	±	0.09
Pennsylvania	2.79	±	0.2
Georgia	2.98	±	0.33
Florida	2.39	±	0.43

The considerable variation even within each state shows that the figures need to be treated with caution. This is illustrated by figures from different sites in Virginia.

Kiptopeke	3.48	±	0.42
Lewisetta	4.97	±	1.03
Gloucester Point	3.81	±	0.47
Portsmouth	3.76	±	0.45
Chesapeake Bay	6.05	±	1.14

Even the highest figure is not extreme by the standards of alarmists who claim a sea level rise of many metres is imminent. Those in the metric system don't need translation, but for the Americans the highest number for sea level rise, Chesapeake Bay, translates into 1.98 feet in 100 years

Elsewhere in the world similar figures are reported, such as:

Reykjavik, Iceland	2.34	±	0.71
Bermuda	2.04	±	0.47
Murmansk, Russia	3.92	±	1.00

In Scandinavia we have negative numbers:

Goteborg, Sweden	-1.3	±	0.36
Oslo, Norway	-4.53	±	0.34

This presumably is a result of the non-climatic cause of sea level change, isostatic uplift in response to the loss of the old ice sheet.

Two places are especial favourites amongst alarmists for future calamity from sea level rise - Tuvalu and the Maldives.

Sea level measurements for Tuvalu (and 10 other stations) between 1992 and 2006 have been measured, and graphs are available on the Australian Bureau of Meteorology website:

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

For about the past ten years the sea level seems to be virtually unchanging.

Sea level in the Maldives was studied by the doyen of sea level scientists, Niklas Axel-Mörner and a team of experts. They determined the sea level curve over the past 5,000 years based on evidence of morphology, stratigraphy, Biology and archaeology supported by extensive C14 dating. They found that "All over the Maldives there is evidence of a sub-recent sea level some 20 cm higher than the present one. In the 1970s, sea level *fell* to its present position." (my italics).

Holland, also known as the Netherlands or lowlands, would be particularly vulnerable to an alarming rise of sea level, and one might expect alarm to be at its height there.

Yet in a piece in the December 11 issue of *NRC/Handelsblad*, Rotterdam's counterpart to the *New York Times*, Wilco Hazeleger, a senior scientist in the global climate research group at KNMI (the Royal Netherlands Meteorological Institute) wrote:

“In the past century the sea level has risen twenty centimetres. There is no evidence for accelerated sea-level rise. It is my opinion that there is no need for drastic measures. ... Fortunately, the time rate of climate change is slow compared to the life span of the defense structures along our coast. There is enough time for adaptation.”

It would be much better if our politicians (and some scientists) based their opinions on what we can actually observe about sea level, instead of alarming us with dreams of catastrophic sea level rise based on false models of what might be happening to ice caps. Of course even if we believed sea level is rising, it takes another leap of faith to think it is caused by miniscule increases in atmospheric carbon dioxide caused by human activity.

25 May 2009