

Luctor et Emergo

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An important article of the man-made global warming dogma is the belief that global sea-levels will rise dramatically, causing the forced migration of hundreds of millions of people. Four areas especially serve as poster regions for the man-made global warming propaganda: the Netherlands, Bangladesh, Tuvalu in the South Pacific and the Maldives in the Indian Ocean.

The Netherlands. For the title of this essay I have used the Latin motto of the province of Zeeland in the Netherlands, *Luctor et Emergo*, which means *I struggle and Emerge*. It goes with the coat of arms of the province, showing a lion emerging from the waves (Figure 1), symbolising the eternal struggle of the province (and the country) against the sea. As recently as 1953, the province suffered a severe flood, costing the lives of 1800 people and countless



Figure 1. Coat of Arms of the province of Zeeland

animals. It was caused by a combination of a severe storm and a springtide. Many dikes broke. I remember this well myself. We lived in the province of Utrecht. My parents owned a small boat with outboard motor. That was put on a truck and transported to the stricken area, where in the meantime the storm had abated. My brother, a friend and I took part in rescuing several people stranded on rooftops and transporting them to higher grounds. Since that time, the Dutch have constructed a modern system of protection against a repeat of this disaster, called the *Delta System*.

Historically, there have been several disastrous floods. The best remembered were the so-called *St Elisabeth Floods* of 1404 and 1421. That was during the Little Ice Age, when there were more severe weather events than during the preceding Medieval Warm Period.

Al Gore, in his movie *An Inconvenient Truth*, mentions specifically the Netherlands, showing an animated picture of the country being flooded due to man-made global warming

About 27% of The Netherlands is below sea level (not 55% as stated in the fourth assessment report of the IPCC), protected by dikes and natural dunes (Figure 2). A large part of the country is formed by the delta of three major rivers, the Rijn (Rhine), the Maas (Meuse) and the Schelde (Scheldt).

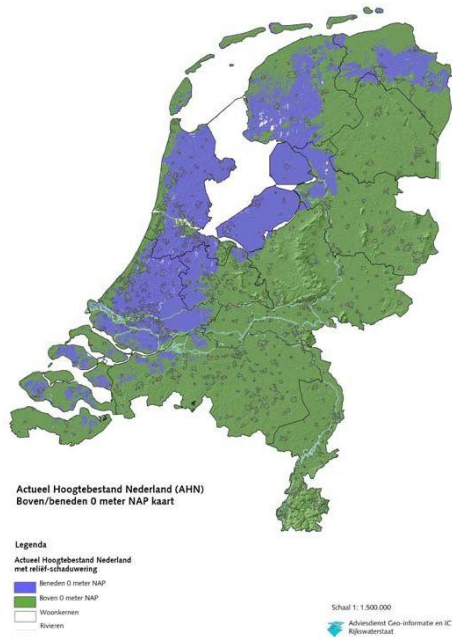


Figure 2. About 27 % of The Netherlands is below sea level (blue areas).

Indications of human habitation of The Netherlands go back more than 5000 years. Initially, people probably lived only in the higher areas, which were shaped by the icecap of the penultimate ice age, which covered about two-thirds of the country. Signs of human habitation in the low-lying areas go back at least 2500 years, when people started to build 4 to 6 metres high hills, called *terpen*, in the NW and N of the country, to protect them from high tides. (Figure 3). They are also found in northern Germany all the way to Denmark.



Figure 3. The red dots indicate the localities of pre-historic “terpen”, plotted on a pre-historic map of the Netherlands.

This struggle against the sea goes therefore back to prehistoric times. After about 1100, when dikes were built, the use of terpen against regular flooding became redundant.

Al Gore, in his scaremongering sub-prime science movie *An Inconvenience Truth*, makes a big, albeit unfounded spiel about alleged sea-level rise caused by human CO₂ emissions. According to him, sea-level could rise by several metres by the end of this century. The movie shows alarming animated pictures of The Netherlands being inundated.

Yes, sea-level in the Netherlands is rising. But that is a relative statement. It is a combination of sea-level rising and the land sinking. During the last Ice Age the North Sea was dry land. Since the end of the last Ice Age the sea-level has risen by about 120 metres (Figure 4).

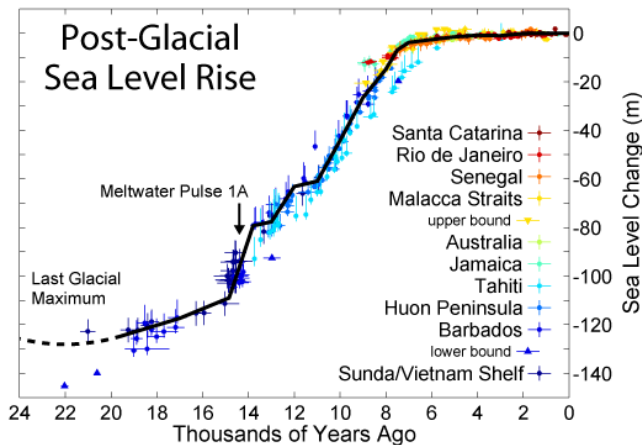


Figure 4. Post-glacial sea-level rise.

Our ancestors, living between 11,000 and 8,000 years ago, had to cope with a sea-level rise of about 22 mm per year. Even more in the period about 15,200 to 14,200 years ago. Since about 7,000 years ago sea level continued rising (with temporary reversals, like during the Little Ice Age), but at a much slower rate. Notwithstanding global-warming-alarmists claims, there has been no increase in this steady rise of about 1.3 to 1.8 mm per year.

There are four reasons why sea level in the Netherlands is rising. Three of them are due to the land sinking:

1. Crustal movement. The earth's crust below the river and marine sedimentary cover has been going down in a hinge-controlled fashion. Carboniferous (359-299 million years ago) rocks outcrop at the surface in the south-eastern-most corner of the country. Those can be seen in the famous Heymans groeve (=quarry). Carboniferous rocks contain coal layers, which were mined until 1974, when coal became redundant after a huge natural gas field was discovered below the northern province of Groningen. Those coal strata were formed from the remains of large forests. Those coal layers were formed close to the surface. However, those coal strata are now found at depths up to 5 km underneath the North Sea (Figure 5). This means that the Earth's crust has sunk in a hinge-like movement towards the north-west. This crustal movement probably started in the Cretaceous, about 60 million years ago, and is probably still going on.

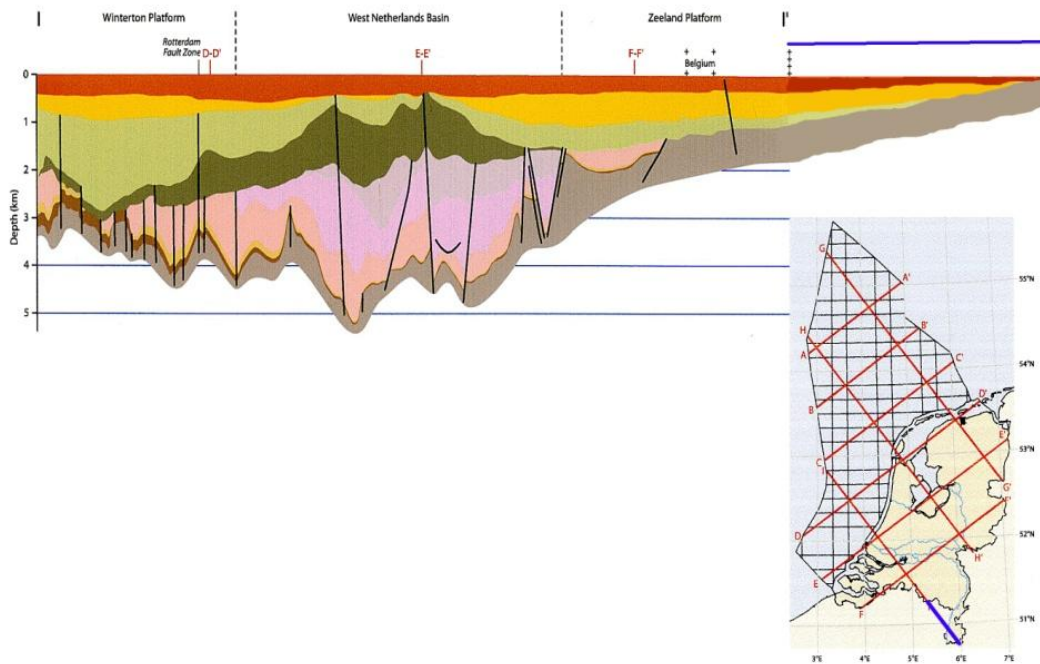


Figure 5. Geological cross section through the Netherlands, from south-east to north-west (Line I – I’). The Carboniferous strata (light-grey) are the lowest indicated.

Source: Duin, E.J.T., J.C. Doornenbal, R.H.B. Rijkers, J.W. Verbeek & Th.E. Wong, 2006: Subsurface structure of the Netherlands – results of recent onshore and offshore mapping. *Netherlands Journal of Geosciences – Geologie en Mijnbouw*, 85(4): 245-276.

2. Isostatic re-adjustment. During the last ice-age, a large ice-cap of up to 3 km thick covered Scandinavia. The weight of this ice had pushed down the Earth’s crust underneath. After the rapid melting of the ice-cap the crust started to rebound slowly. This process is called “isostatic re-adjustment”. This process is reflected in the fact that relative sea-level in Stockholm, for instance, is falling (Figure 6).

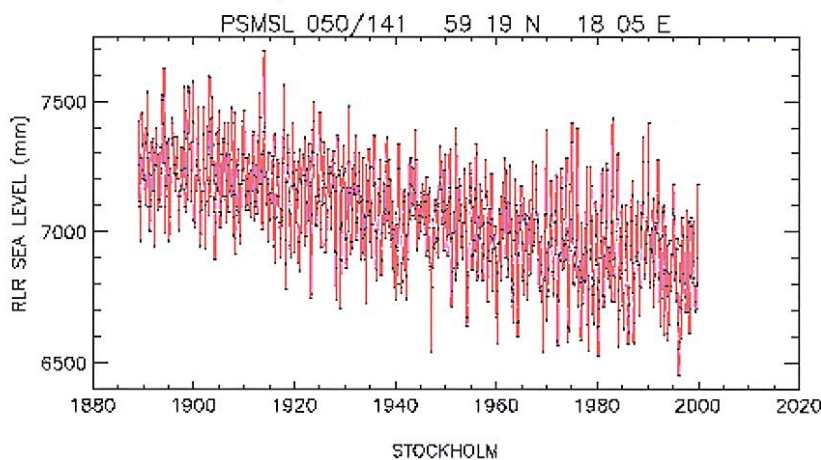


Figure 6. Relative drop in sea-level in Stockholm, caused by isostatic re-adjustment.

While the crust is rebounding, mantle material below the crust moves towards Scandinavia. This in turn causes the surrounding crust, including the Netherlands, to subside.

3. Sediment compaction. Unconsolidated sediments, mainly belonging to the Neogene (23 million years ago to Present) overlie harder and older sedimentary strata. These sediments compact over time, assisted by human extraction of ground water, attributing to the dropping of the surface of the Netherlands.
4. Eustatic sea-level rise. This is the global sea-level rise due to the melting of ice caps and glaciers since the last ice age, and the thermal expansion of the sea-water.

NAP - Normaal Amsterdam Peil (Normal Amsterdam Datum).

One of the oldest records of sea-levels is the so-called AP (Amsterdam Peil = Amsterdam Datum). It started in the 17th century, when in 1683, the then-mayor of Amsterdam, Johannes van Waveren Hudde (1628-1704), established a baseline datum by having marble stones mortared into the walls of eight locks. These eight stones were at exactly the same height. From then on daily measurements were made of high- and low-water sea-levels. During the 18th century this standard datum was transposed to many other areas in the Netherlands. In the period 1875 to 1885 a more precise check was made of all level marks in the country. Corrections were made where necessary and a new datum name was introduced in 1891, the NAP (Normaal Amsterdam Peil = Normal Amsterdam Datum). Twice a re-levelling was carried out, to correct for measurement errors in the older measurements and for vertical changes in the various levels. One was carried out from 1875 to 1885, the second from 1926 to 1939. In 1953 a new datum for NAP was established, being the top of a bronze bolt on top of a 22 metre long pole, driven into the ground at Dam Square in Amsterdam. This bolt is at 90 centimetres below the pavement and is 1.43 metre above NAP. Figure 7 shows that from 1700 to 1861 sea-level has risen gradually.

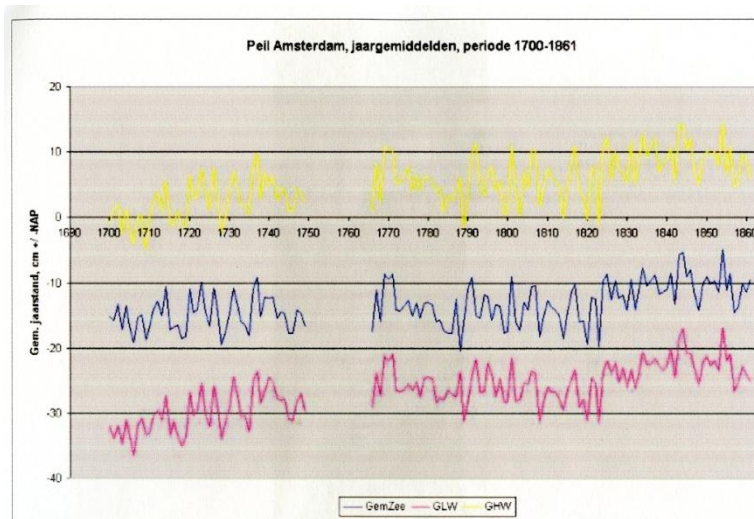


Figure 7. Sea level record in the Netherlands from 1700 to 1860 Annual averages). GemZee - Average Sea level, GLW – Average low tide, GHW – average high tide.

Source: Kwaad, F.J.P.M: Het NAP-niveau – de dijkpeilstenen van burgemeester Hudde en de geschiedenis van het Normaal Amsterdams Peil.

The relative sea-level rise along the North Sea coast in the Netherlands, from 1891 to 2008, was 22 cm or 1.88 mm per year. **It did not show any acceleration** (Figure 8).

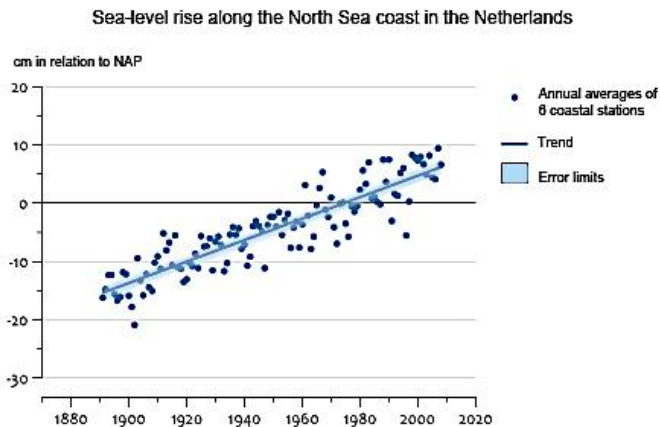


Figure 8. Sea-level rise along the North Sea coast in the Netherlands, from 1880 to 2010. Note the lack of acceleration in sea-level rise.

(Source: Rijkswaterstaat – see www.Compendiumvoorleefomgeving.nl)

This graph indicates (ca) 220 mm in 125 years, or 1.76 mm/yr.

It should be clear from this description that it is well nigh impossible to determine a rise in sea-level for the Netherlands, due to man-made global warming, from these contributing causes with their uncertainties and errors. However, the Dutch government, like most other governments, has based their climate policies on the IPCC and the “Hockey Team” (the epithet for a small group of scientists around the authors of the infamous “Hockey Stick” graph in the Third Scientific Assessment Report of the IPCC. This group of scientists also featured prominently in the so-called “Climategate” affair of 2009). Recently they set up a commission to look into the future “dangers” of sea-level rise for the Netherlands and what to do about it. This commission, called the *Delta Commissie* (Delta Committee), also called the *Veerman Commissie*, after its chairman, Cornelis Pieter Veerman. Veerman is an economist and agronomist. He held professorial (*extraordinarius*) posts at the Catholic University of Brabant, the Erasmus University in Rotterdam and Wageningen University. From 2002 to 2007 he was a minister of the crown for agriculture, fisheries, nature and food quality. The committee consists of ten members. They cover expertise in landscape architecture, economy, sustainable development, cultural technology, journalism, dredging, water protection technology, civil engineering and hydrology. There are no climatologists or paleoclimatologists on the committee. The closest to such expertise is professor Pavel Kabat, who is a expert in hydrology and water resources. He specialises in earths system science and climate. He teaches climate hydrology at Wageningen University. As far as I can ascertain, they are all believers in the IPCC/Hockey Team dogma. Alternative scientific opinions have not been considered. They certainly did not consider a scenario of future global cooling, which is a distinct possibility, based on solar activity (Duhau & de Jager, 2010). Their dogmatic stance is exemplified by statement in their report introduction:

(translated) *there is a relationship between global temperature increase and sea-level rise. The increase in temperature has been caused by greenhouse gas emissions, the most important source being the use of fossil fuels (p. 24).* They also state that (translated) *The European Union has agreed as the aim of their climate policy that the global temperature (relative to the pre-industrial level) is not allowed to increase by more than 2°C (p. 24).*

Probably because of their lack of expertise in climate science, the Delta Committee commissioned a report from a committee of international “experts” under the chairmanship of professor Pier Vellinga from Wageningen University. Their report is a joint publication by Wageningen University, Research Centre/ Alterra and the KNMI (Royal Netherlands Meteorological Institute).

The main findings of the Vellinga Committee represent an extreme position on possible sea-level rise. While the last IPCC report (AR4, 2007) present as a scenario (not prediction) a possible rise of between 18 and 59 cm by the end of 2100 (an earlier draft was

even lower, from 14 to 43 cm, *see* Figure 19), the Vellinga Committee proposes two high-end scenarios, one of 55 to 110 cm by 2100 and 150 to 350 cm by 2200. These figures are based on a projected temperature rise up to 6°C by 2100 and up to 8°C by 2200. These numbers are clearly unfounded. They are based on computer models and not on real-world data.

One of the members of the Vellinga Committee was Professor Stefan Rahmstorf, a German well-known catastrophic-man-made-global-warming advocate. In 2009, he and Martin Vermeer wrote a paper on the link global temperature and global sea-level (Vermeer and Rahmstorf, 2009). They carried out computer modelling, using the IPCC 2007 temperature projections for six greenhouse gas emission scenarios and past sea-level data. An earlier attempt by Rahmstorf to calculate sea-level rise caused by large, rapid warming (Rahmstorf, 2007) did not provide the required results. By developing a new formula, making all sorts of assumptions and by tweaking the data, including applying a smoothing algorithm, they calculated a sea-level rise for the period 1990 to 2100 from 75 to 190 cm. Their sea-level rise graph (see Figure 9) has a similar shape as the first half of the graph in the report of the Delta Committee (see Figure 10). It seems highly likely therefore that Rahmstorf’s opinions strongly influenced the Vellinga Committee.

The Vermeer and Rahmstorf paper has been enthusiastically received by the IPCC coterie and members of the *Hockey Team* (<http://www.realclimate.org/?s=rahmstorf>; Overpeck and Weiss, 2009). However, it has also been heavily criticised (<http://climatesanity.wordpress.com/2010/10/14/rahmstorf-2009-off-the-mark-again-part-8-reproducing-vr2009-results/>)

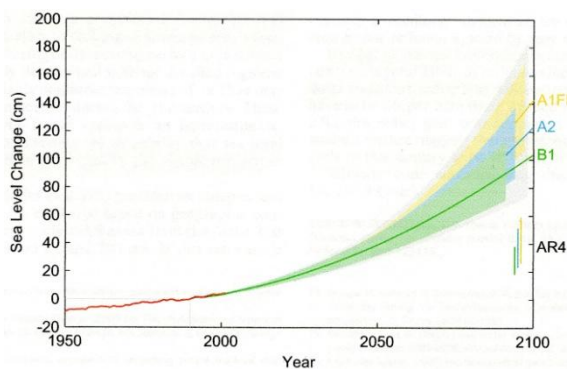


Figure 9. Projected sea-level rise until 2100, for 3 temperature scenarios of the IPCC (2007). Figure 6 of Vermeer and Rahmstorf, 2009.

The Delta Committee has taken most of the Vellinga Committee findings on board, but goes even a bit further. It is of the opinion that The Netherlands must reckon with a rise in sea level of between 65 and 130 cm by 2100 and between 200 to 400 cm by 2200 (Figure 10)

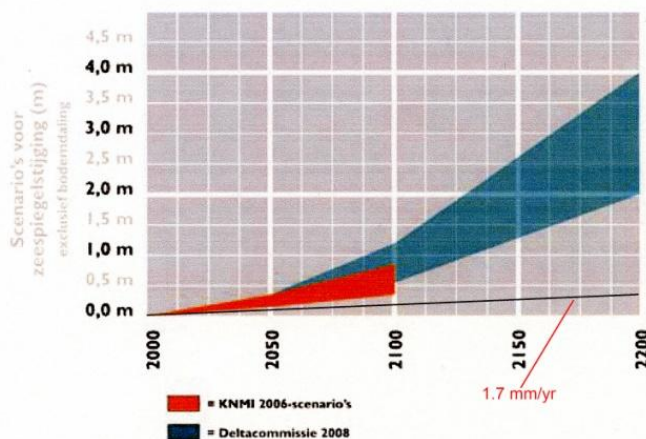


Figure 10. Figure 4 of the sea-level rise report of the Dutch Delta Committee, showing their extreme sea-level rise scenario. The red graph is from 2006 scenario's by the KNMI (Royal Dutch Meteorological Institute). I have added a line assuming a constant increase of 1.7 mm/yr, as has been the case till the present.

They calculated that, to protect the Netherlands from this (extreme) scenario, the government should spend 1.2 to 1.6 billion euros per year from 2010 to 2050, and 0.9 to 1.5 billion euros per year from 2050 to 2100. They suggest extra spending for associated projects of up to 0.3 billion euros per year. These are enormous sums for something that has no basis in credible science.

No wonder the committee's report has been severely criticised, as it borders on fanatic environmentalism. For instance, an article in the Dutch newspaper *NRCHandelsblad* of 9 October 2008 reports that some climatologists involved in the Vellinga Committee report think that the Delta Committee has misused their worst case scenarios for political ends. The German professor Hans von Storch, a respected climate scientist and expert in climate modelling (and not a man-made global warming sceptic), states (I quote) that they (the Vellinga Committee) were asked what a worst-case scenario would mean for the Netherlands in the coming two centuries. They were asked what scenarios we could not exclude, although there was still a lack of knowledge. The Delta Committee has subsequently presented our findings as probable. That is not fair. The bottom line is of course that they wanted to get the billion euro. Why do they elect for measures to be taken now already (end of quote)? His critique is supported by another member of the Vellinga Committee, glaciologist Roderick van de Wal of Utrecht University. He said that, because the great margins of uncertainty in the scenarios, the Delta Committee could also have decided to look at the problem again in ten years.

The government has accepted most the advice from the Delta Committee. They appointed a *Delta Programme Commissioner*, who will draw up, update and implement the Delta Programme on behalf of the government. His name is Wim Kuijken. He has already stated that he needs more money to implement the programme as suggested by the Delta Committee. However, his authority and duties still have to be enshrined in a *Delta Act*. This Act was submitted to the Lower House of Parliament on 1 February 2010. However, its implementation was postponed due to the fact that the Government fell in February 2010. A new government was installed on 14 October 2010. I sent the Netherlands part of this essay to the new Prime Minister, Deputy Prime Minister and the leader of the party supporting the new minority government. I received a kind letter back from the Prime Minister. However, it seems that they still push ahead with the recommendations of the new "Delta Programme". They have started by adding huge amounts of sand to the beaches, extending the coastline sea-wards. The present planning is to add 12 million cubic metres of sand annually to the coastline.

Bangladesh. Bangladesh is created by the built-up of sediments, forming the delta of three major rivers, the Ganges, the Brahmaputra and the Meghna (Figure 11). In that respect it compares with the river deltas of the Netherlands. Those sediments in turn are the erosion products of the Himalayas. This process has been going on since the formation of the Himalayas, caused by the plate-tectonic collision of the India Plate with the Eurasian continent, pushing up the Himalayas. The timing of the start of this collision is still uncertain, estimates varying from 70 to 34 million years ago (White & Lister, 2010). Sedimentation is still going on, Bangladesh is still growing. Satellite photos show **it is growing by 20 square kilometres (sq km) per year** (<http://notrickszone.com/2010/10/15/climate-change-now-questioned-at-german-universities-professors-speaking-up/>)



Figure 11. Bangladesh is formed by the delta of three major rivers, the Ganges, the Brahmaputra and the Meghna.

The Bangladesh delta is partly above and partly below water. Sediment poured into the sea is further channelled via a submarine canyon to feed one of the largest submarine fans in the world, the Bengal Fan (Figure 12).



Figure 12. Map showing the huge submarine Bengal and Indus Fans.

The major difference with the Netherlands is that no substantial protective structures have been built against the sea. As all river deltas, much of its area, especially the lower reaches close to the sea, are at the mercy of storms and floods. However, left to its own, the delta would gradually build up and extend seawards due to the sediment built-up by the rivers.

People try to eke out a meagre existence in the low-lying areas of the delta. They try to protect their plots by building crude dikes around them. These, however, prevent the build-up of sediment, which is then channelled out to sea. To say that the flooding of the low-lying areas is due to man-made global warming is not supported by the facts. Like the rest of the world, sea-level rise has been going on since the last ice age and is still going on, especially since the end of the Little Ice Age. There is no indication that sea-level rise has been accelerating. The rise is entirely natural.

Tuvalu and other South Pacific Islands. Tuvalu especially has been made the poster island for the sea-level rise scare by the global warming alarmists. Almost from the beginning of the man-made global warming scare, global warming activists have been using Tuvalu for their propaganda. A good example is the British Greenpeace activist Jeremy Leggett. In his 1999 book *The Carbon War*, he describes how he managed to get the Tuvalu Prime Minister, Bikenibeu Paeniu, to join Greenpeace at a press conference during the 1992 Earth Summit in Rio de Janeiro. There the Prime Minister told the journalists that “I have come to Rio to tell you of the fate of my people”. He reminded the scribbling journalists of what climate scientists were now predicting for his homeland, and others like it, unless the burning of oil, coals and gas could be stemmed. Then he described what his people saw happening today. They saw shores being washed away by the sea, a higher frequency of cyclones, prolonged periods of drought. They struggled as it was to build an economy. Now planning had become a nightmare.” (*The Carbon War*, p. 98). The reality is that there has not been an increase in the frequency of cyclones, nor prolonged periods of drought. The erosion of their shores is due to the mining of the protective coral reef for road and airport construction.

The Prime Minister of Tuvalu became the poster boy for mankind allegedly being threatened by catastrophic man-made global warming. He was unashamedly being used by Jeremy Leggett and Greenpeace for their propaganda. The next action reported in Leggett’s book was a visit by him and Prime Minister Paeniu in June 1993, to Florida and Washington (pp 131-137). The intention of the Prime Minister was “to express solidarity with fellow cyclone-threatened communities. Leggett was with him throughout as his “technical advisor”. Subsequently they went to Washington, hoping to meet President Clinton and Vice-President Gore. This was unsuccessful. Leggett admits in his book that the trip to America had been a disappointment from beginning to end (p. 137).

In July 1993, Leggett and Paeniu went together to Tokyo, where the G7 economic summit was being held. But they weren’t successful there either. As Leggett reports “The Japanese government could not have been more unwelcoming. The Japanese foreign and environment ministers would be unable to see Prime Minister Paeniu, they informed Tuvalu’s Ministry of Foreign Affairs. Neither would any of their officials” (p. 137).

Leggett stayed on in Tokyo. He managed to get into the press centre by posing as a TV reporter. Inside he used the free photocopiers to run off 3000 copies of a press statement he prepared. He writes: “As a security guard walked past, I bent over the tray so he couldn’t read the product of his government’s largesse to the world media”. His statement “listed the items on the summit agenda which, in the Greenpeace analysis, threatened economic ruin as a result of climate change”. It took him two hours to distribute his pamphlet around the press centre. Again, the response was disappointing.

I am sad to say that Leggett is a colleague-geologist of mine. He was professor of geology at the Imperial College of Science and Technology in London. I understand that he quit his job to become a paid Greenpeace activist. I say “sad to say”, because, of all people, a geologist should be aware that climate has always changed naturally, often dramatically, and always will, and at all time scales, and that the present minor warming is nothing unusual. As a scientist he should also be aware that the science behind the catastrophic man-made global warming dogma, does not stack up. As examples of geologists who are actively pointing out the *sub-prime* science behind the scare I can mention three professors of geology who have written books on the subject: Australian professors Ian Plimer (*Heaven and Earth*), Bob Carter (*Climate: The Counter Consensus*) and the Dutch professor Salomon Kroonenberg (*De Menselijke Maat: De Aarde over Tienduizend Jaar* (The Human Measure: the Earth in Ten Thousand Years Time)).

Personal anecdote. I met Jeremy Leggett at conferences and in 1982 I contributed an article for a book he was editing for the Geological Society of London (Van der Lingen, 1982). This was before man-made global warming became an international issue. Reading his book *The Carbon War* I was thoroughly disillusioned. I wrote some critical comments, which I sent to him. I received the following email in reply: “*You are clearly losing your mind in your old age. Please cross my name off your email list. Jeremy*”. End of story.

While whizzing around the world as a Greenpeace activist (his carbon footprint must have been huge), he paid special interest to insurance companies, like Munich Re and Swiss Re. His spiel was to tell the insurance industry that many big property losses were caused by man-made global warming, resulting in more and stronger hurricanes. They took his explanations on board. As he writes on page 123: “*Both Munich Re and Swiss Re were now telling the press that the recent pattern of losses must at least in part reflect enhancement of the greenhouse effect*”. However, whatever the climate alarmists tell us, there is no evidence whatsoever that hurricanes and cyclones are increasing in strength and frequency. But that did not withhold *Lloyds List* to publish the following comment, that “*the convenient theory that the increase in the size of losses is mainly a reflection of higher wealth – and consequently, of insured values – in those countries affected by natural disasters seems to be incorrect. It is far more likely that other causes, such as climatic changes, have already taken over as the main factors pushing losses upwards*” (p.123). One only has to look at coastal developments around the world, especially in the developed world, to realise that this comment is untrue. Coastal property values are at a premium, resulting in more expensive houses being built on them. But it is to the advantage of insurance companies to believe that man-made global warming is the main cause of losses due to weather disasters. It gives them an excuse to raise their premiums.

Towards the end of his book, Leggett tells us that he left Greenpeace in 1997 to start his own solar-energy company, called *Solar Century*. He couches his decision in idealistic rather than commercial language. He writes that his intention was to try to force “*the river of carbon-bound capital to break its banks. There was too much inertia and lack of imagination in the system, not to mention the malign intent of the vested interests*” (p. 244).

I have spent some space on Leggett and his book, as they present a prime example of the actions, tricks and deceptions used by a prominent extreme environmental activist. This book beats anything I have read about man-made global warming activism. It is a thoroughly disturbing read.

Al Gore, in his movie *An Inconvenient Truth* made also much of the Tuvalu story. He mentioned that Tuvalans had fled to New Zealand because of their island disappearing below the waves. This was a blatant lie. This was not the only untruth in his movie. At least 35 of them have been analysed. It just shows again - anything goes in the man-made global warming propaganda.

The real story about South Pacific islands is entirely different. Not only Tuvalu, but also other islands, such as Takuu and Carterets islands, are used for propaganda purposes.

Last year, on May 3, 2009, New Zealand TV broadcast a program round the launch of a man-made global warming propaganda book, *POLES APART*, by economist Gareth Morgan and writer John McCrystal. The program showed sea water sloshing through a village on Takuu island, situated about 250 km north-east of Bougainville. The story was that rising sea levels were drowning the island and that its inhabitants would soon have to be

evacuated. They would then become the first global warming refugees. Searching the Internet, I found that the sea level is rising by a huge 20 cm per year. I knew that the island is SINKING, because of its position on the Pacific tectonic plate that is being subducted into the Solomon Trench. Plate tectonics is causing the island to disappear below the waves, not human carbon dioxide emissions. Some people criticised the TV program, pointing this out. A discussion developed in blogosphere, some people maintaining that it was global warming, not plate tectonics . These people are not susceptible to simple logic. If the sea is rising by 20 cm per year (that is 20 metres by the end of this century!!), it should also be noticed in other Pacific islands, if not round the world. Fortunately, we can check with the Australian South Pacific Sea Level & Climate Monitoring Project, installed and maintained by the National Tidal Centre of the Australian Bureau of Meteorology (BOM - www.bom.gov.au) . They have twelve monitoring stations over a wide area around Takuu Island (Figure 13). This robust project is called SEAFRAME (Sea level Fine Resolution Acoustic Measuring Equipment). It measures all parameters that have an effect on sea level, such as wind, air and sea temperatures and atmospheric pressure. It uses a Continuous Global Positioning System (CGPS) to monitor vertical movements of the Earth's crust, allowing corrections for tectonic movements to be made to sea level data. This latter aspect is absolutely essential in assessing real changes in sea level. Incidentally, it is a pity that no tide gage station was established on Takuu or Caterets islands (see page 13).

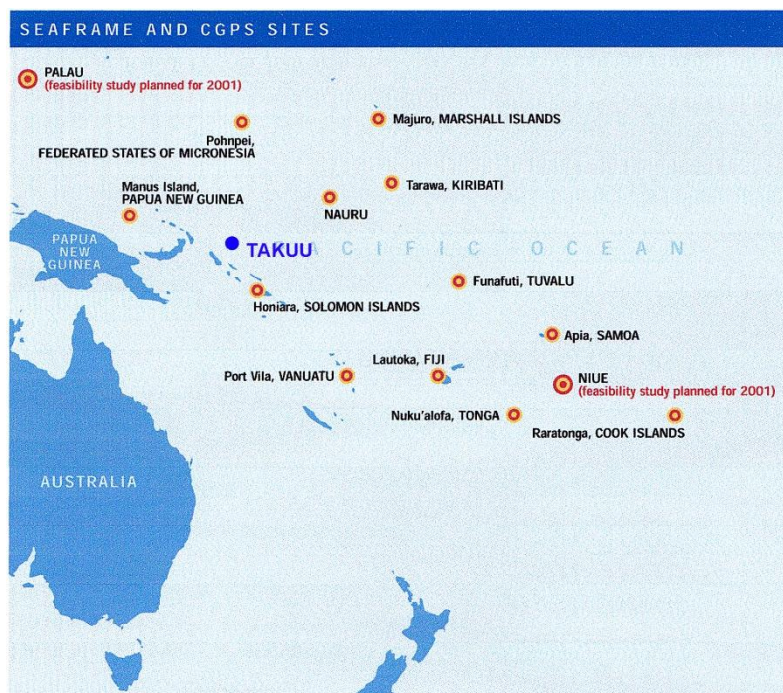


Figure 13. 12 SEAFRAME Australian sea-level monitoring stations in the South Pacific. Approximate location of Takuu Island is indicated (Source: Australia Bureau of Meteorology – www.bom.gov.au/pacificsealevel/)

The BOM website provides a graph showing monthly mean sea levels from 1992 to 2009 (Figure 14).

MONTHLY MEAN SEA LEVELS TO JUNE 2009 (m)
 The zero line represents an arbitrary fixed offset from the zero of the tide gauge.

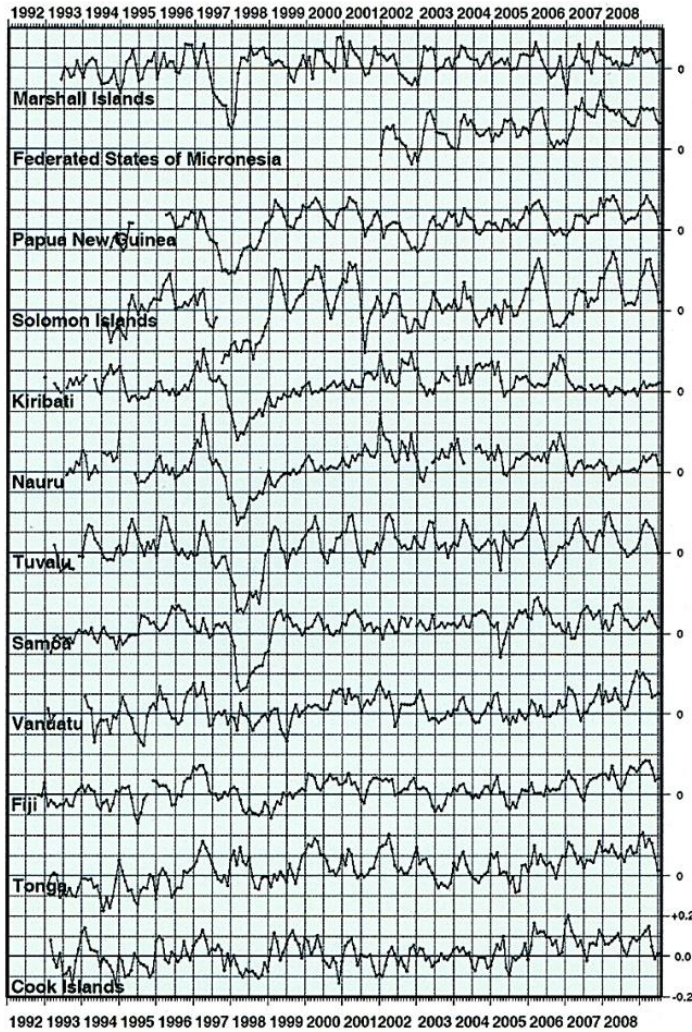


Figure 14. Monthly sea level data for 12 South Pacific monitoring stations (see Figure 13) from 1992 to 2009. (Source: Australian Bureau of Meteorology).

What strikes one first is that Tuvalu, the poster island for the global warming alarmists, does not show any rise in sea level over this period. Similarly, the other stations show variations over time but no overall rise. From this can be concluded that the sea level rise of 20 cm per year in Takuu is not caused by man-made global warming. The only other explanation is a sinking tectonic plate.

But real-world data will not deter global warming alarmists. If one searches for Takuu on Google Earth, it shows a nearby island group to the west, called Carteret Islands. These islands are on the same sinking tectonic plate as Takuu. It has the Greenpeace logo next to it (Figure 15).

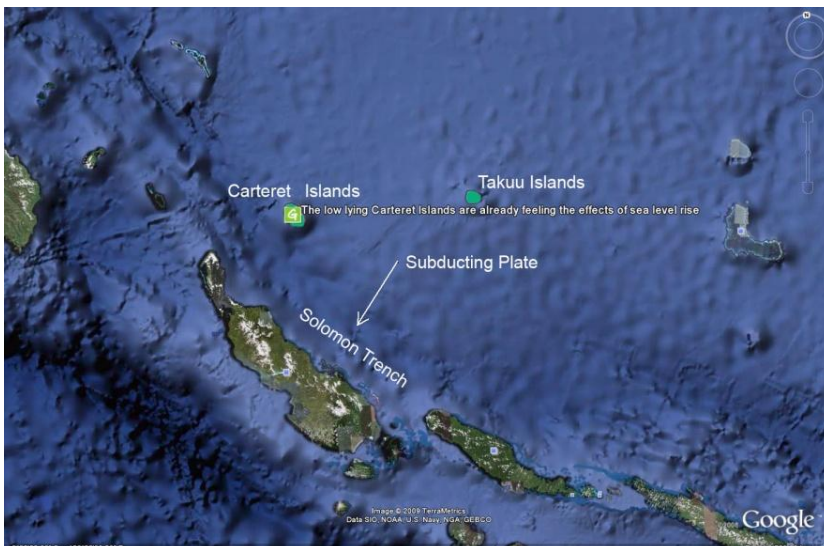


Figure 15. Google Earth picture of part of the South Pacific, showing the locations of Takuu and Carterets Islands. The Greenpeace logo and text at Carterets Island is from Google Earth. Further information added by the author.

Clicking on the Greenpeace logo brings up the following text: *The Carteret Islands, off the coast of Papua New Guinea, could be one of the first casualty communities as a result of climate change related sea level rise. This idyllic South Pacific paradise is suffering from the combined effects of sea level rise, erosion, storm surges, increased population and increased salinity of the soil. The combined effect are making the Carteret Islands uninhabitable.* No mention of tectonic plates of course. This blatant dishonesty is typical for groups like Greenpeace. Anything to scare the living daylight out of an unsuspecting public.

Personal note: I am not unfamiliar with the tectonic setting of the Takuu and Carterets Islands. Both are situated on the submarine Ontong Java Plateau (OJP). In 1971 and 1973 I was involved with the scientific Deep Sea Drilling Project. With the drilling ship *Glomar Challenger* we drilled three holes in the OJP.

Growing Pacific islands. Against all popular beliefs, of 27 islands in the Pacific Ocean, 23 have stayed the same or have *increased* in size since 1950. Only 4 decreased in size. Two scientists, Paul Kench of the University of Auckland, New Zealand, and Arthur Webb of the South Pacific Applied Geoscience Commission in Fiji, used historical aerial photographs and satellite images to study changes in land areas of those islands (Webb and Kench, 2010). The growth is caused by the continuous adding of coral debris, eroded off continuously growing coral reefs. This growth has occurred notwithstanding the fact that sea levels have risen by not more than 2 mm/yr, or 12 cm (maximum) during those 60 years.

The Maldives. The Maldives is a group of low-lying atolls in the Indian Ocean, south-west of India. Together with Tuvalu, they are being used by global warming activists as poster islands for sea level rise caused by man-made global warming. Like Tuvalu, Maldives politicians use that (unfounded) propaganda to obtain financial support from western countries. As a stunt to highlight their imagined plight, the cabinet of the government, clad in scuba gear, held an underwater meeting on October 17, 2009 (Figure 16), shortly before the UN climate conference in Copenhagen (COP15) in December 2009.



Figure 16. Cabinet meeting underwater by the Maldives government, on 17 October, 2009. This was a stunt to draw attention to the imagined threat of sea level rise for the Maldives.

Again, reality checks show that their fear is imagined. A Swedish professor and his team carried out an in-depth study of recent sea level changes in the Maldives (Mörner et al. 2004). The abstract of their peer-reviewed paper is as follows: *“Novel prospects for the Maldives do not include a condemnation to future flooding. The people of the Maldives have, in the past, survived a higher sea level of about 50-60 cm. The present trend lack signs of a sea level rise. On the contrary, there is firm morphological evidence of a significant sea level fall in the last*

30 years. This sea level fall is likely to be the effect of increased evaporation and the intensification of the NE-monsoon over the central Indian Ocean.”

Dr Mörner is a highly respected authority on sea levels. He is the past-president (1999-2003) of the INQUA Commission on Sea Level Changes and Coastal Evolution, and leader of the Maldives Sea Level Project. He has been studying sea levels and their effect on coastal areas for some 35 years.

Not surprisingly, the findings by him and his team did not go well with global warming activists or the Maldives Government. Mörner’s team made a program for Maldivian television, but that was forbidden to be shown by the government, as Mörner said “because they thought that they would lose money. They accuse the West for putting out carbon dioxide, and therefore we have to pay for our damage and the flooding. So they wanted the flooding scenario to go on.” (Mörner, 2007).

Part of the evidence by Mörner and his team was an old tree growing close to sea level. If levels had been rising, it should have been swept away by the sea. It didn’t. What happened next? A group of Australian global warming activists came along and destroyed the evidence by removing the tree (Mörner, 2007). Again, as far as global warming activists are concerned, anything goes, according to their motto *The End Justifies the Means*.

An interesting aside. During the 26 December 2004 Indian Ocean earthquake and resulting tsunami, the Maldives were also affected. However, subsequent research showed that there was no appreciable erosion, nor any significant reduction in island area. Rather, the tsunami had deposited extra sediment on top of some of the islands, up to 30 cm thick (Kenck et al., 2006).

An anecdote. Almost all national science academies and universities are supporting the man-made global warming dogma. It is not different in New Zealand. In the Christchurch University of Canterbury newsletter *Chronicle* of June 23, 2005 is a report of a training visit by four Maldives government officials “to study climate change implications”. Their visit was funded by the United Nations Development Program (UNDP), an organisation headed by the former New Zealand Prime Minister, Helen Clark, who is a staunch man-made global warming believer. While Prime Minister she was planning to make New Zealand the first carbon-neutral country. Believe me, I am not making this up. Professor Mörner simply doesn’t exist for these people.

Some final remarks:

Since the last Ice Age (since the Last Glacial Maximum), sea-level has risen by about 120 metres ! See Figure 17 (repeat of Figure 4).

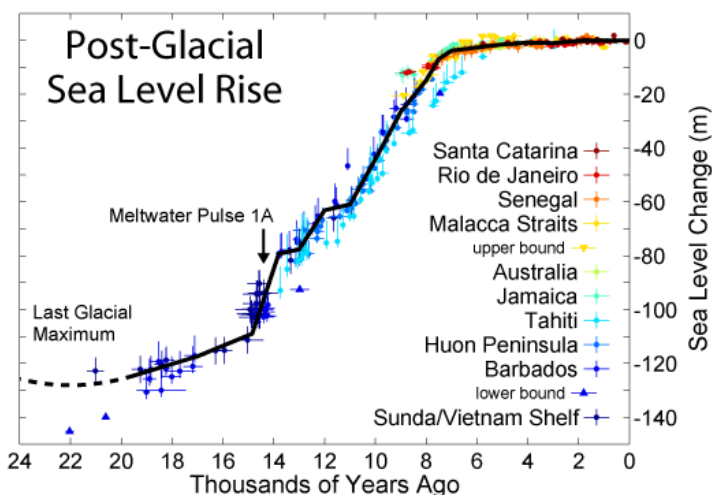


Figure 17. Post-glacial sea level rise, deduced from various localities around the world. *Source:* www.globalwarmingart.com.

For instance, our ancestors living between 11,000 and 8,000 years ago, had to cope with a sea-level rise of about 22 mm per year. Even more in the period about 15,200 to 14,200 years ago. Since about 7,000 years ago sea level continued rising (with temporary reversals, like in during the Little Ice Age), but at a much slower rate. Notwithstanding global-warming-alarmists claims, there has been no acceleration in this steady rise of about 1.3 to 1.8 mm per year.

The following graph (Figure 18) shows sea-level rise since about 1850, heralding the end of the Little Ice Age. Before 1850, sea-level had been falling, due to advancing glaciers and growing ice caps.

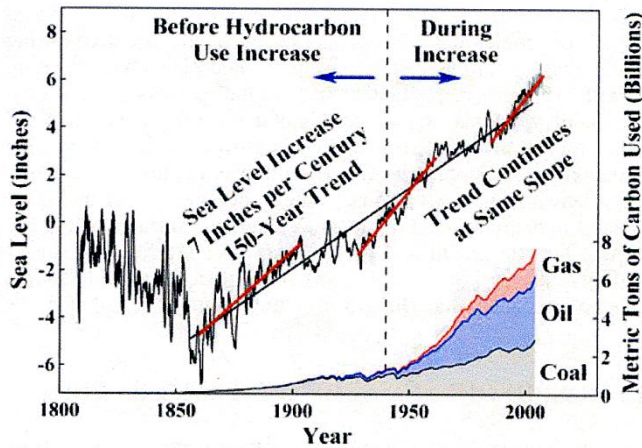


Figure 18. Global sea level rise since the end of the Little Ice Age. (Source: Robinson, Robinson & Soon, 2007). 7 inches per century equals 1.8 mm per year. Note a decrease in sea level during the Little Ice Age, which ended in about 1850.

In their latest Assessment Report (2007), the Intergovernmental Panel on Climate Change (IPCC), predicted a global sea-level rise by the end of this century of between 18 and 59 cm or 1.8 to 5.9 mm per year, based on computer modelling. Their predictions have steadily *decreased* since their first 1990 report (Figure 19). However, two well-known global-warming-alarmist scientists have made far more extreme predictions. Professor Ramstorf from Germany predicted 1.4 metres and Dr James Hansen from NASA, USA, even a staggering 6 metres! Professor Singer, a well-known catastrophic-man-made-global-warming sceptic, predicted a more realistic 20 cm. The various predictions are shown in Figure 19.

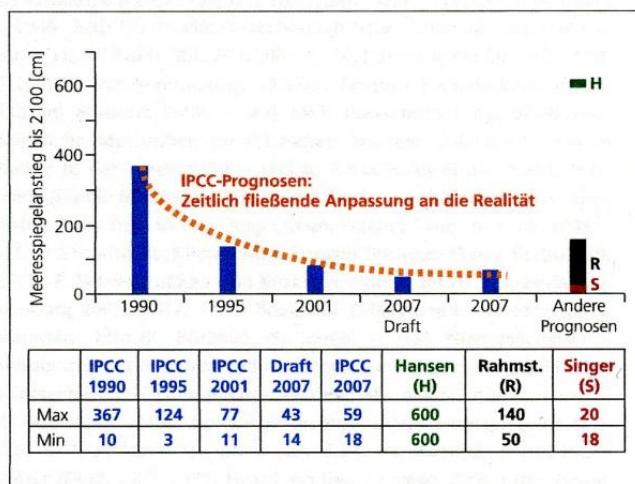


Abb. 10. Prognosen des IPCC zum Meeresspiegelanstieg im 21. Jahrhundert [21]. Die IPCC-Prognosen passen sich mehr und mehr der Realität von ca. 20 cm/Jahrhundert an (vgl. Abb.4-5).

Figure 19. Predictions of sea level rise by the IPCC. The German caption says *Prediction by the IPCC of sea level rise in the 21st century. The IPCC-predictions adapt themselves more and more to the reality of the 20th century.* Also indicate are the predictions of James Hansen (H), Rahmstorf (R) and Singer (S).

The most common argument used by global warming alarmists is that

sea level rise, although it has been going on since the last ice age, has been *accelerating* during the 20th century. However, a peer-reviewed paper by Holgate (Holgate, 2007), analysing nine long and nearly continuous sea level records from tide gauges found that, although the record showed high variability, sea level rise between 1904 and 1953 was 2.03 ± 0.35 mm/yr, was *higher* than the rise between 1954 and 2003 (1.45 ± 0.34 mm/yr). He found that over the entire 20th century the mean rate of change was 1.74 ± 0.16 mm/yr. He concludes that the tide gauge record suggest *a general deceleration in sea level rise during the 20th century*. A more recent paper (Wenzel & Schröter, 2010) came to a slightly lower figure for the period 1900 to 2006 from tide gauges of 1.56 ± 0.25 mm/yr.

Since 1992, sea levels have also been measured by satellite. For the period 1992 to 2007, these gave a value of 3.2 mm/yr. The discrepancy between the data from tide gauges and satellites still needs to be resolved. First of all, the period covered by the satellites is still too short to establish a long-term trend. Second, the satellite data need to be tested by in situ observations. The late John Daly, an Australian man-made-global-warming critical commentator, already in 2001 wrote about intrinsic problems with satellite measurements (www.john-daly.com/altimetry/topex.htm). For instance, the satellite sends out radar pulses down to the surface of the oceans. This surface is always in motion through swells and waves. The claimed accuracy is ± 1.2 metres. By averaging multiple pulses the statistical accuracy can be improved to about ± 4.7 centimetres. On top of that comes the calculated accuracy of the satellite's position, which is claimed to be ± 3 centimetres. Compared with tide gauges, satellite data can do a thousand times better. But even the satellite data do not show any acceleration of sea level rise, but a slight deceleration (Figure 20).

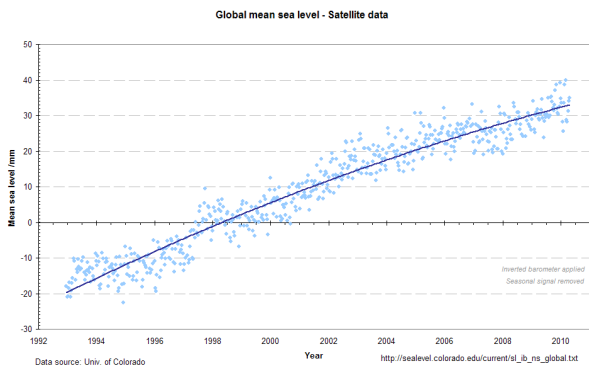


Figure 20. global sea level rise from satellite data, showing a slight deceleration. Source: University of Colorado, USA, plotted by Bob Dedekind.

More recent satellite records show a decrease in the rate of sea-level change for the last two years (Figure 21).

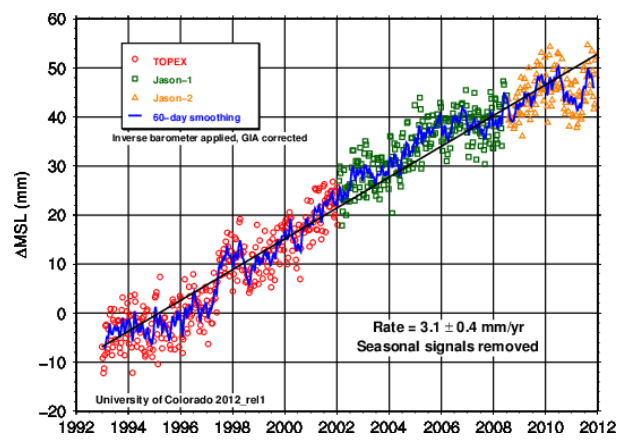


Figure 21. Global Mean Sea Level time series (seasonal signals removed) from Topex and Jasons satellites (updated 13 February 2012). From University of Colorado.

It should be noted, however, that, even if the satellite data are accurate, sea level will have risen by not more than 31 cm by the end of the century, provided the rate of increase continues to remain stable.

A component of satellite sea-level data is due to changes in the planet's geoid. This is the actual shape of the globe, caused by variations in gravity (Figure 22)

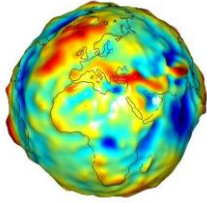


Figure 22. The earth's geoid. Irregularities, including sea levels, are due to variations in gravity. Differences in sea level can be as high as 100 metres.

Political consequences of the sea-level scare

As explained in the section *The Netherlands*, belief in dramatic sea-level rise due to man-made global warming can have serious economic-financial consequences. This is not only happening at the state level, but also influences the planning of local governments. There are good examples from New Zealand and Australia.

New Zealand. Advice for local government planning in relation to sea-level rise comes from the Ministry for the Environment (MfE). They produced a report titled "*Adapting to sea-level rise*" (last updated November 2010). It starts with the following chapters:

Observations of sea-level rise

Global average temperatures have warmed by over 0.7°C over the last 100 years, as reported in the Intergovernmental Panel on Climate Change's [Fourth Assessment Report](#) on the science of climate change. The ocean is absorbing 80 per cent of the heat added to the climate system and average ocean temperatures have increased down to a depth of 3000m. This warming is causing an expansion of ocean water which, in combination with water from the melting of land-based ice, is causing sea-levels to rise. Consequently, sea-levels in New Zealand rose by 17 centimetres last century and they have risen on average 1.8 mm/year over the last 40 years.

During 1961-1993 global average sea level has risen at an average rate of 1.8 mm per year and during 1993 – 2003 average sea level rise was approximately 3.1 mm per year. It is likely that this is not a temporary increase in the rate of sea-level rise but reflects a change to significantly higher trends.

The impacts of climate change on our coast

Much of New Zealand's urban development and infrastructure is located in coastal areas, making it vulnerable to coastal hazards such as coastal erosion, inundation and sea-level rise.

The following changes are likely to occur as a result of climate change:

- *coastal defences are overtopped by waves or high tides more often*

- *severe storms increase in intensity and storm surge levels rise*
- *some sandy beaches, like in the Manawatu, may continue to accrete, but more slowly*
- *some gravel beaches, like Haumoana in Hawke's Bay, are more likely to erode*
- *waves in Wellington could be 15 per cent higher by 2050 and 30 per cent higher by 2100*
- *areas with smaller tidal ranges, like Wellington, the Cook Strait area and the East Coast, may have bigger problems with the high tide mark exceeded more often.*

Like so many governments and government organisations, they base their advice on the IPCC assessment reports. But the *Climategate* and IPCCgate scandals have shown that this is not a wise thing to do. The statement that “*The ocean is absorbing 80 per cent of the heat added to the climate system and average ocean temperatures have increased down to a depth of 3000m.*” is simply not true. Is not based on real-world data. As revealed by the ARGO buoys system, oceans have been cooling over recent years. Those buoys measure ocean temperatures up to a depth of 2000 (not 3000) metres.

The report states that “*During 1961-1993 global average sea level has risen at an average rate of 1.8 mm per year and during 1993 – 2003 average sea level rise was approximately 3.1 mm per year. It is likely that this is not a temporary increase in the rate of sea-level rise but reflects a change to significantly higher trends.*” What they don’t tell is that the 1961-1993 figure is based on tide gauge measurements, while the higher 1993-2003 figure is from satellite measurements. As explained earlier, there is a big and still unresolved discrepancy between “on the spot” tide gauge measurements and satellite measurements.

Another “article of faith” is the belief that “*severe storms increase in intensity*”, again not supported by real-world data. Another one is that “*high tide mark are exceeded more often*”.

The MfE recommends planning based on the following projections for sea-level rise:

- For planning and decision timeframes out to 2090–2099, a base value sea-level rise of **0.5m relative to the 1980–1999** average be used **along with** an assessment of potential consequences from a range of possible higher sea-level rise values. At the very least, all assessments should consider the consequences of a mean sea-level rise of **at least 0.8m** relative to the 1980–1999 average.
- For planning and decision timeframes beyond the end of this century an additional allowance of **10mm per year** be used.

Especially the prediction of 10 mm per year beyond the end of this century is extreme. Together with the 0.8 metres by the end of 2100, this would mean a sea-level rise by 2200 of 1.8 metres. Admittedly, although extreme, it is not as extreme as the maximum predictions by the Dutch Delta Commission of 4 metres by 2200.

Such official advice has resulted in local government restricting development in coastal areas, rejecting consent for alterations or extensions to existing buildings in coastal zones, etc. This can have disastrous effects on property values. When followed slavishly without proper regard for local conditions and real-world data, this can lead to bizarre consequences. A good example in New Zealand are the directives of the Whakatane Districts Council for the coastal settlement of Ohope in the North Island. They asked an engineering consultancy to indicate on topographical maps where the coastline would be in 2060 and 2100. This resulted in two

coastal zones for which draconian restrictions to the development of sites and buildings were put in place.

However, citizens collected irrefutable evidence, such as old photographs, that the coast had moved seawards for the past 50 years. Scientists were even able to show that the coast had extended seawards for at least the past 5000 years. This extension is caused by a considerable sediment supply by the Whakatane River, provided by the erosion of the hinterland mountain range. Notwithstanding a commission looking into this evidence, the Council stuck to its draconian rules. Some citizens considered appealing against the decisions, but that would have been too expensive for them. Moreover, they would also have had to pay for the Council's legal expenses through their rates.

It is unfortunate that many local governments are basing their coastal planning on the MfE advice, dramatically affecting coastal property values.

Recently, an excellent article was published on sea-level rise in the Auckland region (Hannah et al., 2011). Their Figure 3 is a graph showing the linear sea-level trend from 1898 to 2010 (Figure 23). This trend is 1.5 ± 0.09 mm per year. They write that “The most recent analysis

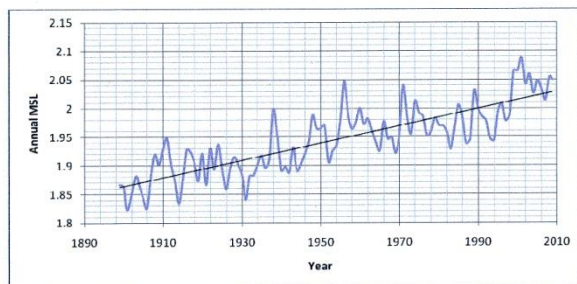


Figure 23. Linear trend of sea-level rise in the Auckland region, from 1898 to 2010. This trend is 1.5 ± 0.09 mm/yr (uncorrected for any regional vertical land motion). Please note, there is no acceleration. Figure 3 from Hannah et al, 2011.

of the Auckland data (Watson, 2010, Cole, 2010) **reveals no acceleration** in the rate of sea level rise”. Indeed, their analyses suggest a slight positive acceleration in the early-mid 20th Century **followed by a slight negative acceleration in recent years.**” [my emphases]. Making a correction for the Global Isostatic Adjustment at the Auckland tide gauge site of +0.30 mm/yr, they obtained a final figure for the sea level trend of 1.8 mm/yr. This result is very similar to global sea level rise, including that of The Netherlands (1.76 mm/yr, see Figure 8). Again, none of these show any acceleration of sea level rise.

Thus, if this trend continues, by the end of this century, sea level would have risen by a paltry 18 cm!

In their paper, Hannah et al. also discuss the effects on sea levels of the ENSO (El Niño Southern Oscillation) and the IPO (Inter-decadal Pacific Oscillation). These can have a substantial influence on sea level variations. In their final chapter they give an assessment of future sea level change. They mention the 3.1 ± 0.7 mm/yr figure from satellite observations. The discrepancy with on-the-spot tide gauge data makes that figure highly suspect (see discussion above). However, they write that “when the global altimetry data is incorporated into the picture we conclude as follows: ...”. They mention four points. Point one states: “The consistency between the rate of the GIA [Global Isostatic Adjustment] corrected sea level rise found in Auckland and the best long-term average estimates of sea level rise suggest that long-term sea level rise predictions developed by the international community, including the

IPCC, should form a starting point for a reliable estimate of the sea level rise that can be expected in the oceans around New Zealand”. Such prediction are of course pure dogma.

And further: “Best evidence suggests that during the mid-Holocene climatic optimum [the Holocene is the period after the last ice age - GJvdL] when global temperatures were warmer than at present, eustatic sea levels around the Auckland region were between 0.5 and 0.8 m higher than at present” [In their abstract they mention 0.5 to 1.0 metre higher than at present - GJvdL]. When discussing Holocene sea levels they mention that “..., eustatic sea level oscillations of up to 1 m above present levels are thought to have occurred from 5,500 to 3,000 years ago at sites in or close to the Auckland region (Gibb, 1986; Woodroffe et al. 1983 and Nichol, 2007)”. They also mention that such higher sea levels during that time were also observed on other coastlines in the Tasman Sea, Queensland and southeast Australia. The write: “It is commonly argued that the sea level oscillation was instigated by the mid-Holocene climatic optimum, a period when global temperatures are thought to have been at least 1 to 2°C (and perhaps as much as 6°C in some regions) higher than at present (Chappell, 1987)”. This chapter is accompanied by a graph of the Holocene eustatic sea level curve for New Zealand as produced by Gibb (Figure 24). This is very similar to the global curve (see Figure 17).

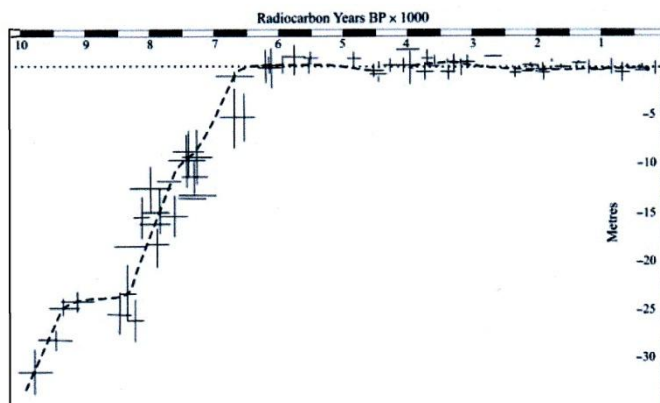


Figure 24 – Holocene eustatic sea level rise curve for New Zealand produced by Gibb (1986). Figure 1 from Hannah et al. 2011.

In the context of the IPCC dogma one has to wonder what caused these high temperatures during the mid-Holocene.

They conclude that “the most probable sea level rise by the 2090s would be in the range approximately 12-76 cm. The top end of this range is consistent with existing Ministry for the Environment (NZ) planning guidelines for coastal hazards and climate change [which is 80 cm – GJvdL] (MfE, 2008) whilst the lower bound is considerably lower than existing guidelines [which is 50 cm - GJvdL]. However, this conclusion is based on the belief that, for the upper limit, global temperatures could rise as high as during the mid-Holocene climatic optimum. But that is pure IPCC dogma.

Australia. Similar adverse effects of coastal development planning, based on unfounded beliefs in sea-level rise caused by human CO₂ emissions, have been reported from Australia. A good example comes from the State of Victoria. Their Department of Sustainability and Environment put out an *Advisory Note: How to consider a sea level rise along the Victorian Coast*. It states that “*the Victorian coastline will be impacted by sea level rise and increased frequency and severity of storm events which are likely to lead to greater coastal inundation*

and erosion. This may cause damage and loss to property and assets.” Like the New Zealand example, they base their advice on the Assessment Report of the IPCC.

The *Advisory Note* also states that “*The Victorian Coastal Council has recommended in the VCS2008 that a minimum sea-level rise of 0.8 metres by 2100 be applied for planning purposes*” and “*Currently the data input for sea level rise as part of any erosion vulnerability assessments is to use the IPCC upper projections of 0.8 metres by 2100 as a prudent measure*”. It is curious that the prediction of a 0.8 m rise is similar to the one used in New Zealand. No mention in both cases of the fact that the last (fourth) IPCC report predicts a sea-level rise by 2100 of between only 18 and 59 centimetres.

A recent court case in Victoria put these beliefs to the test. The *Victorian Civil and Administrative Tribunal* had to decide on an application for permits for residential dwellings on rural allotments outside the township of Toora. The land was low-lying and, according to the Tribunal “*at risk of inundation from sea level rise and coastal subsidence*”. The Tribunal accepted that “*there is growing evidence of sea level rises and risks of coastal inundation, even though there is uncertainty as to the magnitude of the sea-level rise*”. The Tribunal decided to refuse to grant the planning permit.

Conclusions

It is obvious from this essay that there is no evidence whatsoever that global sea levels are rising due to human CO₂ emissions. Predictions of sea-level rise by the end of this century, varying from 18 (status quo) to 600 centimetres, are based on non-validated computer models or plain scare mongering. The most important conclusion is that sea-level rise since the end of the Little Ice Age has been at a constant 1.7 to 1.8 mm per year. Contrary to the predictions of the global warming alarmists, there has been no acceleration in sea-level rise over this time. If this rise continues, which is likely, or even decreases (see Figure 21), sea-level will have risen not more than 17 to 18 cm by the end of this century.

About the author. Dr Gerrit J. van der Lingen studied geology at Utrecht University, The Netherlands, where he obtained his Ph.D. in 1960. His first job was in Surinam in South America. In 1965 he came to New Zealand to join the Sedimentology Laboratory of the NZ Geological Survey. Since 1990 he worked as a private consultant and Research Associate at the University of Canterbury. From 1991 till 2002 he was involved in paleoclimate research, studying ocean sediment cores from the Tasman Sea and Southern Ocean. He has retired from paid research, but remains active as an anthropogenic-global-warming critic, giving lectures and writing articles.

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