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The Views of Three Sea Level Specialists

Mörner NA, Wysmuller T and Parker A

Paleogeophysics and Geodynamics Department, Stockholm University, Sweden

*Corresponding author
Nils-Axel Mörner, paleogeophysics and geodynamics department, Stockholm University, Sweden; E-mail: morner@pog.nu

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Nils-Axel Mörner (190311)

It is sad when those who are NGW-proponents (i.e. opposite to AGW) do not present adequate analyses – in this case of sea level changes. Let me therefore summarize a few points with respect to my own views and papers:

- It is necessary to understand the coastal dynamics, thermal expansion, and the multiple forces behind coastal erosion and sea level changes [1-4].
- The satellite altimetry records have been "corrected" or rather "manipulated"– the real values are about +0.55 ±0.1 mm/yr [5,6].
- The subject of sea level changes includes exaggerations far beyond scientifically established "frames" [7,8].
- Global isostatic adjustment must be questioned [6].
- The gauge records must be analysed with care as they include so many different forcing components [9,10].
- In fact, there is nothing we can call "mean global sea level changes" [11-13].
- Nowhere do we see any adequate field records of "acceleration". Many erroneous records have been revealed [10].
- The sea level changes during the last 500 years are dominated by "rotational eustasy" (with minute effects from glacial eustasy and thermal effects) as documented by multiple facts in the Indian Ocean and the Pacific [12,14-17].
- A summary of sea level changes is presented by Mörner & Newman – or read: http://www.internationaljournalssrg.org/IJGGS/paper-details?Id=53

To be within the frames of realistic sea level change or in the pink field of nonsense

Changes in sea level are a hot topic, and frequently addressed in present day media. The quality of statements is another thing. Doomsday statements of a rapidly rising sea are not anchored in observational facts, however.

In truly scientific assessments we must always be **within the blue field set by the frames of realistic sea level change** (the figure below from Mörner, 2018b).

The science of sea level changes is a complicated issue and calls for deep knowledge in a number of fields given by the frames in the figure below. The author notices with sadness that people still think that there are shortcuts in sea level research, and that even an outsider can contribute with significant material – maybe, they can summarize data, but they can never advance the science of sea level changes in any meaningful way: rather mess it up.

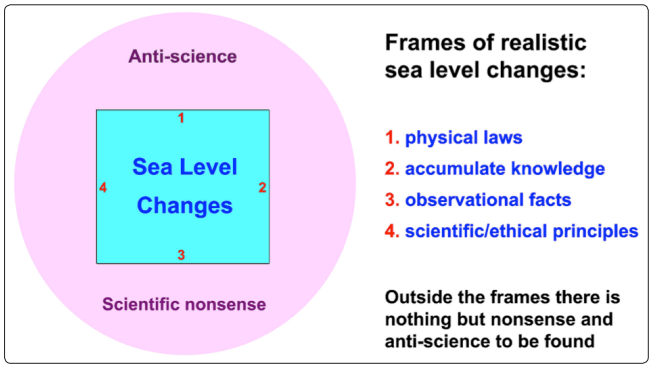

Figure 1

All what is said, shown and claimed in this paper lie well within the frames of the blue box.

Very much of what IPCC and its proponents claim lie well out side the frames of realistic sea level changes in the pink field of nonsense

Let us reserve "the pink field of nonsense" for the AGW-proponents, who have created their own frames, where factors like personal ideas, public agenda, modeling data and personal benefits are included, it seems.

The NGW-proponents must be sure that all what they claim in talking or writing lie with in the frames of realistic sea level changes. One foot in the pink field, and reality is gone.

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Thomas Wysmuller (190313)

It is clear that rise, fall, or stasis of sea level is local. It changes locally, can be measured locally, and trends locally. The most influential driver of local sea level trend happens to be local tectonics. Variations are tide and storm driven, each tending to cancel search other out, up and down, over long time periods along a linear path. The exceptions are sharp spikes resulting from earthquake driven tectonic movement that fall outside of far longer-term gradual tectonic movement. Local long term tectonics determine directional trend of tide gauge measured sea level, and these trends are straight-line linear all over the globe. Even in cases of earthquake driven tectonics, local sea-level trends are linear before and after the event.

Coastal locations that are vertically "tectonically inert," experiencing neither uplift nor subsidence, exist all over the world. They generally lie between regions that were formerly covered by ice sheets whose thickness was measured in kilometres, and less ice covered areas previously uplifted (called "fore-bulge") that are now slowly sinking. In Europe, parts of Denmark qualify as "tectonically inert," lying between the great Norwegian and Swedish uplift, and bordering what are now called the Low Countries; The Netherlands and Belgium, which continue to sink, and are still getting lower. Similarly, regions of Western Canada lying between the Alaskan uplift and eastern Pacific subsidence, can also be regarded as "tectonically inert." These areas experience an unchanging 1mm to 1.2mm rate of sea level rise when measured over the span of a century. This is been well known for over two decades – a lengthy but comprehensive review can be found in The American Almanac's 1997 article by Robert E Stevenson titled "AN OCEANOGRAPHER LOOKS AT THE NON-SCIENCE OF "GLOBAL WARMING" < http://members.tripod.com/~american_almanac/globwarm.htm >. Stephenson offers up a comprehensive review of IPCC "issues." In a section titled "Working Geophysical Scientists" Respond, Stevenson arrives at the 1mm/yr. sea level rise, referencing first-rate researchers Nils-Axel Mörner, Robert Stewart, and K.O. Emery & David Aubrey, from the Woods Hole Oceanographic Institution. Other than a missing umlaut in Mörner's name, Stevenson's review is dead accurate. More recently GPS stations have been co-located with long-term tide gauges. Those with a ten-year or greater record in tectonically inert coastal sites clearly show the 1mm to 1.2mm rate of sea level rise. In other locales, netting out uplift or subsidence where GPS is there to validate readings, 1mm to 1.2mm rates remain.

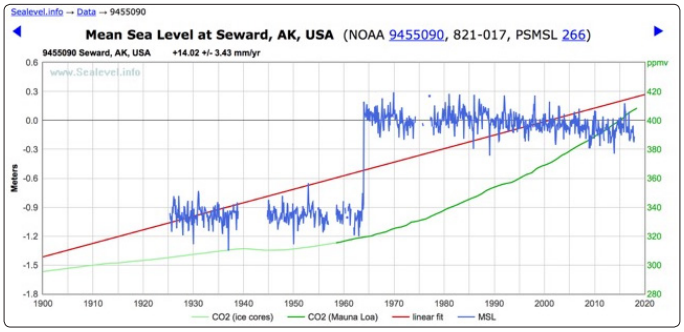

Figure 2

This is the relative sea level record (blue curve) from Seward in Alaska as presented by NOAA and PSMSL (with green line of CO_2 added by D. Burton). It spans 90 years. The red line is presented by NOAA and PSMSL as the mean long-term trend: a very rapid rise of 14.02 ±3.43 mm/yr. The truth, however, is something quite different. The area was hit by the Alaskan 1964 earthquake of magnitude 9.3. Before the earthquake, sea level remained more or less stable for 40 years. Then came the earthquake and land fell instantaneously by about 0.9 m. During the 50 years' post-earthquake period, sea level fell by about 6.0 mm/yr. What should we say about this way of handling observational facts? The "sealevel.info" database says: a rapid rise of +14.0 mm/yr. But the truth is: a sea level fall of -6.0 mm/yr.

One other issue remains, and that is the differential between Satellite reported readings and Tide Gauges. Satellite technology was introduced to hopefully provide more objective measurement of the sea level rise. However, the new satellite and radar altimeter data lacked the resolution to accurately measure sea levels down to the mm level, by an order of magnitude or two. In addition, adjustments to this poorly resolved data were also made – most notably a Glacial Isostatic Adjustment (GIA). GIA assumes that basically all previously ice covered land is rebounding from long ago glaciations, but apparently neglects the fact that oceanic basins

also deepened, allowing more room for the melt water. The GIA theory is that this rebounding is masking the "true" sea level, yet the transfer of weight from land to somewhat geologically thinner ocean basins points slightly in the opposite direction.

In their defence, reported satellite altimeter readings are not only straight-line linear over the last quarter century, but reflect changes noted in tide gauge readings too. A notable example is the anheric Australian aquifer replenishment of 2010-2011 that dropped sea levels evidenced by both tide gauge and satellite reportage. It is just the rate of increase reported that differs. Respect climate scientist, Dr. Roy Spencer posits that "Biased Water Vapour Correction" might well be responsible for the rate differential [5]. Other alternatives such as coding errors have been also been suggested as possibilities too (Wysmuller, 2018; https://youtu.be/h4tz_8Mb_1M between 20:40 & 25:10). These issues are still open and must be resolved!

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Albert Parker (190312)

There are no real "global" measurements of sea levels since 1870, or since 1993, but only products engineered to give the false impression that the carbon dioxide emission is driving both. There are however also real measurements, such as the tide gauge records, and these measurements prove the global warming narrative is false. Other indicators are for example the increasing, rather than shrinking, areas of the emerged atoll islands in the Pacific or the Indian ocean completely incompatible with the accelerating sea level rise scenarios of overwhelming thermo-steric component [1-4].

There are very few tide gauges in the world that have been recording since 1870. The most part is in North Europe, two of them are in North America. Not a single tide gauge covers the South hemisphere. However, the only certainty in sea levels is that all the long-term trend tide gauges of the world with more than 100 years of recorded data, and no sign of administrative corrections, have negligible acceleration.

The lack of any acceleration in the tide gauges' signals is very well known in the literature, despite the ongoing censorship and harassment of dissidents practiced in the last few decades.
The lack of any acceleration is shown for example by [5-52].

The average relative rate of rise at the long-term-trend world tide gauges is less than 0.5 millimeter per year. The average acceleration is a negligible few micrometers per year squared. Thus, parabolic sea level rise forecasts make plausible a relative sea level rise of 1 meter, on average, in about 2,000 years [34,41,42].

Similar doubts exist for the global temperature reconstructions, as apart from urban heat island (UHI), change of land use and other biasing effects, or, again, administrative corrections, many individual long-term-trend thermometer records show a gentle warming with no significant acceleration component. Real global measurements of air temperatures free of administrative corrections, such as the satellite lower global troposphere temperature, www.drroyspencer.com/latest-globaltemperatures/, are only available since 1979. The 1970s were the times of a wrong consensus about an imminent global cooling. The warming rate of the lower troposphere temperature since 1979 is 0.0125 °C/yr. There is no acceleration component of this warming rate.

Real global measurements of ocean temperatures are only available since 2004. These measurements suffer of administrative corrections. Outliers considered too cold were indeed removed, while outliers too hot were kept, to correct the first cooling trend shown after few years of measurements in a small warming trend earthobservatory.nasa.gov/features/OceanCooling

The measured temperatures of the world oceans 0-1,900 m from ARGO, despite the administrative corrections, show a warming of the world oceans 0-1900 m of 0.0033 °C/yr. By considering a coefficient of thermal expansion $114 \bullet 10^{-6}$ m/°C, for a 1,900 m salt water column, and neglecting the warming 1,900 m to the average ocean depth of 3,682 m, the latest sea level rise contribution from thermal expansion is, therefore, overrated to at the most 0.71 mm/yr. The contribution from melting of ice on land is difficult to be assessed with accuracy, but it is not expected to be significant. This warming rate of the oceans is perfectly consistent with the long-term-trend tide gauge result, that is relative, and not absolute sea level rise. The relative sea level is rising (or falling) because the absolute sea level is rising or falling, for thermal expansion and mass addition, or because the instrument and the land is rising or falling.

Since the end of the last little ice age in the mid-1800s, the temperatures are warming gently, and the sea levels are similarly rising slowly, both without any acceleration component. The effect of the carbon dioxide emission is hard to be detected, without having a pre-conceived agenda.

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