

## The Illusive Flooding of New York City

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### *Abstract*

*In media we often hear frightening stories of a sea in the progress of rapidly rising and flooding low-lying coasts and islands, and coastal cities like New York. This paper is devoted to a scientific evaluation of evidence-based facts versus fake news that violates facts and physical laws. It is a serious mistake to claim that global sea level is in a phase of rapid rise. Observationally based facts document a present changes in absolute (eustatic) sea level ranging between  $\pm 0.0$  and  $+1.0$  mm/yr. This poses no threats what so ever. In New York City, sea level is rising at a rate of  $+2.84$  mm/yr, which would imply an additional rise in sea level by 23.3 cm by 2100, a modest rise that can be handled without problems. There also occur statements that sea level may raise by 1 m or more by 2100. All such claims represent fake news that does not concur with observational fact and violates physical frames of realism.*

**Keywords :** *Sea level, The Battery, New York, Ice melting, Global eustasy*

## 1. Introduction

In media we often hear about an approaching flooding of New York City and other coastal areas of the world. We often see illustrations where sea has risen high up over the city or where the Statue of Liberty is hardly emerging out of the sea (Fig. 1). All this is unreal, and what we may call fake news.



Fig.1. The Statue of Liberty covered by sea. Media is full of such images, all representing fake news that seem deliberately spread to harass the public.

However, there are also papers published in scientific journals claiming a rapid rise in sea level. In this paper, I will try to straighten out the facts with respect to observational facts and related physical laws.

## Material and Methods

Last year, Garner et al. (2017) published a paper, where they claimed that New York City was in immediate danger of becoming flooded and that sea level by year 2100 might even rise as much as by 2.6 m. The predictions were based solely on model calculations and a hypothetical melting of ice in Antarctica. Real observational facts of sea level changes and physical laws of the rate of ice melting violated their claims, however (Mörner et al., 2018; Mörner, 2018a).

At The Battery in New York City, there is a tide gauge station (NOAA, 2018a), which has been in operation since 1856 (Fig. 2). The mean trend of sea level changes is a rise of +2.84 mm/yr. This rate has been kept reasonably constant for 162 years. If extrapolated to year 2100, it would imply a rise in sea level from today (2018) to 2100 by 23 cm, which would pose no real problems, and certainly not any fear of flooding (as claimed by Garner et al., 2017).

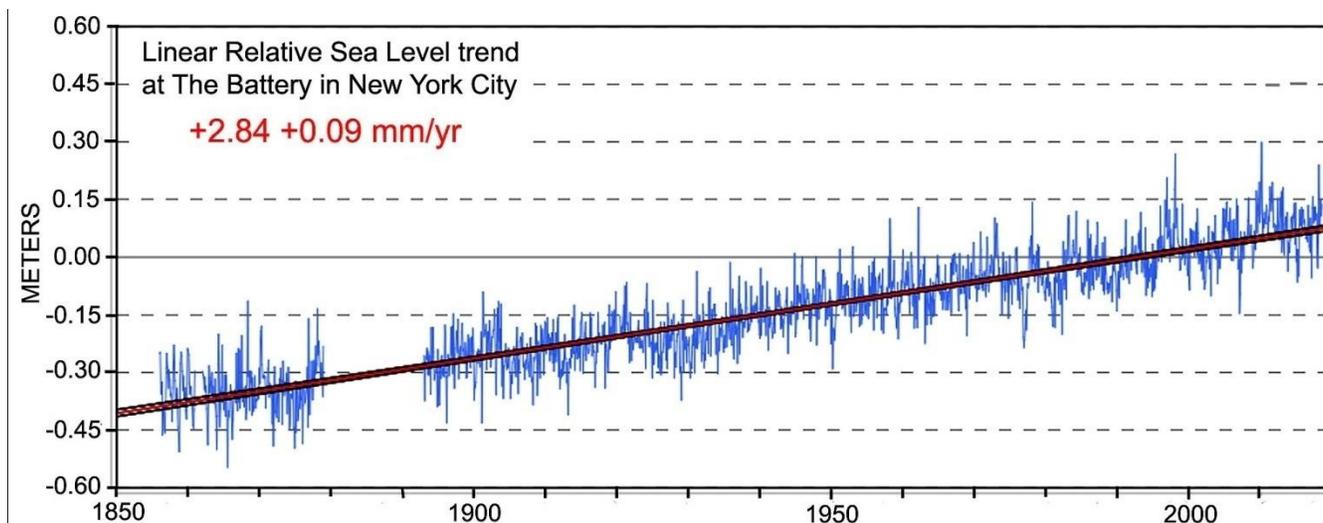


Fig. 2. The tide gauge station of The Battery in New York City recording a present mean rise of sea level of +2.84 mm/yr due to a combination of absolute (eustatic) rise in sea level and local subsidence.

On a global scale, the sea level changes differ significantly on a horizontal dimension, being of about  $\pm 0.0$  mm/yr in the Indian Ocean and the equatorial Pacific, about  $+1.0 \pm 0.1$  mm/yr in North Sea, Kattegatt, Baltic region, around  $+1.1$  mm/yr along Eastern North America and about  $+1.1$  mm/yr along Western North America (Mörner, 2014, 2016; Wymuller, 2018).

If we use these three sources of sea level data constitutes our material, their extrapolation up to year 2100 is the method (Fig. 3).

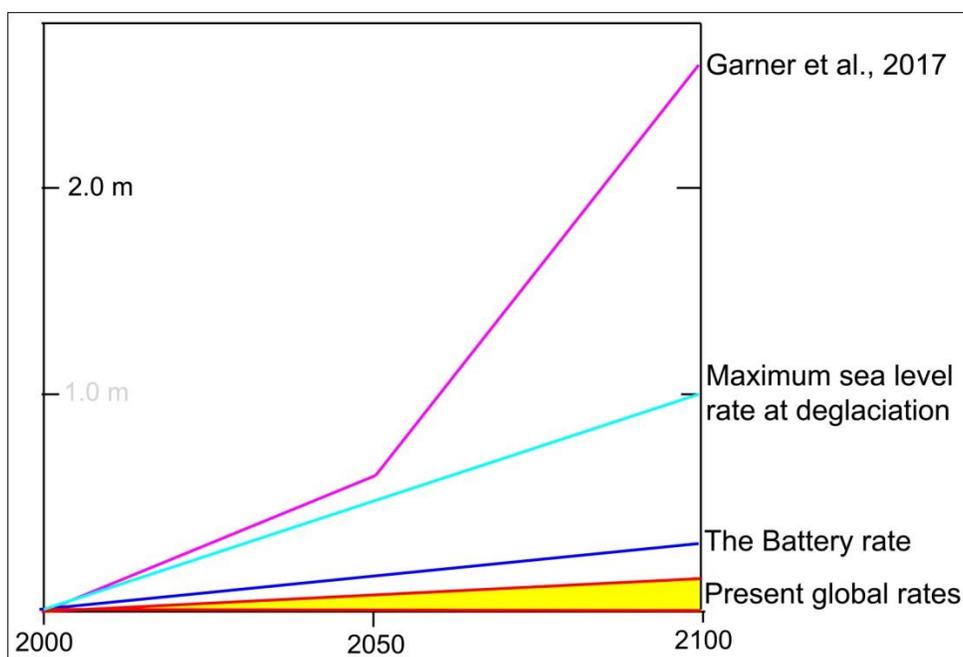


Fig. 3. Sea level changes 2000-2100 according to present global eustatic data (red), The Battery tide gauge (blue), maximum deglacial rates (turquoise) and the proposed rates by Garner et al. (pink).

## Results

The three data sets shown in Fig.3 need to be evaluated with respect to significance and trustworthiness (Mörner et al., 2018; Mörner, 2018a).

Present global rates indicate a sea level at 2100 ranging between  $\pm 0.0$  and  $+1.0 \pm 0.1$  mm/yr (Mörner, 2014, 2016). The present trends have a general latitudinal distribution (Mörner, 2015a, 2018b) with values of  $\pm 0.0$  mm/yr in the equatorial area (below  $30^\circ\text{N}$ ) and values of  $+1.0$  mm/yr in the northern hemisphere (above  $30^\circ\text{N}$ ) driven by some sort of super tidal forces (Mörner, 2018b).

An extrapolation of The Battery tide gauge in New York City gives a sea level rise at year 2100 of 28,5 cm. This rise is a combination of a eustatic sea level rise in the order of 1.1 mm/yr and a subsidence in the order of 1.75 mm/yr. A rise of 28,5 cm will generate modest practical problems, and it is the most reasonable prediction for New York at 2100.

The turquoise line in Fig. 3 gives the maximum rate of sea level rise at the most intensive phase of melting at the end of the Last Ice Age some 11,000 years ago (Mörner, 2011). This value can be used as the very ultimate rate of glacial eustatic rise in sea level. In present time, the rate of sea level rise must be significantly lower, however. At 2100, the value would be  $+1.0$  m, which can serve as an ultimate boundary for any sea level rise. All values exceeding this frame-value must be regarded as nonsense.

The curve of possible sea level rise by Garner et al. (2017) lies well above the frame-value, and must therefore be regarded as invalid (Mörner et al., 2018). From 2000 to 2050, the rate lies close to the maximum frame-rate. Between 2050 and 2100 it increases drastically into an absolutely impossible rate. The background for this acceleration is by Garner et al. proposed to be a hypothetical melting of Antarctica. Such a melting is contradicted by observational facts (Easterbrook, 2016; Mörner et al., 2018). It also violates the law of ice melting.



Fig. 4. Table decoration with ice obelisks at the Nobel 2017 Banquet in Stockholm. The ice did not melt in at least 4 hours despite the temperature, indicating that melting of ice takes time.

Melting of ice takes time, and is bounder by physical laws controlling the rate of melting at different levels of temperature input (we all made such experiments in primary school). At the Nobel Banquet in Stockholm in 2017, the head table was decorated with obelisks of ice (Fig. 4), which did not even start to melt in 4 hours. Obviously the person decorating the table was well aware of the physics of ice melting. The second part of the proposed sea level rise by Garner et al. (2017) violate these physical boundary conditions for ice melting by several orders of magnitude (Fig. 3). Still, it was accepted for publications, which sheds serious doubts on the refereeing system of PNAS (whether peer reviewed or pal reviewed). Even more so, by their refusal of even considering a comment about all the serious mistakes in a paper by a group of 11 subject-specialists (Mörner et al., 2017).

### **Applying boundary frames**

Careless dropping of unfounded values of sea level changes implies a misuse of scientific methodology (we may even say: a vulgarization). Science must always be in the centre. The “play ground” is bounded by the frames of physical laws, accumulated scientific knowledge, observational facts, and scientific and ethical principles, as illustrated in Fig. 5 (from Mörner, 2018a). What I have been stating in this paper (and underlying papers) lies well within the blue field of realistic claims (Mörner, 2004, 2007, 2010a, 2013, 2014, 2015a, 2016, 2017a). What Garner et al. (2017), the IPCC and their proponents (e.g. Marzeion & Levermann, 2014; NOAA, 2018b; Clark et al., 2018) claim lie well outside the frames of realistic data in the pink field of nonsense.

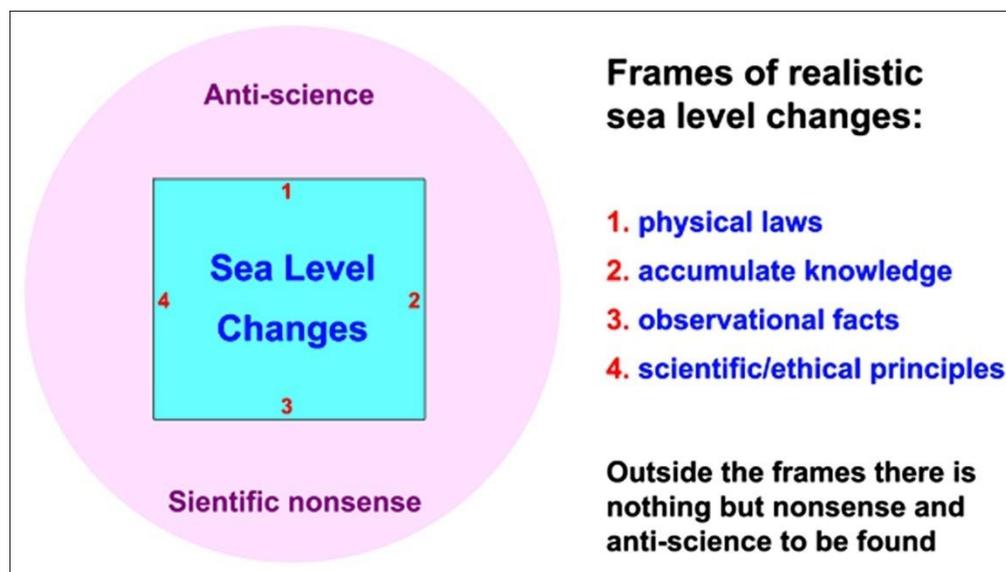


Fig. 5. Sea level changes are bounded by strict frames (1-4). Realistic values only occur within the blue field. Data falling outside are in the pink field of nonsense.

It seems obvious that we must obey the physical laws. Many sea level writers do not seem to be aware of some of those frame-setting conditions (like the time of ice melting), however.

The accumulated knowledge of sea level changes goes back by centuries (e.g. Mörner, 2019), and we see a succession of improvements and deepening of knowledge. Thanks to this, boundary 2 (Fig. 5) has moved from the old concept of equal and synchronous changes in eustatic sea level (e.g. Fairbridge, 1961), to the new concept of irregular changes in eustatic sea level both in time and space (Mörner, 1976, 1986), redistribution of oceanic water masses (Mörner, 1988) and rotational eustasy of the 60-yr cycle and the cycles of Grand Solar Maxima and Minima (Mörner, 2010b, 2016a, 2017a, 2018b). The theory of global (not just regional) isostatic adjustment of changes in loading and de-loading of continental ice caps (e.g. Clark, 1980; Peltier, 1998; Lambeck, 1998) seems to be rebutted by sea level data in the near-field area and the far-field area, and by additional records of the presence of a low-viscosity layer in the upper mantle (Mörner, 2015b), implying that sea level records and satellite altimetry data should not be “adjusted” or “calibrated” for any global isostatic factor (Mörner, 2015b, 2017b).

Observational facts or evidence-based facts are the basic fundament for all meaningful ideas of sea level changes (boundary 3 in Fig. 5). Good observational facts must remain valid with time (this is a quality criteria). The interpretations, on the other hand, may well change with time (in line with improved knowledge).

Finally, we have the 4<sup>th</sup> boundary of scientific and ethical principles. This is a frame set by fairness and honesty. We are not allowed to hide or ignore facts just because they do not agree with the concept favoured. We are not allowed “adjust”

or “correct” data in order to obtain the records preferred, especially if the reasons and values of adjustment and “correction” are not carefully specified (which far too often is not the case with published sea level data as well as temperature data). Reviewing of papers must have the quality of the paper in centre, not the personal opinion. Far too many excellent papers on sea level research are stopped by reviewers just because they have a different personal view (usually ICPP favored), and far too many low-quality papers are accepted just because they are consistent with the IPCC scenario.

Models are models and should never be allowed to overrule firm observational facts. It seems significant that Easterbrook (2016) in his book on the causes of global warming concluded: *Because of the absence of physical evidence that CO2 causes global warming, the only argument for CO2 as the cause of warming rests entirely in computer modelling.* The alternative to CO2-forcing is, of course, solar forcing or rather planetary-solar forcing (e.g. Mörner et al., 2013), which would imply that we by 2030-2050 will be in a new Grand Solar Minimum and cold climate (e.g. Landscheidt, 2003; Charátová, 2009; Mörner, 2010, 2015c; Abdussamatov, 2016). This calls for a total revision of the IPCC project (Mörner, 2018c).

## Conclusions

- All talk about a disastrous sea level rise by 2100 is nothing but scaremongering and deliberate harassment of the public by the IPCC (2013, 2018) and its media proponents.
- The Battery tide gauge provides the best value for a future rise in sea level in New York City. It is +28.5 cm by year 2100 (+23.3 cm with respect to today’s level), a value that poses no real problem and certainly not any threat of “flooding”.
- The best global mean sea level value for 2100 is +5 cm  $\pm$ 15 cm (Mörner, 2004, 2010a, 2016). The irregular distribution of water masses over the globe (Mörner, 2015a, 2017a, 2018b) implies difference ranging between  $\pm$ 0.0 and +10 cm (the yellow field in Fig. 3).
- The proposed value by Garner et al. (2017) violates the frames of realistic changes and must be discarded as physically impossible.
- It seems obvious that the observed changes in climate are driven by natural forces due to the planetary-solar interaction on the Earth and Earth-Moon system (Mörner, 2018c).

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**References**

1. Abdussamatov HJ (2016). The Little Ice Age has started. In: Easterbrook D.J., (Ed), *Evidence-based Climate Science*, second ed., Elsevier, p. 307-328, Chapter 17.
2. Charvátová I (2009). Long-Term Predictive Assessments of Solar and Geomagnetic Activities Made on the Basis of the Close Similarity between the Solar Inertial Motions in the Intervals 1840-1905 and 1980-2045. *New Astronomy*, **14**:25-30.
3. Clark JA (1980) A numerical model of worldwide sea level changes on a viscoelastic Earth. In: N-A Mörner, Ed., *Earth Rheology, Isostasy and Eustasy*, John Wiley & Sons, London, 525-534.
4. ClarkPU, Mix AC, Edy M, Levermann A, Rogelj J, Nauels A, Wrathall DJ (2018). Sea-level commitments as a gauge for climate policy. *Nature Climate Change***8**:648-659.
5. Fairbridge RW (1961). Eustatic changes in sea level. *Physics and Chemistry of the Earth***4**: 99-185.
6. Garner AJ, Mann ME, Emanuel KA, Kopp R., Lin N, Alley RB, Horton BP, De Conto RM, Donnelly, JP, Pollard, D (2017). Impact of climate change on New York City's coastal flood hazard: Increasing flood heights from the preindustrial to 2300 CE. *Proceedings of the National Academy of Sciences*, **114**(45):11861-11866.
7. IPCC (2013). *Fifth Assessment Report*. Climate Change, 2013, Cambridge University Press.
8. IPCC (2018). *Summary for Policymakers* of IPCC Special Report on Global Warming of 1.5°C approved by governments. <https://www.ipcc.ch/report/sr15> or [www.ipcc.ch](http://www.ipcc.ch)
9. Lambeck C (1998). On the choice of timescale in glacial rebound modelling: mantle viscosity estimates and the radiocarbon timescale. *Geophysical Journal International***134**:647-651.
10. Marzeion B, Levermann A (2014). Loss of cultural world heritage and current inhabited places due to sea level rise. *Environmental Research Letter***9**:934001.
11. Mörner N-A (1976). Eustasy and geoid changes, *Journal of Geology* **84**:123–151.
12. Mörner N-A (1986). The concept of eustasy: a redefinition, *Journal of Coastal Research***S1**(1):49–51.
13. Mörner N-A (1988). Terrestrial Variations within Given Energy, Mass and Momentum: Paleoclimate, Sea Level, Paleomagnetism, Differential Rotation and Geodynamics. In: FR Stephenson & AW Wolfendale, (Eds.), *Secular Solar and Geomagnetic Variations in the Last 10,000 Years*, Kluwer Acad. Press, 455–478.
14. Mörner N-A (2004). Estimating future sea level changes, *Global Planetary Change***40**:49–50.
15. Mörner N-A (2007). *The Greatest Lie Ever Told*. P&G print, 20 pp (1st ed. 2007, 2nd ed. 2009, 3rd ed. 2010).

16. Mörner N-A (2010a). Some problems in the reconstruction of mean sea level and its changes with time. *Quaternary International* **221**:3–8.
17. Mörner N-A (2010b). Solar Minima, Earth's Rotation and Little Ice Ages in the Past and in the Future. The North Atlantic-European Case. *Global Planetary Change*, **72**:282-293.
18. Mörner N-A (2011). Setting the Frames of Expected Future Sea Level Changes by Exploring Past Geological Sea Level Records. In: DJ Easterbrook, (Ed), *Evidence-Based Climate Science*, Elsevier, p. 185–196, Chapter 6.
19. Mörner N-A (2013). Sea level changes: Past records and future expectations. *Energy & Environment*. **24**:509–536.
20. Mörner N-A (2014). Deriving the eustatic component in the Kattegatt Sea. *Global Perspectives in Geography* **2**:16–21.
21. Mörner N-A (2015a). Multiple planetary influences on the Earth. In: NA Mörner, Ed, *Planetary Influence on the Sun and the Earth, and a Modern Book-Burning*, Nova Science Publishers, p. 39–49, Chapter 4.
22. Mörner N-A (2015b). Glacial isostasy: regional—not global. *International Journal of Geoscience* **6**:577–592.
23. Mörner N.-A (2015c). The approaching new grand solar minimum and little ice age climate conditions. *Natural Science* **7**:510–518.
24. Mörner N-A (2016). Sea level as observed in nature. In: DJ Easterbrook, Ed, *Evidence-based Climate Science*, second edition, Elsevier, p. 185–196, Chapter 6.
25. Mörner N-A (2017a). Our oceans—our future: New evidence-based sea level records from the Fiji Islands for the last 500 years indicating rotational eustasy and absence of a present rise in sea level. *International Journal Earth Environmental Science* **2**:137, <https://doi.org/10.15344/2456-351X/2017/137>.
26. Mörner N-A (2017b). Sea level manipulation. *International Journal of Engineering Science Invention* **6**(8):2319-2326.
27. Mörner N-A (2018a). New York City: Is the threat of sea level flooding trustworthy. Proceedings of 5th World Conference on Climate Change and Global Warming, New York, May 23-24, 2018, p. 32. DOI: 10.4172/2157-7617-C1-038
28. Mörner N-A (2018b). Planetary beat and sea level changes. The Porto Climate Conference, Sept. 7-8, 2018, Day 2, Paper 8, <https://www.portoconference2018.org/presentations--posters.html> or [https://www.researchgate.net/publication/327427281\\_Planetary\\_beat\\_and\\_sea\\_level\\_changes](https://www.researchgate.net/publication/327427281_Planetary_beat_and_sea_level_changes)
29. Mörner N-A (2018c). Anthropogenic Global Warming (AGW) or Natural Global Warming (NGW). *Voice of the Publisher*, **4**: in press.

30. Mörner N-A (2019). Development of ideas and new trends in modern sea level research: The Pre-Quaternary, Quaternary, Present, and Future. In: M Ramkumar, Ed., *Coastal Zone Management*, Elsevier, Chapter 2, in press. <https://doi.org/10.1016/B978-0-12-814350-6.00002-1>
31. Mörner N-A, Tattersall R, Solheim J-E (2013). Pattern in solar variability, their planetary origin and terrestrial impacts. *Pattern Recognition in Physics, Special Issue 1*, Preface, PRP, 1, 203-204. DOI:10.5194/prp-1-203-2013
32. Mörner N-A, Parker A, Burton D, Easterbrook D, Khandekar M, Legates DR, Matlack-Klein P, Ollier CD, Soon W, Wymuller T, Yim W (2017). Evidence-based predictions versus model-based speculations. *Letter to PNAS* – Rejected without reviewing.
33. Mörner N-A, Parker A, Easterbrook DJ, Matlack-Klein P (2018). Estimating future sea level changes, assessing coastal hazard, avoiding misguiding exaggerations, and recommending present coastal management. *International Refereed Journal of Engineering and Science (IRJES)*,7(4):19-25.
34. NOAA (2018a). [https://tidesandcurrents.noaa.gov/sltrends/sltrends\\_station.shtml?id=8518750](https://tidesandcurrents.noaa.gov/sltrends/sltrends_station.shtml?id=8518750)
35. NOAA (2018b). Is sea level rising? <https://oceanservice.noaa.gov/facts/sealevel.html>
36. Peltier WR (1998). Postglacial variations in the level of the sea: Implications for climate Dynamics and Solid-Earth Geophysics. *Reviews of Geophysics*36:603-689.
37. Wymuller T (2018). The fall of IPCC's sea level rise. *The Porto Climate Conference*, Sept. 7-8, 2018, Day2, Paper 10, <https://www.portoconference2018.org/presentations--posters.html>