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# ***Interactive comment on “Ice melt, sea level rise and superstorms: evidence from paleoclimate data, climate modeling, and modern observations that 2 °C global warming is highly dangerous” by J. Hansen et al.***

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1.- When developing any model one needs to compare it with available observation data. According to figure 29 of the paper only a portion of the data from Church & White (theirs starts in 1880, the figure in the paper in 1900) and no older data series such as the one from Jevrejeva (Jevrejeva, S., J. C. Moore, A. Grinsted, and P. L. Woodworth, "Recent global sea level acceleration started over 200 years ago?" (2008), Geophys. Res. Lett., 35) are included. The missing information from early 19th century

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is important since at that time the rate of rise of global sea level was, for decades, of the same magnitude as today, while human activity could not have had an influence. This disproves, falsifies or refutes the major affirmation made in the paper related to "CO<sub>2</sub> as climate control knob". see figure 1, in which satellite data are from Combined TOPEX/Poseidon, Jason-1 and Jason-2/OSTM

2. Also the rate of rise, shown in Figure 2 calculated from the running averages over 13 months, oscillates with various periods. Overall, since 1750 no statistically significant acceleration is observed (correlation coefficient R square = 0.0555 in Jevrejeva dataset).

2.- According to the current mass loss (over the past 25 years) of Greenland and Antarctica ice sheets, and if continued at the same rate, the total melting of Greenland would be over in 10'000 years and of Antarctica in 380'000 years. This melting contributes currently to rise the global sea level by approx 0,9 mm per year or 90 mm per century. (Surveys in Geophysics 201132:9137 DOI: 10.1007/s10712-011-9137-z Ice Sheets and Sea Level: Thinking Outside the Box, Michiel R. Van den Broeke et al.)

Thus the cause for the sea level rise at a current rate of approx. 3-4 mm/a oscillating between -4 and +11 mm/a (satellite data since 1993, with periods of 4-5 years) cannot be attributed to ice melting.

3.- The paper describes a possibility of spectacular and rapid sea level rise, 5 to 9 m until end of this century due to loss of ice sheet, implying a sudden acceleration from 0.9 mm/a to 60-100 mm/a (if starting today, even more if it materializes later). This implies a heat transfer from the atmosphere to the ice sheet (number of days with T>0 °C) that should dramatically change, which is highly improbable even if the global temperature anomaly gets to +2 K or more. This required heat transfer phenomenon is not discussed in the paper.

4.- To speak of a possibility does not imply that the event is probable. The paper makes no attempt to evaluate the probability of occurrence, neither the [high] probability that

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the models used might be grossly wrong (see point 3, missing heat flux).

4.- Is it a form of "newspeak" to use the term "experiment" when running simulation calculations of finely tuned models using more or less discussable scenarios? Should now experimental scientists describe their practical work "physical simulation" ?

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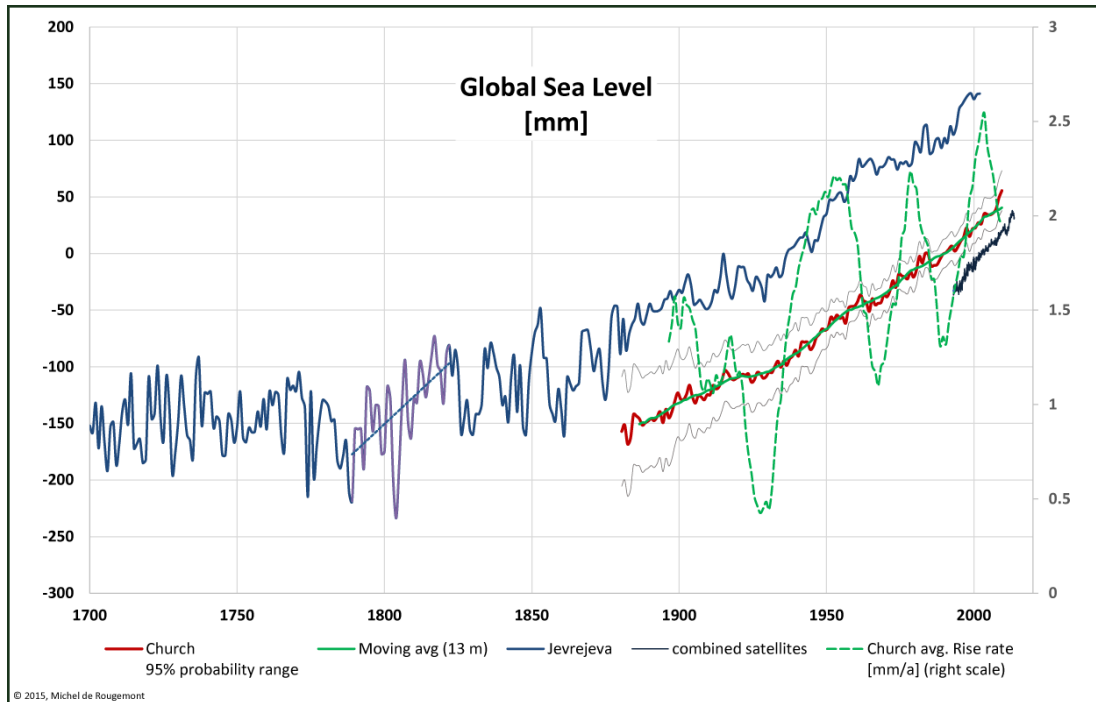
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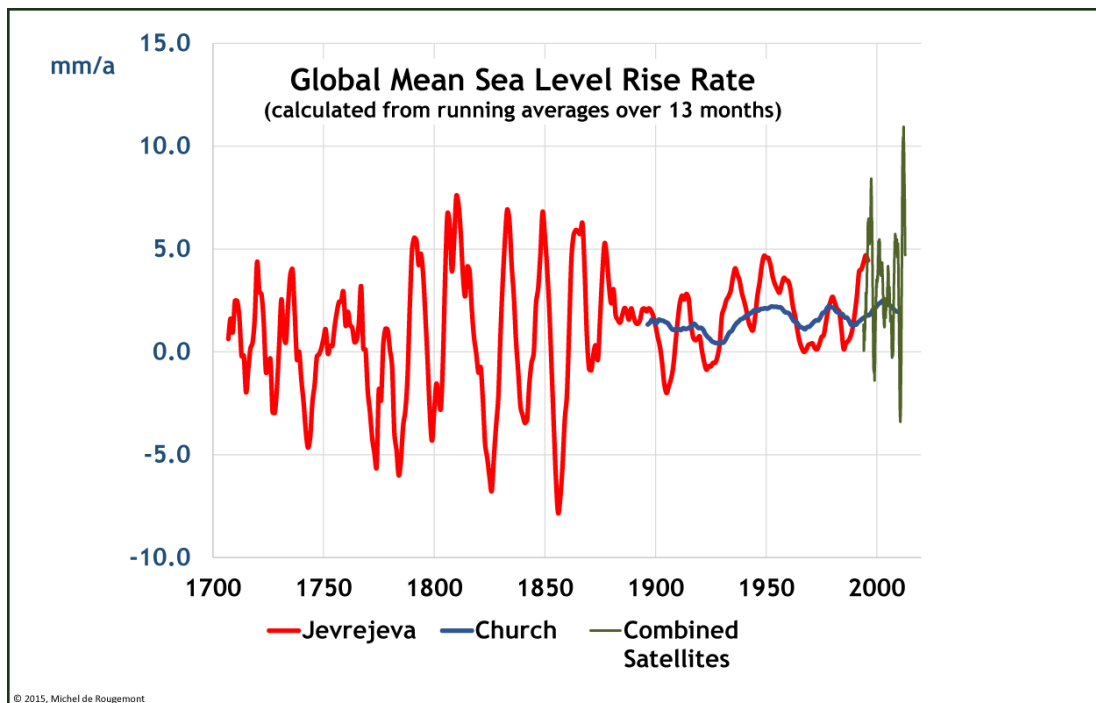
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**Fig. 1.** Global mean sea level, various sources

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**Fig. 2.** Global mean sea level annual rise rate

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