

Response to RC C5209 (David Archer, Referee) and RC C6089 (Peter Thorne, Referee)

RC C5209: ‘Very important but strenuous paper’, David Archer, 27 Jul 2015

RC C 6089: ‘Review of “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 and colleagues’, Peter Thorne, 20 Aug 2015

We thank the referees for their reviews, which will be very helpful for production of the final paper, and the journal editors for their success in obtaining reviews from appropriate referees willing to take on such a long ‘strenuous’ paper – the referees’ having exceptional qualifications including recognized global leadership in carbon cycle and climate research and IPCC (Intergovernmental Panel on Climate Change) Lead Authorship.

In view of issues that have been raised publicly and in the extensive ACPD (Atmospheric Chemistry and Physics Discussion) review process, it is appropriate, before outlining the changes that will be made in the revised paper, to provide some remarks about those issues. These remarks are based in large part on experience of the lead author (JEH) over the past several decades, so I make them here in first person.

Contrary to the impression that may be obtained from some media, including blogs, I find our experience with the ACPD publication method to be exceptionally effective. The innovative aspect of ACPD (and a few other journals) is the open publication of the Discussion version of the paper, which is used to generate open public comments as well as official referee assessment. This Discussion version of the paper is published; it is freely and permanently available.

Senior editors who devised and implemented this approach deserve much credit. I understand that they encourage but do not require referees to reveal their identity. Confidential reviews may be appropriate in rare cases, but most scientists are aware of and deplore abuses of confidential reviews. The referees in the present case deserve credit for revealing their identities, as it makes their reviews more meaningful and effective in achieving the purpose of scientific reviews.

A widespread criticism of this specific paper has been the publicity that the Discussion version of the paper received. The criticism came especially from a newspaper reporter, but also from many scientists and one of the referees. Thus almost all media reporting on the paper made reference to these criticisms. The editors were more agnostic (see EC C6973: ‘Background information regarding the review process of the paper by J. Hansen et al’, Frank Dentener, 18 Sep 2015). I was responsible for drawing media attention to the Discussion paper. If I did it over again, I would do the same. The reason for wanting publicity is the relevance of the paper’s conclusions to ongoing climate discussions, specifically the Paris summit this December, and the urgency of achieving effective policy changes needed to avert undesirable consequences of climate change that would especially affect young people and future generations.

The publicity was successful in drawing attention to issues that the paper highlights, notably the threat of large sea level rise. Criticism that it got too much attention seems clearly wrong. Would it have been better to keep the process and issues hidden from the public while they were being worked out? The only argument presented for that conclusion is that the publicity resulted

in some irrational (bad science) comments from climate change “deniers”. Is there harm in that? On the contrary, it shows a disinterested judge or observer that all opinions are given a hearing. Yes, a few may be of low scientific quality and thus a nuisance, but the public probably wants all to be heard. When an editor cuts off such discussion after it becomes an excessive nuisance, a judge can readily verify that fact and affirm that all parties had a fair opportunity.

As for the interactive process, technical scientific reviews, and many open comments, I found the transparency to be exhilarating and the added opportunity for communication to be very helpful. Based on all comments, it is obvious that the paper needs to be easier for the reader to follow. Useful suggestions to achieve that were provided by the referees but also in the open Comments. The abstract can be a better summary. There needs to be an early discussion of the paper’s organization, and a conclusion that makes the implications clearer. These improvements are possible, while making the paper somewhat shorter, because the ACPD publication procedure allows many details to be handled in response to Comments and in the open review process.

There is a more subtle, yet important, merit in the open ACPD review process. In our paper we are questioning “group-think” conclusions. I am acutely aware of the difficulty of this, because of an analogous experience a few decades ago. I was the head of a small research group that could only afford a used computer, which we could not update. The computing capacity was orders of magnitude less than that at large centers, and electronic connections allowing users at remote places to use computers at the large modeling centers did not exist. The result was that so-called “state-of-the-art” models, with high resolution and bells and whistles, were favored, sometimes detracting from concern about identifying the most essential physics. Most reviewers were associated with such groups and tended to think similarly. Even though the scientists were capable and well-intentioned, the group-think made it difficult for someone with a different perspective to be recognized and thus to be taken seriously by the external community. These difficulties could be overcome, but the slow, anonymous peer-review and publication processes, with limited options for supplementary information and commentary, meant that it took years, years that we cannot afford in the climate change issue today.

My present concern about group-think is not a criticism of IPCC (Intergovernmental Panel on Climate Change), even though I strongly disagree with a very tiny subset of IPCC participants who have controlled the message about the threat of sea level change. IPCC provides a crucial service via generous unpaid efforts of volunteers including many of the best relevant scientists in the world, who work for public well-being under intense scrutiny and often unfair criticism. Most of the IPCC scientists, at least those that I have had contact with, share my concern that the presentation of IPCC reports has led to under-appreciation of the threat of sea level rise. I believe that the perspective we bring to the problem is welcomed by almost all IPCC scientists, but we need to confront a small reticent subset. This task becomes feasible, in a more timely way, because of the open interactive public ACPD review process, including Comments, Reviews and Responses, all publicly available.

For the moment, I comment here on only a few of the matters raised by the referees.

Contrary to the suggestion of the 2nd referee, the conclusions of the paper are not developed via a causal chain (a leads to b which leads to c, etc.), where a flaw in any one would insubstantiate all conclusions. On the contrary, we use three approaches based on paleoclimate data, modeling, and modern observations. These three independently point toward similar interpretation. Each by itself would require stronger caveats. However, the fact that they all point to a common interpretation makes the conclusions more certain and powerful.

We will make some changes that shorten the paper as well as make it clearer. The paleo repetitions were intentional and in some sense necessary. For decades many of the more interesting interpretations of paleo facts have been ad hoc and as more data became available interpretations fell apart like a house of cards. This is a reason that we repeated discussion of several paleo climate changes, to show that the same interpretation worked time and time again, increasing confidence that the interpretation was correct. However, one of the valuable things about the ACPD → ACP method is that the ACPD paper is now archived. We can now discuss fewer examples, and note that the interpretation works in other paleo events.

The first reviewer is right that our discussion of pathways of carbon into the deep ocean is not complete and we do not need to include detailed discussion of the mechanisms of carbon uptake into the deep ocean, which are still uncertain. This part of the story can be shorter and clearer.

The second reviewer represents IPCC positions, many of which we disagree with. We will respond to these matters point by point. We also strongly disagree with the contention that pointing out the policy implications of our results is “out of scope”. On the contrary, when scientific results have policy implications, we believe it is an obligation of climate scientists to draw attention to those implications. Otherwise, as history has shown, we run the risk of laypeople drawing conclusions about this complex issue that are erroneous, ill-informed, misleading and counterproductive. Do we expect policymakers to read scientific journals and figure it out? Certainly a scientist is free to avoid or obfuscate the policy implications if they so choose, but they cannot impose such a constraint on other scientists.