

Interactive comment on “Climate engineering by mimicking the natural dust climate control: the Iron Salt Aerosols method” by Franz Dietrich Oeste et al.

Anonymous Referee #2

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This is an interesting paper with some interesting ideas, but which fails to provide sufficient evidence that this is a good approach and has many errors.

The english is not adequate in the paper. The organization is poor (most of the conclusions talk about the cost-effectiveness of this solution, instead of pulling ideas together from the paper).

The paper is full of details, but it gives the impression that the authors don't really understand what they are saying, as there are not always the right papers cited, and the latest ideas included in the paper, which could be a consequence of the great breadth discussed in the paper. The paper does not convince that the feedbacks described will be large, just that they might exist. There are many other impacts NOT discussed that

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could offset the impacts suggested in the paper.

I am only able to review limited portions of the paper: particularly the atmospheric aerosol and impact on land and ocean biogeochemistry, and I found these parts of the paper to be incomplete to the point of wrong.

In the introduction, the paper does a poor job describing the state of our knowledge of iron in the oceans. While I agree that we know less about iron than carbon this sentence is a problem: "meanwhile the iron biogeochemical cycle is only described in the ocean by few scientific publications (Boyd and Ellwood, 2010;Mahowald et al., 2005; Mahowald et al., 2009).:" Please correct these citations: Mahowald et la., 2005 and 2009 focus on the atmospheric iron cycle. For example, work by Ken Johnson, Moore et al., 2013 or Sigman et al., 2010 on the importance of iron in the oceans on ocean biogeochemistry in different time periods would be appropriate papers to cite here.

People have rejected the idea of iron fertilization of the oceans for many reasons, and this is not well described in the paper. Are you arguing we should go back and debate this? You are not really discussing the state of knowledge of this debate, or countering it, but rather just ignoring the debate here?

The authors do not seem to realize that if you add iron to aerosols, they will tend to absorb more incoming radiation, and thus warm the planet: so this is the opposite effect you want. Check Sokolik and Toon, 1999.

None of the section 2.1-2.4 convince me that these effects will be significant. I lost a bit of ability to understand after that, but it seems like many of these feedbacks are actually very long term, and not very helpful in the next 30-300 years (ie. Section 4.3: minimizing ch4 emissions from sediment and bedrock: is ch4 release from bedrock really a problem we have right now, or on geologic time scales?) The whole section 4.4 seems totally off base: it is not thought that the iron inputs from Amazon are important but rather the P inputs, and they only operate on geologic time scales.

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I would recommend to the authors to focus one paper on each section, not just on describing possible mechanisms, but rather on calculating the impacts of ISA for each mechanism, and making sure the impacts are significant. Do a good job, get each idea published, and then you can pull them together later.

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