

Interactive comment on “Contribution of riverine nutrients to the silicon biogeochemistry of the global ocean – a model study” by C. Y. Bernard et al.

A.F. Bouwman (Referee)

lex.bouwman@pbl.nl

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This is an interesting study and I have no major comments except for two: the authors combine pre-industrial (or is it pre-dam) river DSi export with current N, P and C export, current climate. To show the importance of silicon in ocean biogeochemistry this may be all-right. However, some discussion could be added on the fact that all nutrients have changed. DSi has probably decreased, and N and P have increased, but with large variability of the changes in molar C:N:P:Si ratios. In addition, constant fluxes were used, which is another simplification. So the role of Si may be rather hypothetical.

The authors discuss the recycling of opal in comparison with N and P. Does this mean

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that opal recycling is slower than than of N and P, or N and P in organic matter? I wonder what this all means, since according to Treguer silicon is recycled many times before it is deposited on the ocean floor. How do the model results compare with this, and how is this in comparison with N and P?

Minor comments and questions are listed below:

The term opal needs to be defined.

When mentioning the redfield ratios, please mention it is molar ratios. Page 4921, line 1-3: there seems to be a repetition here.

Page 4922, line 24: I guess fisheries also has a major impact on jellyfish biomass (see the Purcell et al reference).

In the methods section the model is well described. However, the some parts need further explanation of at least a reference to support the choices made. For example, page 4926, line 1: why is 0.5 DSI the upper limit? Also equations 4, 5 and 6 need more explanation and references.

The reference Kroeze and Seitzinger was based on the knowledge then available. Since then other projections have been made which could be more realistic, especially for the period 1990 (the base year of Kroeze) till 2005 (for which we have measurements). For example, the work of Seitzinger et al in GBC (2010) gives a more recent projection which is much lower.

In the discussion section some statements are repeated, for example page 4935 line 9-11 is also on page 4937; page 4937 lines 14-18 also seem to have the same statement twice. Page 4933, line 23 is also on page 4935. My suggestion is to shorten the discussion section somewhat, by avoiding duplications and by combining some paragraphs.

Page 4933, line 24: river inputs of silica do have a stronger effect: stronger than what? I do understand what is mean, but the sentence needs rephrasing.

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