

Interactive comment on “Global spatial distribution of natural riverine silica inputs to the coastal zone” by H. H. Dürr et al.

Anonymous Referee #3

Received and published: 14 May 2009

This is a very well written and documented manuscript which adds new synthetic information on the continental side and the land-to-ocean connection in the global silicon cycle. Using a regional approach, based on major catchments areas discrimination and global databases, the authors bring new data on the transfer of silica to the major areas of the global ocean. They also analyse very accurately the possible mechanisms responsible for regional differences in direct inputs as well as yields between the different types of catchments areas. This approach enables to identify the major gaps and tracks for future research for improving the global silicon cycle. I strongly recommend the publication of this manuscript by Biogeosciences after the minor remarks listed below are considered, mainly dealing with the clarity of some sections.

General: when talking about concentrations, the authors most often use the term "con-

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper



tents". It would be better to refer always to the same term and I suggest using "concentrations" which is unambiguous.

p. 1347, line 16: the reference to Conley (1998) does not refer typically to the soda extraction but to an "inter-laboratory" comparison. The original reference for the method is "Paasche (1973) modified by Nelson et al. (1989)" Paasche E. 1973. Silicon and the ecology of marine plankton diatoms. I. *Thalassiosira pseudonana* (*Cyclotella nana*) grown in a chemostat with silicate as the limiting nutrient. *Marine Biology* 19: 117-126. Nelson D.M., Smith Jr. W.O., Muench R.D., Gordon L.I., Sullivan C.W., and Husby D.M. 1989. Particulate matter and nutrient distribution in the ice edge zone of the Weddell Sea: relationship to hydrography during late summer. *Deep-Sea Research* 36: 191-209.

p. 1350, line 28: even though the PRISRI database is mentioned in Meybeck (2003), a short description including the location of the database could be useful for the reader.

p. 1352, last sentence of the first paragraph. An additional sentence should be useful to state how robust is the affirmation of a bed load representing 10% of sediment transport.

p. 1353, line 13: the explanation for the abbreviation M should come earlier in the text in the abstract.

p. 1356, line 26: the reference to Table 1 for the limnic index is incorrect; there is no value of this index in the mentioned table. Probably the authors want to refer to Table 6 (?).

p. 1358, line 21: refer to Table 3 at the end of the first sentence, rather than at the end of the paragraph on next page.

p. 1359, line 24: replace "... silica contents (concentrations) ..." by "... silica concentrations ..." (see my general comment above).

p. 1361, line 2: "As a rough approximation, we estimate that the additional uncertainty

BGD

6, S1021–S1024, 2009

Interactive
Comment

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper



on extrapolated yields, using our method, yields in a total error probably not much greater than 30% and probably less in well-documented areas." This affirmation is not scientifically correct and the authors might need to give little information about their hypotheses leading to this approximation. This also holds true for the following sentence "The hypothesis of constant P_{Si} content in river particulates induces an uncertainty of +15%, probably lower than the uncertainty of particulate matter fluxes." Definitely more information is needed on how these estimates are obtained.

p. 1361, line 25: give the exact references within the special issue of GBC mentioned.

p. 1366, line 27: as diatoms are not the sole organisms depositing biogenic silica, I suggest replacing "... by diatoms ..." by "... by silicifying organisms such as diatoms ...".

p. 1370, line 26: I have difficulties understanding the sentence "The net riverine inputs to the open Pacific, even without considering the estuarine and shelf retention, could therefore be lowered by half of the gross river inputs." There is need for explanation.

p. 1372, line 13: I would not suggest any probable range of P_{Si} dissolution as the amount of available data is so scarce and, so, I suggest removing "... leading to a suggested probable range of 1% to 5% of dust fallout P_{Si}".

p. 1373, line 8: replace "... (classes 1, 3, and 15% of 4, 5, 9-12 ...)" by "... (100% of classes 1, 3, and 15% of classes 4, 5, 9-12 ...)".

p. 1374, line 11: replace "This retention has already been attributed to the decrease of silica in some large river basins ..." by "This retention has already been suggested as responsible for the decrease of silica in some large river basins ...".

p. 1391, for clarity of the table, please add a blank line in between the D_{Si} and P_{Si} related data.

p. 1398, inside fig. 3, D_{Si} and P_{Si} should be replaced respectively by YD_{Si} and YP_{Si}.

[Full Screen / Esc](#)[Printer-friendly Version](#)[Interactive Discussion](#)[Discussion Paper](#)

Interactive
Comment

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper

