Biogeosciences Discuss., 11, C3668–C3670, 2014
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Biogeosciences
Discussions
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Interactive comment on "Quantification of iron-rich volcanogenic dust emissions and deposition over ocean from Icelandic dust sources" *by* O. Arnalds et al.

Anonymous Referee #1

Received and published: 22 July 2014

GENERAL COMMENTS

This paper addresses the interesting question of how much iron is carried out over the ocean from Iceland with dust storms. To quantify the amount the authors use two methods, both of which are extrapolations with fairly high uncertainty. The main drawback is the lack of description of what is done; there is a lot of discussion about previous work, but when it comes to, for example, the concentration in dust storms it seems that only one of the tables has some description of what was done and in it there are only references to papers on which the calculations are based. There is also little/no description of the impact of recent eruptions.

SPECIFIC COMMENTS

Better description of how and which calculations were done.

Some error estimates.

For instance difference between studied events, other estimates, ...

Is the visibility during a dust storm in the Sahara the same as in Iceland for a given concentration of particulate matter?

What were the numerical calculations for dust storms?

TECHNICAL CORRECTIONS

Abstract. Mention river discharge when talking about iron to ocean.

Methods. Not easy to follow what was actually done.

P5946, l4. "(iii) the representativeness of the visibility observations are estimated from MODIS satellite images." - What does this mean. For how many events are there MODIS images available? - How is the "representativeness" estimated? - Is the concentration of dust storms based on the 4 events of Dyngjusandur?

l25. What was used for an average duration of dust storm in the calculations? - Which are occurring 135 times a year?

l26. "The calculated amount ..." - How calculated?

P5947, l4. "... main dry winds from each major dust source, ..." - What are "main dry winds"? - "This deposition..." to "The deposition ..."

l15. "The map is presented in Fig. 3." - cite figure in text.

l22. Where does the log distribution for sedimentation come from? How does that correspond to theory?

l25. Extra "of" after "... major ..."

P5948, l14. What is the error estimate for the number of dust storms, 135.

l20. How is the split between major, medium and minor dust storms decided? What is the emission during major?

l23. Take out "major" after "Dyngjusandur".

P5949, l22-23. Is a factor of 3 comparable?

Section 4.2 is quite unclear.

Discussion. Is it likely that Icelandic sources are 21% of North African dust?

P5953, l27. How old is the material being blown out to sea? Has it been washed through a glacier, and what would the solubility of the iron be then?

Fig. 1. How are "major" plume areas defined?

Fig. 3. Very nice looking image, but would be good to know a little more about how generated.

Interactive comment on Biogeosciences Discuss., 11, 5941, 2014.