Atmos. Chem. Phys. Discuss.,
doi:10.5194/acp-2016-557-RC1, 2016

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Mineral nutrients in Saharan dust and their potential impact on Amazon rainforest ecology" *by* Joana A. Rizzolo et al.

Anonymous Referee #1

Received and published: 8 September 2016

General Comments:

Rizzolo et al, address an actual topic in their study which is to quantify and assess the potential impact of mineral dust on the biogeochemistry of the Amazonian basin. Although this is a very important aspect as they correctly present it, the main topic Fe (II)/Fe (III) availability is not well described. In some aspect they are too brief such that their final results cannot be appreciated. However, it is an important topic that meets the requirements of publication at ACP. I would recommend that major revisions are done prior to consideration of a possible publication.

There is not enough evidence that the high soluble content they observe is due to Saharan dust. They need to show some correlations which lead to such arguments.

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Simply because the air mass originates from Africa does not imply all chemical components in the aerosol are from the Saharan Desert. This aspect has to be clarified and the identification of the sources that could lead to different soluble iron concentrations in this region has to be discussed. There should be more clarity on the experimental approach on how they measured the soluble metals.

Specific Comments:

How long did the samples stay in the nitric acid flask and were they any measurements done to ensure that the transition from Fe (II) to Fe (III) or vice versa did not occur during the time frame of storage?

Where the extracts filtered? The experimental part is too brief to follow the obtained results.

What were the concentrations of the total fractions of each of the elements? How could the fungi be optimally identified using a light microscope? Was there an algorithm that matched the shapes of the fungi to given types of fungi in a library or was it simply done by intuition?

How good could the mineral dust adsorption in the black carbon signal be isolated since it's mentioned that mineral dust could also produce similar adsorption signals?

The soluble Fe concentration seems to be high for pure Saharan dust. It is known that in lower pH the solubility can be as high as 10% or more. However, it would be helpful to explain in detail how the samples were prepared.

How did you differentiate the sources of the soluble Fe? As mention in the literature comparisons, Fe has other sources, such as combustion, industrial emissions. Iron from these sources in some cases has been found to be more soluble than in Saharan dust. It is unclear from your arguments, why you allocate the soluble iron to be originating from Saharan dust. Long range transport is a mixture of different air masses and these air masses may have different chemical compositions. Thus a more detailed

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tracer analysis or correlation of an intrinsic dust element such as Al or Ti would be helpful to identify how significant the Saharan dust contributed to the obtained soluble iron concentrations.

What could be the likely reason for the high wind and high Fe (III) correlation observed above the canopy?

How good did the soluble content correlate with the BC content and total mass concentration?

Interactive comment on Atmos. Chem. Phys. Discuss., doi:10.5194/acp-2016-557, 2016.

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