

## ***Interactive comment on “Particle size traces modern Saharan dust transport and deposition across the equatorial North Atlantic” by Michèle van der Does et al.***

**Michèle van der Does et al.**

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Dear Dr. Schwarz,

Thank you for the time you spent assessing the manuscript. We would also like to thank the three anonymous reviewers for their comments. We considered every comment carefully and made changes to the revised manuscript accordingly.

We have found similar comments on the manuscript from different reviewers, and we are of the understanding that this is mainly due to the different “languages” researchers from different disciplines speak. One of the reviewers’ main concerns deals with the representation of the lithogenic particles found in the sediment traps as aeolian dust.

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As can be seen in the answers to the comments of the reviewers below, there are many reasons for this assumption. First, the sediment traps are located far away from any other possible source, e.g. riverine sediments, resuspension from shelf or bottom sediments, etc. Second, we compared grain size of the lithogenic particles collected by the sediment traps to dust collected from the atmosphere, directly above the sediment traps, which showed to be almost identical. Third, when comparing the upper (1200 m) and lower (3500 m) sediment traps from the same station, there are many indications of the nearly vertical settling of particles, indicating their atmospheric origin. And finally, when considering the large amounts of Saharan dust that are transported across the Atlantic Ocean every year, about 182 Tg (Yu et al., 2015), it will be fair to assume this will be a large contribution to the particle flux in the sediment traps.

Another question raised by the reviewers concerns the particle size of the dust we find in the traps, and if this is affected by some sort of processing or aggregation of particles. Aggregation of particles during or after deposition is possible, however all aggregates are destroyed by the three-step pretreatment processes to remove organic material in the sediments prior to grain-size analysis, including aggregates of dust particles that already existed during transportation in the atmosphere. Grain-size analysis is performed on the lithogenic fraction of the samples only. Therefore, the particle-size distributions of the dust measured in this study is at the very least an underestimation of the size of dust particles and aggregates as transported across the Atlantic Ocean.

With this paper we would like to bring the different disciplines together, which is also why we have chosen this journal for publishing. We greatly value the reviewers’ comments and hope we have answered them adequately. Please find attached (in the supplement) the response to the reviewers’ comments, including the revised manuscript with tracked-changes with respect to the original manuscript. For reviewer 1, the changes were made in red, for reviewer 2 in green, and for reviewer 3 in blue.

Please also note the supplement to this comment:

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<http://www.atmos-chem-phys-discuss.net/acp-2016-344/acp-2016-344-AC2-supplement.pdf>

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Interactive comment on Atmos. Chem. Phys. Discuss., doi:10.5194/acp-2016-344, 2016.