Interactive comment on "An On-line Monitor of the Oxidative Capacity of Aerosols (o-MOCA)" by Arantzazu Eiguren-Fernandez et al.

Anonymous Referee #1

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General comments

This manuscript brings a very useful (and expected!) device for atmospheric commu-nity and there is no doubt with the relevance of the subject matter to the journal AMT. The manuscript is written in a very clear way and the methodology addresses all the expected points with regards to protocol, step of validation etc.. The introduction is well presented and points out with clarity the aims of the study. Authors have done a very good job and I would recommend for publication it after some minor revisions :

"specific comments"

*L 37: "the mechanisms that lead to those effects are not understood" => to be adjusted the mechanisms that lead to those effects are not completely understood ", since a consensus exists concerning one key parameter that drives the PM toxicity as you

mentioned it after : it is attributed to their carrying or inducing reactive oxygen species in the lung, at the origin of oxidative stress leading to biological effects.

The sentence has been changed.

*L67 "Additionally, this assay has the ability distinguish between the contribution of metals and of organics to the overall oxidative capacity". = > a ref is needed. As a user and in charge of OP assays development in my lab, I found that OP AA has a greater ability to distinguish metals from organic contribution to the overall OP that DTT.

A short explanation of the methods and references have been added.

Additionally, this approach has the ability to distinguish between the contribution of metals and of organics to the overall oxidative capacity by the selective removal of metal associated activity before conducting the assay. With the addition of a metal chelator to the solution we eliminate the metal associated activity to obtain the oxidative activity due to organics alone. Thus, the contribution of metals to the overall oxidative potential of the sample is obtained from the difference in the DTT activities without and with the chelator (Eiguren-Fernandez et al., 2010;Eiguren-Fernandez et al., 2015).

*L 68 I would suggest to complete with more inflammatory markers: The accep-tance of this assay is based on several studies that showed a high correlation be-tween the DTT assay and more specific biological markers of oxidative stress such as Heme-oxygenase 1 (HO-1) and inflammatory markers such as interleukins (Il-6, IL-8) (Li et al., 2003;Steenhof et al., 2011;Jiang et al., 2016) and GM-CSF (Granulocyte macrophage colony-stimulating factor) (Hussain et al. 2009; Uzu et al. 2011).

The authors have added these references.

Hussain S, Boland S, Baeza-Squiban A, Hamel R, Thomassen LCJ, Martens JA, et al. 2009. Oxidative stress and proinflammatory effects of carbon black and titanium diox-ide nanoparticles: Role of particle surface area and internalized amount. Toxicology 260:142-149.

Uzu G, Sauvain J-J, Baeza-Squiban A, Riediker M, Sanchez Sandoval Hohl M, Val S, et al. 2011. In vitro assessment of the pulmonary toxicity and gastric availability of lead-rich particles from a lead recycling plant. Environmental Science & Technology 45:7888-7895.

*l 146: I would recommend to do a pre-treatment of Phosphate buffer with chelex before mixing it with DTT , it's allow a better LOD.

Thanks for the recommendation. Authors did used Chelex treated water when preparing the phosphate buffer to minimize noise signal. This point has been added to the information of the buffer.

"DTT solution (100 nmol) in phosphate buffer (0.1 M, pH 7.4, Chelex treated)"

*L 225 "fixed wavelength UV-VIS detector." Which wavelength exactly? 412 nm? Need to be specified.

The wavelength information (412 nm) has been added.

* paragraph 3.2.4. S : very good idea, and absolutely compulsory to run an OP online device if runned with DTT.

*l 299 : This value is slightly lower than previous limits of detection reported in the literature for the DTT assay (Charrier and Anastasio, 2012;Fang et al., 2014) => 2 times lower than Fang et al, well done, you could simply write "This value is lower" , because 2 times lower is significant!

The sentence has been corrected as suggested by the reviewer.

*l 308 "As no standards have been established for DTT consumption rate equivalence". Yet, it does exist but it's true that's not very well established. Some researchers found an equivalence between DTT consumption and H2O2 formation rate could be useful since H2O2 exposure in regulated in occupational environments.)

Authors thank the reviewer for this information. H2O2 could be added in further improvements of the DTT assay and the o-MOCA as a control. H2O2 has been used in other assays, however the authors are not aware of studies using H2O2 as standard when running the DTT assay. Most researchers have use redox active metals (cupper and iron) and quinones (9,10-PQ) as positive controls.

The sentence regarding the lack of standards has been removed.

*L 345 , Figure 6 To strengthen your experiment and validation of methodology, I would recommend sampling aerosols on filters in parallel to your o-Moca acquisition so as to confront your results. In fact, your parallel previous test with reference compounds is ok, but results could be different when in contact with real PM!

The reviewer is correct, a comparison with filter collections will be necessary for a field validation of the systems. It is important to note that filter collections usually require longer sampling periods and collections artifacts may be important. Although results may be different for the OP of samples collected using the o-MOCA and filter, the comparison between both collection methods and analsys will strengthen the validity of the o-MOCA system.

"technical comments"

*L 129 a point is needed to end the sentence.

The point has been added at the end of the sentence.