Atmos. Chem. Phys. Discuss., 12, C10460–C10461, 2012
www.atmos-chem-phys-discuss.net/12/C10460/2012/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Radical loss in the atmosphere from Cu-Fe redox coupling in aerosols" *by* J. Mao et al.

Anonymous Referee #2

Received and published: 10 December 2012

This is an interesting contribution on the role of TMI interaction of Fe and Cu with HO2. As discussed before and elsewhere, HO2 can be efficiently taken up into aqueous particles and may then be destroyed by TMI redox chemistry. The main point of the paper is the inclusion of this chemistry into GEOS-Chem where interesting things are observed upon this implementation. However, I feel that at least part of these effects have already been observed in the study by Thornton et al. (2008). So, it would be good if the authors clearly describe inhowfar their chemical scheme is different from Thornton's et al. chemistry and also compare the resulting effects.

I would find it helpful if the authors could clarify that the chemistry of interest is described in CAPRAM 2.4. - a scheme not being restricted to cloud chemistry but as well addressing other tropospheric aqueous systems including aqueous aerosol particles.

The point at the end of the manuscript that speciation measurements are highly desirable is well taken. It also points to something which could require a different treatment as performed here: Many soluble TMI including those studied here could be complexed in atmospheric aqueous particles and especially under deliquescent aerosol conditions. Such complexation does not necessarily coccur with organic ligand but also with inorganic solutes. It is unclear how kinetics will change from the just aquated TMIs towards the corresponding complexed species. If reactivity would decrease, the present treatment could result into a too strong destruction of HO2 - so, I would like to suggest to discuss this additional uncertainty. The complexation addressed here can involve other species than those already mentioned on Page 27058 - which, for the case of Fe, are mainly introduced into the models because of their photochemistry.

In summary, this is a very interesting and noteworthy study. If the above comments are addressed, the paper should be published.

Interactive comment on Atmos. Chem. Phys. Discuss., 12, 27053, 2012.