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Interactive comment on "Comparing solubility algorithms of greenhouse gases in Earth-System modelling" *by* V. M. N. C. S. Vieira et al.

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The second paper by Vieira et al presents two different parameterisations for the solubility of CH4, N2O and CO2 - that of Johnson 2010 and the classic Weiss and colleagues empirically derived relationships used widely in GHG science and presented in Sarmiento and Gruber.

The paper is rather hard to follow (paragraphs longer than a page. . .) and there are a few non sentences and other minor typographical errors which I will not raise here.

It is unsurprising that the scheme of Johnson 2010 does not agree well with the empirically determined solubilities - my scheme is intended to be a stop-gap where such empirical data is unavailable i.e. for more 'obscure' trace gases - it is a generalisation

of solubility on the basis of easily determined molecular properties. I'm rather pleased at how well it does compared to the de-facto standard solubilities! As I state in the abstract of Johnson 2010: " It is intended that the various components of this numerical scheme should be applied only in the absence of experimental data providing robust values for parameters for a particular gas of interest. "

Therefore I do not see that this is a worthwhile publication in its own right and would be better integrated into the associated paper on transfer velocities, reduced down to a few paragraphs.

That is not to say that the Weiss solubility data are unquestionable - someone somewhere should probably check them some time as the whole community relies on them as far as I am aware. If science funding and scientific publishing worked properly the results of Weiss and co workers would have been validated many times over by labs around the world given their importance...

Interactive comment on Biogeosciences Discuss., 12, 15925, 2015.