

Review of paper: "EnKF and 4D-Var assimilation with a chemistry transport model"

by S. Skachko et al.

General

This paper represents a unique contribution on the comparison of EnKF and 4D-Var approaches for the assimilation of chemical species. It provides much insight, notably on issues related to inter-species error correlations and localization. I congratulate the authors. I provide here only minor suggested corrections.

Minor corrections:

L16: Change to: "one issue is the large number of ..."

L19: Change "comparison reasons" to "comparison purposes"

L182: Change "will be a subject to" to "will be subject to"

L208: Define PSC

L211 Do not refer to MACC or define it

L303 Change "has the background quality" to "includes a background quality"

L 501 -504 Apparent contradiction where precision level 14 ppbv seems first to correspond to 38 % error at L 501 while at line 503 it corresponds to 250%. This is likely because in the first case it corresponds to 4.6 hPa level while in the other it corresponds to 1 hPa level. Sentence could be clearer.

L 698: why qualify as "tricky" the Aura-MLS dataset?

L707 End of sentence point needed after 5 hPa.

L709 "approaching to them", define what "them" represents. Not clear as is.

L727 Drop the reference to paper in preparation!

L733: Suggest to change "accidentally" by "incidentally"

L826 Life time of ozone is that small, lower than a model time step presumably of order 15 min?

Conclusion: Perhaps add as comment that an hybrid approach such as popular 4D-EnVar approach could emerge as a good way forward for chemical data assimilation.

