

Dear Shuqi,

Thank you for your response to the reviewers and revised manuscript. I'm broadly happy except for one set of revisions. Like the reviewer I didn't understand the section on data assimilations and I still don't understand the revised version. It might be a terminology issue but I think this could be clearer.

"Before implementing data assimilation in our system, the limitations of such a scheme must be considered: (i) As we are performing forecasts, not hindcasts, we are unable to assimilate observations during model runtime (e.g., as done in the NCEP North American Regional Reanalysis: NARR); The lack of observations in the future, makes data assimilation impossible for adjusting forecasts;"

I think the confusion here is that you are mixing data assimilation for re-analysis with data assimilation for forecasting. In the latter you assimilate the observations in near real-time from which the forecast is made. This this "The lack of observations in the future, makes data assimilation impossible for adjusting forecasts" is simply not true as written.

"(ii) data assimilation is computationally intensive, required ~1 month of computational time (Baracchini et al., 2020a), clearly not an option for operational forecasting);"

I'm not sure why a sequential method would be necessarily more expensive. Again I think this relates to the above confusion.

"and (iii) Sequential assimilation could be employed to nudge the initial conditions for the 24-h runs with real-time-observed data."

Nudge one way of doing it but formally you are probably updating the model states

"This could be achieved by modifying the binary AEM3D restart files using model specific read/write statements in our Python workflow (e.g., from `aem3d_restart_v3_type.f90`), followed by smoothing (e.g., with a Kalman filter). "

I don't get the logic here, why would you update the restart file and then apply a smoother? Surely the Kalman filter (or more likely ensemble filter of some type for a nonlinear model) generates the updated states that are then written to the restart file. Also if AEM3D needs multiple states initialised this could be very complicated in practice, which I think you mention in the response but not in the text.

That's a rather long way of saying I think you need to revise this statement a little more for accuracy. In my view you could implement a data assimilation scheme, subject to all the many challenges associated with that, and that you haven't is simply because its beyond the scope of the article and what you set out to do.

However, subject to this refinement I'm delighted to accept the manuscript given that this is not core to the research you present.

Best wishes,
Jeff

Dear Jeff,

Thank you for the explanation here and sorry for the confusion about the data assimilation. Since this part is beyond the scope of our paper, we decided to delete the statement about the limitations of data assimilation in the COASTLINES scheme, and instead state that

“In AEM3D, sequential data assimilation could be implemented through modification of the restart files (aem3d_restart_v3_type.f90); however this is beyond the scope of the present study.”

Again, thank you for providing the suggestions and accepting our manuscript.

Best wishes and Merry Christmas!

Shuqi and co-authors