

We thank the reviewer for their comments and suggestions. Please find our answers below.

Technical comments:

1. Regarding the ATS methodology: if I understand it correctly, the distances used (r and x_i in newly added Table A1) are the shortest linear distance between a gauge and a reach, not the distance along the river network? And so, the ATS approach can be understood as a 'standard' Euclidean localization approach but with reaches that do not meet certain topological constraints removed? Adding a short additional clarification on this point would be helpful.

The distance is actually computed along the river network. For example, if there are 3 reaches separating the observation gauge and the link we need to update, the distance (x_i) is the sum of lengths of these 3 reaches. The data which contains the length of the river reaches within CONUS is part of USGS's National Hydrography Dataset (NHDPlus). This is now clarified in the caption of table A1.

2. Eq. 18: replace 'is approximately equal to' by 'is proportional to' symbol

Done.

3. There are missing citations in the text (appearing as '?' in the pdf, e.g. on lines 278, 321, and several other locations)

The reviewer is right. These showed up in the marked-up version of the manuscript due to a typesetting issue. The non-marked version didn't have that problem. In any case, thanks for bringing this up. We have now fixed all in-text citations in this final form.

4. Links are provided to source code for the hydrological model and data assimilation toolkit on GitHub. That's great. However, these are 'general' software code repos. In the spirit of open science, it would be helpful to also make available a GitHub repo with the specific implementation for the case study used in this paper, including the new ATS methodology which may not yet be available (?) in the existing repos.

All configuration, setup, running and diagnostic scripts used in this work are available in the provided DART repository. The proposed ATS localization methodology is also provided in this repository. Here is a list of some important codes and scripts:

- ATS localization: `${dart_path}/model_mod.f90`
- Setup an experiment: `${dart_path}/python/experiment/setup_filter_experiment.py`
- Run an experiment: `${dart_path}/hydro_dart_py/hydrodartpy/core/run_filter_experiment.py`
- Run diagnostics: `${dart_path}/matlab/run_HydroDARTdiags.m`