

The manuscript proposed an online parallelized data assimilation framework (PDAF) coupled with WRF-ARW. The online DA framework prevents the huge data I/O from the hard disk, which makes the framework more suitable for the operational application. As the first work of PDAF coupled with WRF-ARW, several experiments are conducted to examine the computational efficiency of PDAF and the performance of LESTKF through T profile assimilation. In general, the manuscript is well-written, but there are some minor issues should be addressed before publication.

Line 118-119. It may be better to state the reason of assimilating T profiles in the introduction.

Please briefly describe the features of LESTKF that distinguish the algorithm from others like LETKF and EnSRF. Or briefly introduce the advantage of LESTKF so that readers do not need to read early papers to understand why the authors selected the algorithm.

For equations (6) - (7), could the authors add some words to explain to readers how to deal with the situation when rank deficiency exists?

Line 148. Why the authors named the control state as 'True' and the true state as 'CTRL', which is somewhat confusing. The names are inconsistent with those in Line 373.

Please give the resolution of T profiles in the description of experimental design, rather than Section 4.1. Additionally, is the assumption of observation errors being uncorrelated still valid? What is the vertical resolution of a temperature profile? If all model levels are used to generate an observation profile, the above assumption may not be valid.

Is it possible for the authors to add a schematic plot describing how the ensemble runs and how the online PDAF obtains data from the ensemble?

Figure 1. What does the n in “do $i=1,n$ ” mean? Does n represent the total number of time steps?

How OMI deals with QC? For instance, if the OMB (observation minus background) of an observation is larger than 5 times the standard deviation, the observation should be discarded. Does the OMI interface in the manuscript use an individual member or the ensemble mean as the background? It is not an issue for OSSE but an issue for real data assimilation

How to deal with the localization of satellite observations?

Line 381: Is it Figure 4?

Line 387: Also Figure 4 not Figure 3?

Figure 4: regarding the vertical average, is it computed at a specific moment or over a time span?

Line 401-402: Whether a long radius is an optimal choice depends on the quality of background error covariance and the length scale of error samples. For the discussion here, please refer to some work discussing the multiscale background error covariance