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Interactive comment on "Developing a common, flexible and efficient framework for weakly coupled ensemble data assimilation based on C-Coupler2.0" *by* Chao Sun et al.

Li Liu

liuli-cess@tsinghua.edu.cn

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Dear Reviewer,

Thanks a lot for reviewing our manuscript and for the comments and suggestions.

We would like to reply some comments here, and will carefully follow all your comments and suggestions when revising the manuscript.

1. About "Conversely, the PDAF system is mentioned, which is somehow used along with the existing DA system that authors call GSI/EnKF. But the use of PDAF may be limited to models that can be incorporated inside the PDAF Fortran code and called

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as subroutines which is not the case for every model. That is why the authors might clarify early in the text what is the conïňĄguration of their future CDA system and what are the purposes of the system."

Response: we will significantly rewrite about our motivation of DAFCC for future CDA system. Ensemble DA is also developed and used in China. To help the development of ensemble DA in China, especially when model resolution gets finer and DA frequencies get higher, we aim to develop a common ensemble DA framework that can enable users to make DA systems as efficient as possible. As most developers for models and DA systems in China are origin from science and do not have strong experiences in software engineering and parallel programming (many model teams even do not have any full-time software engineer), we have to make DAFCC as convenient as possible, especially for the model developers who are not proficient in parallel programming and parallel debugging with MPI. So, we try to make DAFCC handle as much work as possible. Now, the MPI communicator of whole ensemble of a component model for running an ensemble DA algorithm is generated automatically and then used intra DAFCC and the data exchanges among members, ensemble and DA algorithm are also automatically handled by DAFCC, no matter the differences regarding parallel decompositions. Moreover, we enable a DA algorithm to be enclosed in dynamic-linking library, in order to make the model code and the DA code as independent as possible. GSI/EnKF does not use PDAF currently. Some content in the manuscript may introduce misunderstandings. We will try to correct.

2. About "The ensemble size of current global operational systems used in NWP generally exceeds 256 members. The global models used in the ensemble are run on grids with horizontal sampling of several tens of kilometers. So, the I/O operations are currently necessary. If the aim of the paper is not to discuss real systems, please state it more clearly in the abstract and the beginning of introduction. It will help to understand what kind of CDA system you are developing and its future use."

Response: DAFCC can handle the original I/O operations for data exchange be-

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tween model ensemble and DA algorithms via MPI, while the I/O operations of operational systems for outputting results can be still kept. Regarding the evaluation in this manuscript, the corresponding I/O operations of WRF as well as other component models are still kept.

Best regards,

Li Liu

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