

## ***Interactive comment on “Estimating Parameters in a Sea Ice Model using an Ensemble Kalman Filter” by Yong-Fei Zhang et al.***

**Anonymous Referee #2**

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Based on the OSSE framework, this paper extends the functionality of DART/CICE to do parameter estimation through the EAKF as well as updating the model states, and explored these impact on the simulation as well as the prediction of Arctic sea ice. This study is systematic and well organized. However, I have some questions:

1. To avoid inconsistencies with the rest of the parameterization scheme, Rsnw is selected to be adapted via DA in this study. However, the snow conductivity is also important as mentioned in the introduction (Line 76). Why not tune snow conductivity through DA? In addition, Urrego-Blanco et al. (2015) suggests the interaction between Rsnw and snow conductivity, and how to consider this interaction in DA?

2. Although this study is based on OSSE, the simulated observations should mimic the real observations unless the goal of OSSE is to help evaluate the new observing

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system. To our knowledge, the large scale SIT observations are mainly retrieved from satellites, while retrieval algorithms fail in the presence of water on the ice (e.g., SMOS and CryoSat-2). Thus, it is worth discussing whether assimilating SIT observation in summer is reasonable.

3. For SIV, the bias of DASit is less than that of DASicPEcst until 1 July 2006 (Fig. 4b). Hence, the conclusions drawn need to be more cautious, such as “The results in the forecast period indicate that by updating parameters as well as state variables, assimilating SIC observations only is comparable to assimilating SIT observations” (Lines 295-296).

4. Rsnw increments cannot be found in Fig. 1b (Line 192). Is it in Fig. 1c?

5. Green line cannot be found in Fig. 1 (Line 453).

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