

I thank the authors for their comprehensive responses to my questions and comments. Most of the proposed revisions are appropriate and well-integrated. However, I would appreciate further clarifications regarding the treatment of ice floes observations.

- In the response to comment 9, the authors state that *"Floes that are not observed at a given cycle are not excluded; instead, their observation-error variance is inflated according to Eq. (50), thereby reducing their influence in the analysis"*. This seems to conflict with Eq. (54) which sets out a different criterion, based on the local total water content and specifies conditions under which a floe cannot be observed at all. Moreover, if "not observed" refers to an inflated observation error (as per Eq. 50), it appears that the same equation also determines the observation level (plentiful or sparse), based on the mean total water content  $[q_t(\mathbf{x},t)]$ . I would appreciate clarification on how observational availability and uncertainty are operationally determined.

In this context, I think that it would be beneficial to merge paragraphs 3.2 and 3.3.1 and to make a clear distinction between true floes' coordinates and observations, adding an equation that links the two.

- An additional comment regarding Eq. 50: is there a defined lower bound on the observational uncertainty in the case of significant cloud cover? According to the current formulation, it seems possible that a small floe with high mean total water content could yield a lower observational uncertainty than a floe under clear conditions. This seems counterintuitive and may require a justification.

### **Minor points:**

- Line 309 (line 345 in the revised ms) : Apologies for not being clear earlier — I was referring to the tilde accent, which appears to be a typographical error.