This manuscript presents a clear and well-designed assessment of the impact of assimilating sea ice thickness observations on the reanalysis and seasonal prediction of Antarctic sea ice using the Norwegian Climate Prediction Model. The results demonstrate meaningful improvements in sea ice extent and thickness prediction skill, particularly in key regions such as the Ross, Weddell, and Amundsen-Bellingshausen Seas. The study is timely and the experimental framework is generally sound. A few issues and clarifications are needed before the manuscript can be considered for publication.

Major points:

The manuscript shows that SIT assimilation extends SIE predictability up to 12 months for October initialisation. The interpretation of this "memory effect" remains mostly statistical. Please discuss whether this memory primarily arises from thermodynamic inertia of thick ice, dynamic processes (e.g., advection and ridging), or oceanic heat storage, and whether these mechanisms differ across regions (e.g., Weddell vs Amundsen-Bellingshausen Seas).

Specific comments:

1. Lines 205–208: The hindcasts use 10 ensemble members selected as the first 10 members of the reanalysis ensemble, with all members assumed to be equally likely under the EnKF framework. Please justify whether this ensemble size is sufficient to robustly estimate skill metrics such as RMSE and IIEE, particularly for regional and seasonal stratifications. In addition, please clarify whether the results are sensitive to the specific choice of ensemble members (e.g., first 10 vs. alternative random subsets), and whether any tests were performed to assess sampling uncertainty.

2. Lines 224–225; 272–274: The ICESat, SMOS, and LEGOS datasets cover different time periods and seasons. Please clarify how temporal mismatches are handled in the evaluation and whether all metrics are computed over identical periods for fair comparison.

3. Lines 262–265: The improvements appear strongest in regions with thick ice (Weddell and Ross Seas). Please briefly discuss whether the weaker improvements in thinner-ice regions are due to observational uncertainty, model deficiencies, or SIT-SIE coupling.

4. Lines 265–269: The authors note that positive SIT biases near the ice edge may partly originate from SIE mismatches rather than intrinsic thickness errors. This is

an important point. Could the authors provide a more quantitative separation of these two contributions, for instance by masking regions with consistent ice cover or by analysing thickness biases conditional on correct ice presence?

5. Lines 270–276: The manuscript compares EXP-OCT against SMOS and ICESat, which have very different sensor characteristics and thickness sensitivity ranges. Please clarify which product is considered more reliable for thin ice and thick ice, respectively, and how this affects the interpretation of RMSE differences.

6. Lines 406–409: The "end-of-winter barrier" in SIT predictability is hypothesised to be partly due to limitations of the LEGOS SIT dataset. It would be useful to test whether this barrier is also evident when verifying against independent SIT datasets (e.g., ICESat-2) or whether it is specific to LEGOS-assimilated runs.

7. Lines 416–417: The study is framed as the "first long-term assessment of Antarctic SIT assimilation". To substantiate this claim, the authors should explicitly contrast their experimental design, length, and findings with those of previous efforts and clarify what novel insight this work uniquely provides.