Revised outline of manuscript

In the following outline, we retained the figure numbering scheme of the manuscript.

1. Introduction
2. Methods
   - 2.1. Study sites
     - 2.1.1. Utqiaġvik, Alaska
     - 2.1.2. Van Mijen Fjord
   - 2.2. Field measurements, sample and data processing
   - 2.3. Aggregation of ice core profile data sets
     - 2.3.1. Degree day classification
     - 2.3.2. Profile depth referenced to snow/ice and ice/ocean interface
   - 2.4. Model simulations
3. A spatial and temporal reference framework for analysis of ice core profile data sets
   - 3.1. Results

     New figure: Difference in classification by using DD vs date of coring or ice thickness for aggregating ice core data.

     Figure 3: Present ice core profile datasets with dual reference horizons (sea ice surface and bottom).
   - 3.2. Discussion: Advantages of the proposed framework

     We will discuss the benefits of using a DD framework and dual coordinate system referencing both the snow/ice and ice/ocean interface. We will discuss requirements in terms of sampling frequency, and amount of ice cores collected for each sampling event to produce a climatology (mean, variance, extremes of profile data) that meets the broader aims outlined in the paper.
4. Interannual and seasonal variability
   - 4.1. Results

     Figure 4: We will describe the shape of core profiles and their variability. We will highlight the difference between previous observations based on a single season (e.g., Eicken et al., 2002; Gough et al., 2012), and this long-term data set.
   - 4.2. Discussion
     - 4.2.1.Source of errors

       We will discuss sources of error (temperature bias, brine drainage), as well as inconsistencies or deviations from core sampling and processing protocols.
     - 4.2.2. Seasonal evolution and interannual variability

       We will discuss the environmental processes responsible for the observed spatial and seasonal variations in ice temperature and salinity.
5. Comparison with CICE model output

   Results

   Figure 5a, b: comparing modeled and observed ice and snow thickness to check the consistency of model tuning.

   Figure 7a, c, d: differences between model observation. This figure will be moved into supplemental materials.

Figure 6: Seasonal anomaly between model and observation: we will describe the success (absence of brine loss and bias in temperature measurement), and failure of the model (desalination during the melt season with more detail in Figure 5c).

Figure 5c: failure of model to capture desalination during the melt season

5.1. Discussion

5.1.1. Sources of error

We discuss the model calibration in terms of ice and snow thicknesses, and limitations of the stand-alone mode we used.

5.1.2. Seasonal evolution and interannual variability

As the model does not reproduce small-scale spatial variability, and does not capture errors due to the sampling method, we discuss the benefits of the model in terms of reproducing seasonal evolution and interannual variability of salinity and temperature profiles and the implications for studies of sea ice processes.

6. Conclusions