Supplementary Information: Common assumptions involving the speed of radar in snow introduce systemic underestimates to sea ice thickness and seasonal growth rate estimates

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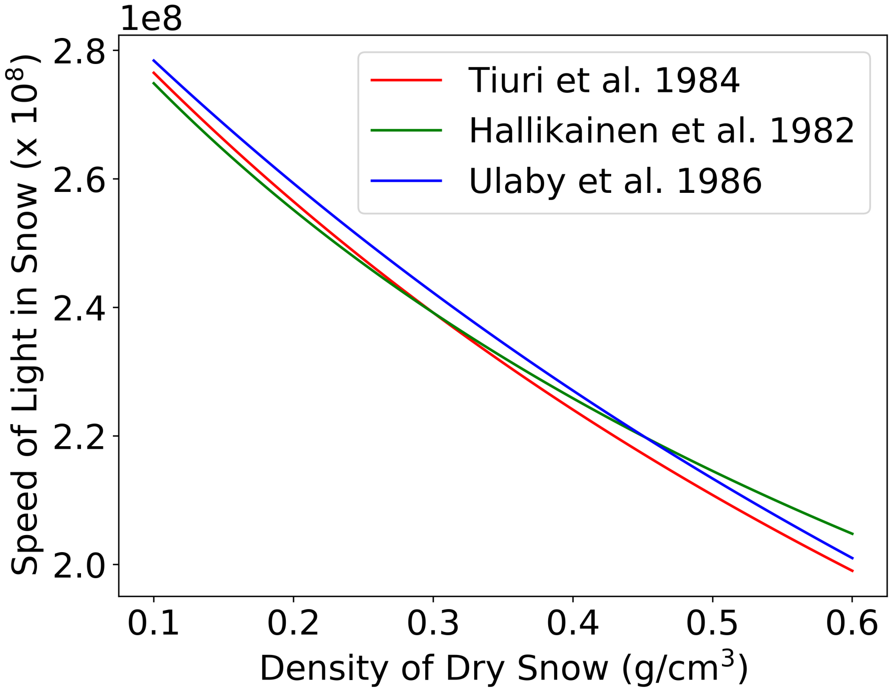

Figure S1. Three commonly used relationships between radar speed and snow density Hallikainen et al. (1982); Tiuri et al. (1984); Ulaby et al. (1986).

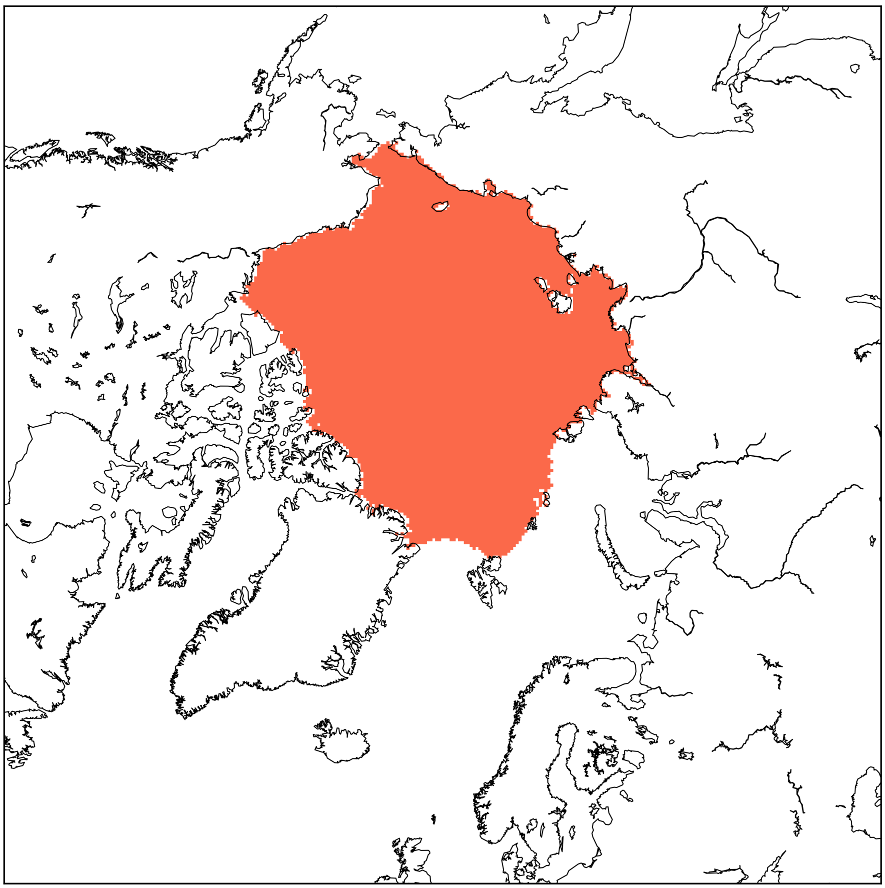

Figure S2. The region over which snow depths published in Warren et al. (1999) are generally considered reliable (Laxon et al. (2013); Kwok and Cunningham (2015)), and over which freeboards are considered in this study.

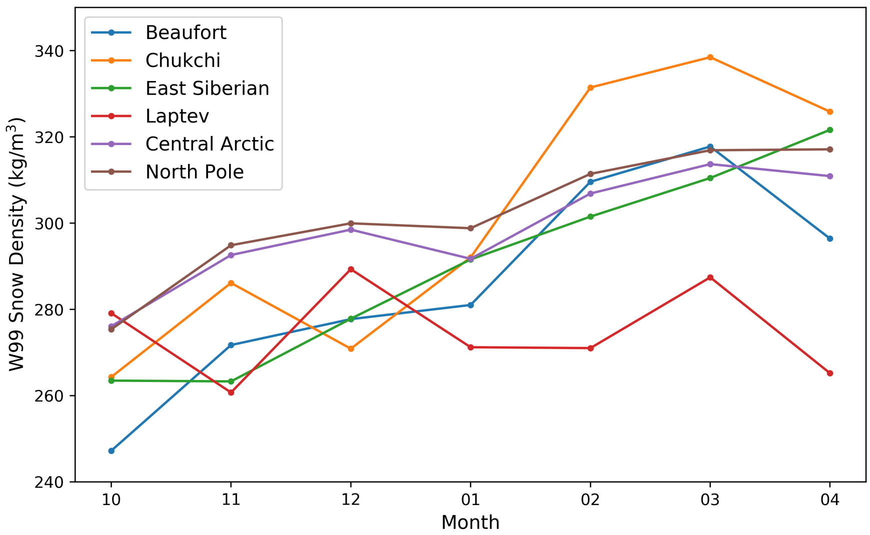

Figure S3. Winter snow densification rates for five regions and the north pole. We found the north pole rate to be representative of its region (the Central Arctic) but also of all other areas apart from the Laptev, which exhibited a small but positive densification.

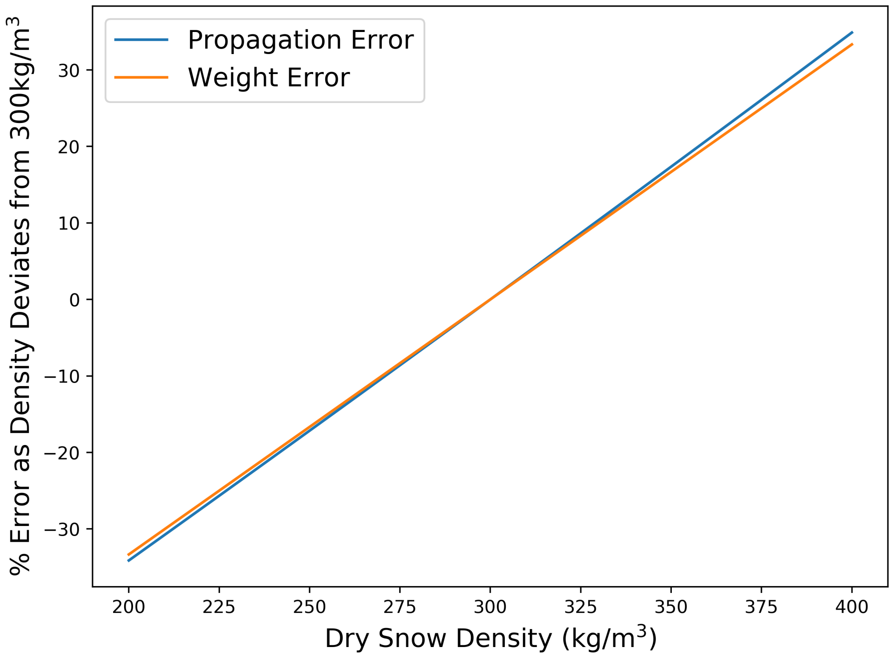

Figure S4. While the functional form and magnitude of expressions for the effect of snow weight and slower radar propagation are different, they have a similar error dependence on snow depth. That is to say, the percentage error introduced to the "weight correction" by snow density uncertainty is the same as that for the "propagation correction".

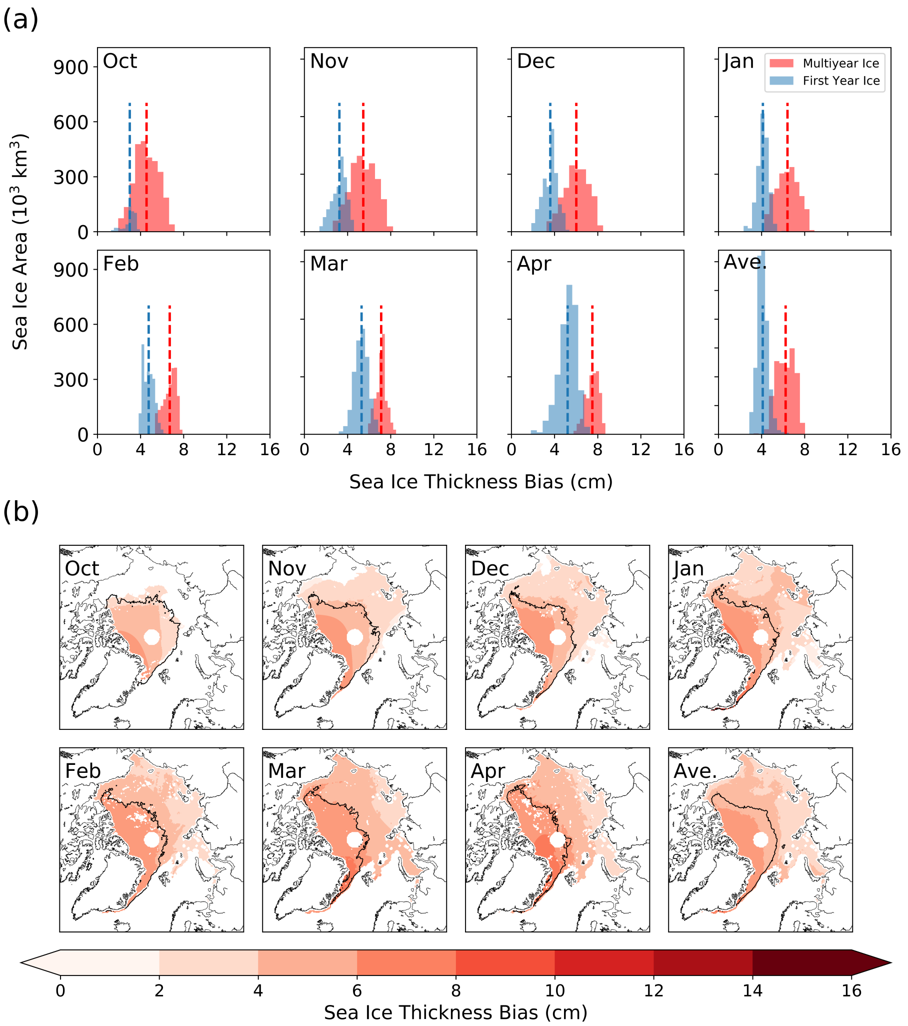

Figure S5. Monthly differences in sea ice thickness from the use of $\delta h = 0.22Z$ and $\delta h = 0.25Z$ for the propagation by AWI and CPOM respectively.

References

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