

**Review: Brief communication: An empirical relation between center frequency and measured thickness for radar sounding of temperate glaciers (MacGregor et al.)**

**Topic:** The study analyzes previous records of radar-sounding measurements over temperate glaciers in order to investigate the relationship between the radar sounding frequency and the maximum measured ice thickness. Maximum ice thickness values are derived from the GlaThiDa inventory and compared to the center radar frequency used in the reported measurements. An empirical relationship is derived from this comparison, showing a decreasing maximum ice thickness with increasing radar frequency at a rate of ~500m per frequency decade. The study then calculates the maximum modeled ice thickness for all temperate glaciers in the RGI inventory, and uses the empirical envelope to predict the maximum radar frequency that could be used to survey different regions.

**General comments:** The manuscript is very well written, and the results are presented concise and clearly. In my opinion, the study makes a significant contribution to the radioglaciology community as it systematically analyzes, -and confirms, the previously assumed relationship between frequency and ice thickness over temperate glaciers. Furthermore, I think that this study provides useful insights when planning future radar sounding surveys. Overall, I think that the study is well-suited for a ‘brief communication’ in *The Cryosphere*, and only have a few recommendations/suggestions.

**Minor comments:**

**L35-36:** The following sentence structure is somewhat difficult to understand, maybe change to “... keep the signal-to-noise ratio ~~high~~ between the ice-bed reflection (signal) and ~~the cavity induced~~ volume scattering ~~arising from the cavities~~ (noise) **high**.”

**L95-96:** “... radar-sounding surveys have historically not always known beforehand where ice thickness is predicted to be greatest, ...” The sampling bias resulting from this statement is not clear, I suggest clarifying this sentence.

**L98-99:** “Some glaciers we assume are temperate -... - are not.’ This sentence reads as the authors know which glaciers were incorrectly assumed as temperate. I suggest changing the last part of the sentence to ‘~~are~~ **maybe** not.’”

**Figure 2:** The figure is quite busy, and it is difficult to identify the ice thickness distribution for some survey regions. If possible, I suggest splitting the figure into a few separate panels, each including a few regions.