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A Benchmark Dataset for Radio Echo Sounding Data

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Melting glaciers and ice sheets contribute significantly to the global sea level rise, posing an existential threat to coastal regions. For that reason, many expeditions collect radio echo sounding data to track, model, and predict the changes in ice mass and thickness. However, manually analyzing the data collected to determine the thickness of the ice sheet and mountain glaciers is a time-consuming task, as the collected data often extends over tens to hundreds of kilometers. Hence, the development and utilization of automated and semi-automated tools have risen in popularity to alleviate the problem. Especially machine learning-based approaches show promising results as they can capture complex relationships in the data. However, such methods require large labeled datasets to achieve their full potential. Thus, we are currently gathering and cleaning data that will be released as a benchmark dataset for radio echo sounding data to train, test, and compare different approaches.

In detail, the dataset will consist of 2D radar data with georeferenced labels for the position of the air-ice and ice-bedrock interface. We plan to incorporate radar data from multiple sources since the underlying radar system and expedition area play a significant role in depicting the data and the general difficulty of the task. That way, the performance of a system can be fairly assessed with the benchmark dataset without the evaluation results being skewed by external factors. We will further ensure a fair comparison by dividing the data of every source in an independent training, validation, and test set. This division will also allow us to use the benchmark dataset to train and compare systems specialized on only a single data source. Thus, future work can also utilize our benchmark dataset to develop systems specialized on only a single data source.
Lastly, we will release a baseline model alongside the benchmark dataset to demonstrate its practicality. Thereby giving an initial point of reference that future work can compare to.