

ICESat-2 spaceborne LiDAR as complementary data source for biomass mapping

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1 Introduction

Reliable and continuous forest monitoring is essential for improving our understanding of the global carbon cycle.

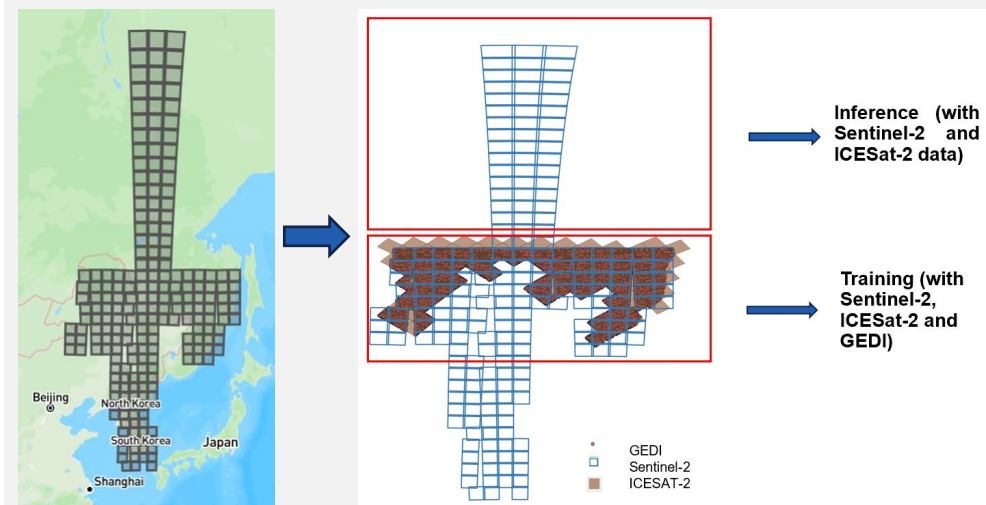
The PRS group has developed a satellite-based global biomass monitoring system which lacks reference data in the sub-arctic region. The project aims to integrate sub-arctic ICESat-2 data into the biomass mapping system so as to provide reference data in the sub-arctic region.

2 Data and methods

Datasets

Datasets	GEDI	ICESat-2	Sentinel-2
Spatial coverage	Lat: 51.6° N~51.6° S	Lon: -179~178 Lat: 43° ~78°N	Global
File format	Point shapefile	GeoTIFF	GeoTIFF
Spatial resolution	60 m	30 m	10,20, 60 m

Study area



Model

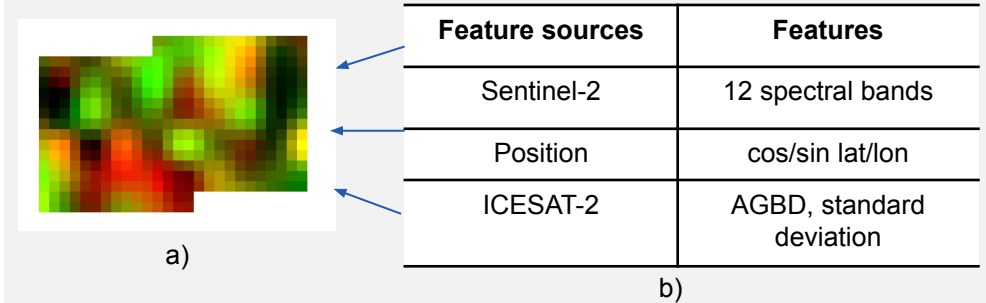
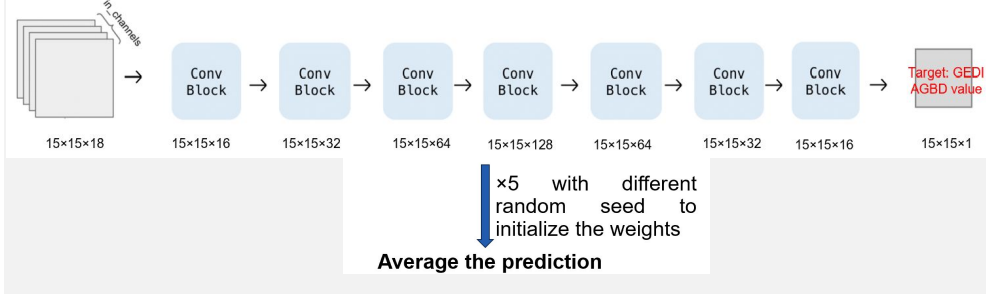


Figure: a) two sample patches of 15 × 15 pixels (corresponding to 150 × 150 m on the ground), centered around GEDI footprints for training, b) the input features of the model

Model architecture (FCN)



3 Results

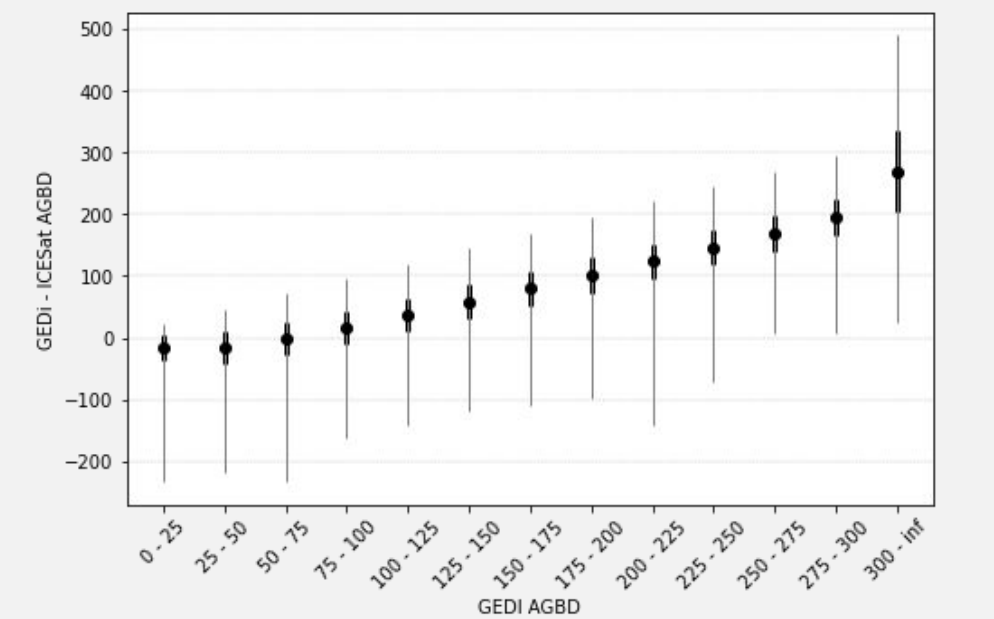


Figure: The boxplot of GEDI-ICESat AGBD for every bin of the GEDI AGBD.

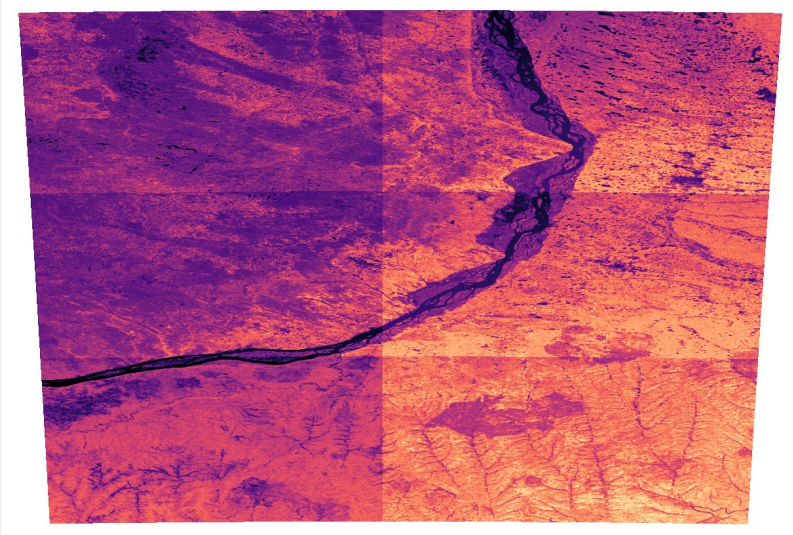


Figure: Example inference result in the sub-arctic region

4 Conclusion and Outlook

Conclusion

- The integration of ICESat-2 is a valuable approach for estimating biomass. It can help provide reference AGBD in the sub-arctic region.

Outlook

- Use more complex models for predictions (ResNeXt, Xception)
- Perform filtering to exclude potential bad data from the analysis
- Create a smooth transition between neighbouring tiles

5 Reference

[1] Ghjulia Sialelli. Global biomass estimation and uncertainty quantification with multi-task bayesian deep ensembles.