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An individual-based tree data set on forest structure in Siberia's remote north-east

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The permafrost-underlain deciduous forests of north-east Siberia form a unique ecosystem that is experiencing pressure from global warming, in the form of permafrost thaw, wildfires of increasing intensity and frequency, and drought stress. Even though it covers millions of square kilometers and could become an important driver in the global climate system with the vast amounts of carbon stored in its soil and plants, there is relatively little knowledge on it because of its remoteness.

In a series of expeditions between 2011 and 2021, a consortium of researchers from the North East Federal University Yakutsk (NEFU) and the Alfred Wegener Institute (AWI) surveyed more than 160 forest sites in Yakutia and at the northern treeline, in Chukotka and the Taymir Peninsula. These include intact larch forest and forest tundra sites, as well as different stages of succession after wildfire disturbance. We observed species, height and vitality status for over 39,000 trees, of which around 2000 were inventorized in a more detailed manner, including diameters and crown diameters.

We will present analyses of individual-based metrics necessary for upscaling the forest inventory to the plot level. Additionally, we compared our ground inventory data with freely available remote sensing products to evaluate their performance in predicting forest structure on the small scale. The comparison yielded large errors, as the forest metrics vary strongly on the local scale, thereby emphasizing the need for ground data like we collected.

This dataset gives a unique insight into the forest structure of this remote area, and can be used for a variety of purposes.