

Submitted Abstract

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Abstract

The catastrophic avalanche winter of 1950/51 devastated large areas of protection forests in Switzerland leading to discussions about causes and suitable measures to prevent future damages. With the initiation of an interdisciplinary mountain research program by the Swiss Federal Institute for Forest, Snow and Landscape Research WSL, scientific activities began at the Stillberg - the 'silent mountain' as the German location translates - near Davos, Switzerland in the Central Alps in 1955. This research facility is located in the treeline ecotone on a northeast-facing slope, featuring topographically highly structured terrain and spanning an elevational gradient of 2075 to 2230 m a.s.l.. As a site belonging to the European Long-term Ecosystem Research (eLTER) network, the infrastructure of the research site includes an automatic weather station, a research station with living facilities and a cable car. Initially, the research aimed at developing ecologically, technically and economically sustainable reforestation techniques at the treeline to reduce the risk of snow avalanches. In the course of time, additional research aspects gained importance, such as the ecology of the treeline ecotone and climate change impacts on alpine ecosystems.

After a series of observational studies and pre-experiments, the main experiment was established in 1975 by the plantation of 92'000 seedlings of *Larix decidua*, *Pinus mugo* ssp. *uncinata*, and *Pinus cembra* following a gridded planting scheme. Trees were planted in >4000 square plots, with 25 trees in each plot placed into the original dwarf shrub community. Survival, growth and damage of trees was intensely monitored. In addition, various other ecological experiments have been carried out at the Stillberg research site, such as a study combining free-air carbon dioxide enrichment with soil warming and a nutrient addition study. More recently, we also investigated plant-snow interactions, plant-soil interactions and community shifts under experimental warming as well as drivers of tree seedling recruitment in this treeline ecotone.

In almost five-decades of research at the eLTER site Stillberg, we have collected a wealth of data that can contribute to transdisciplinary and global syntheses improving the understanding of ecosystem processes and climate change impacts in mountain regions.