

THESIS OFFER

We offer a master/bachelor project about forest diversity buffering effects on microclimatic conditions in Swedish forests as part of the SoilDivTemp project[†]. Interested students should contact Rémy Beugnon (remy.beugnon@idiv.de) or Caroline Greiser (caroline.greiser@su.se)

Supervision: Rémy Beugnon¹, Caroline Greiser²

Aim: The frequency and intensity of extreme climatic events, such as heatwaves and droughts, are increasing with global warming, threatening humanity and other life on Earth. Yet, vegetation can buffer extreme temperature and humidity fluctuations near the ground compared to conditions in the free atmosphere (Fig. 1). For example, in forests, temperatures in the understory are often cooler during the day and warmer during the night compared to open areas. Buffered forest microclimates can provide shelter for vulnerable species and protect communities against climate extremes. Moreover, a diverse canopy and understory can increase primary productivity, therefore, we believe that diversity positively affects forest microclimate buffering.

In this project, we want to quantify the effect of vegetation diversity on microclimatic buffering in forests of central Sweden. In particular, we aim to identify the relative role of tree and understory communities in buffering air temperature.

Project: In about 200 sites across central Sweden, the near-ground air temperature has been measured over 15 months and photos from the canopy and understory community have been taken (Fig. 2). The primary tasks of the student will be to (1) identify species/functional group relative covers and (2) estimate the effect of both upper- and understory cover and composition on temperature fluctuations. Data analyses will be carried out in R and be based on estimates of temperature offsets and buffering. These will be modeled as a function of the vegetation proxies and parameters introduced above.

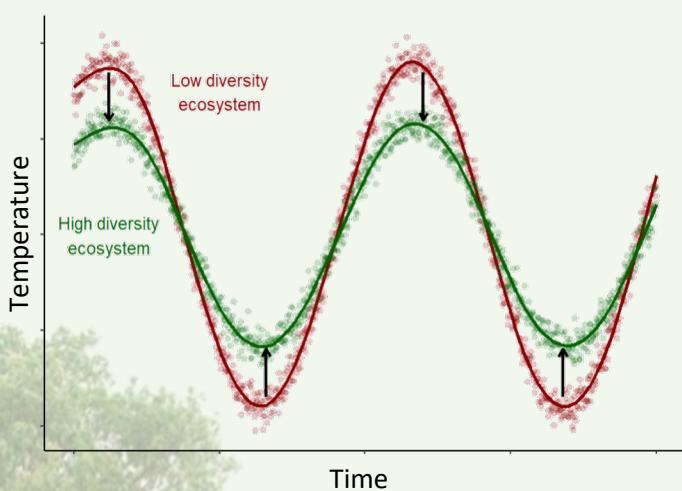


Fig. 1: Expected effects of vegetation diversity on temperature fluctuations. We expect vegetation diversity to reduce temperature extremes over time



Fig. 2: Forest temperature logger with surrounding ground vegetation. From these images, we want to estimate the cover of individual species or species groups (e.g. mosses vs. herbs vs. shrubs). Right corner: Temperature logger under its radiation shield.

[†] More information and details there: <https://remybeugnon.netlify.app/project/soildivtemp/>