Research Unit Forest Dynamics - colloquium

Date: 24.09.2024

Time: 8:30

Room: Engler-Saal

Duration: 25 minutes

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Title: **New approaches for monitoring forest functioning in a changing climate - crossing scales from molecular mechanisms to stand wide processes**

Abstract:

Climate change is affecting forest functioning and jeopardizes the services forest ecosystems provide. Reduced water availability during drought events and increased temperatures affect photosynthetic carbon assimilation, tree growth and the defense capacity causing tree damage and mortality on the long-term.

Forest monitoring (as carried out e.g., within the framework of ICP Forests) provides important information on the changes and long-term trajectories of tree health and mortality. Novel techniques might, however, provide additional mechanistic insights that can complement classical monitoring.

Here we show how the characterization of crown defoliation (a standard ICP Forests metric) trajectories allow to predict the future mortality risk and how the leaf and needle metabolome in dying trees provides additional understanding of the mortality processes.

In addition, continuous determination of the origin of water uptake (based on water isotoplogues) and the tree water deficit (based on point dendrometers) helps nowcasting the immediate stress responses of trees to extreme events.

Finally, we explore how pre-visual stress signals from drone based remote sensing (e.g., the Photochemical Reflectance Index PRI) and its relationship to leaf level photo- and pigment chemistry might be implemented (and scaled to satellite based remote sensing) to better predict health and mortality risks in future.