ARPHA Conference Abstracts 8: e149507
doi: 10.3897/aca.8.e149507

OPEN ACCESS

Conference Abstract

Zöbelboden Forwards: Towards an observatory for the resilience of European forests

Sarah Venier‡, Matthias Steinparzer‡, Thomas Dirnböck‡

‡ Environment Agency Austria, Vienna, Austria

Corresponding author: Sarah Venier (sarah.h.geiger@gmail.com), Matthias Steinparzer (matthias.steinparzer@umweltbundesamt.at), Thomas Dirnböck (thomas.dirnboeck@umweltbundesamt.at)

Received: 12 Feb 2025 | Published: 28 May 2025

Citation: Venier S, Steinparzer M, Dirnböck T (2025) Zöbelboden Forwards: Towards an observatory for the resilience of European forests. ARPHA Conference Abstracts 8: e149507. https://doi.org/10.3897/aca.8.e149507

Abstract

Forest ecosystems cover almost 40% of the European land surface and play a vital role in mitigating the ongoing climate crisis. However, increasing climate extremes, such as droughts, heatwaves, and disturbances, pose significant challenges to forest health, ecosystem services, and societal benefits. Rapid and precise forest monitoring is essential for assessing these impacts and informing adaptive forest management.

The ForestWard Observatory, a prototype developed within the Horizon Europe FORWARDS project, is designed to monitor and evaluate the impact of climate change on European forest ecosystems, enabling fast and informed decision-making for forest management. This observatory integrates a network of pilot plots co-located at existing forest monitoring stations, such as ICP Forests. The inclusion of past and present forest assessments, enabled by long-term monitoring programs like those that are implemented in the European Research Infrastructure eLTER, ensures a comprehensive understanding of climate-induced changes, their impacts, and feedbacks to global warming now and in the future.

To expand already existing methodologies, the observatory applies the concept of "linking methods", combining standardized close to real-time data on water and carbon cycles with remote sensing technologies. One of the sites within this initiative is the eLTER research and monitoring station Zöbelboden, located in the Northern Limestone

© Venier S et al. This is an open access article distributed under the terms of the Creative Commons Attribution License (CC BY 4.0), which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Alps in Austria, established in 1992. The site addresses three primary focus areas within FORWARDS:

1. Stress nowcasting by utilizing soil and tree ecophysiological data to provide immediate assessments of ecosystem stress. For this the site was further equipped with point dendrometers which allow us to measure stem-growth and radial stem fluctuations in high resolution.
2. Linking ground-based and remote sensing data by bridging local observations with large-scale remote sensing information. Multispectral imaging will be captured by drone, at the same time foliar sampling for pigment analysis will be carried out.
3. Carbon storage and structural analysis by measuring carbon sequestration and forest stand structures. Terrestrial Laser Scan data has been gathered for the supersite and 15 surrounding plots.

The Zöbelboden Forwards Site connects the existing eLTER Zöbelboden site to the ForestWard Observatory. This site represents temperate mountain mixed forests on carbonate bedrock typical of the European Alps. Equipped with modern technology and a robust data infrastructure, the Zöbelboden research and monitoring site will serve as a model for monitoring stressors, enhancing climate resilience, and fostering sustainable forest management across Europe.

Presenting author

Sarah Venier

Presented at

td {border: 1px solid #cccccc;}br {mso-data-placement:same-cell;}POSTER

Funding program

Horizon Europe

Conflicts of interest

The authors have declared that no competing interests exist.