Press Release

Forest damage in Europe could double

Prague, March 6, 2026 – Wildfires, storms, and bark beetles have a major impact on forests and the benefits they provide for people and the environment. For the first time, a large international team led by researchers at the Technical University of Munich (TUM) – including experts from the Faculty of Forestry and Wood Sciences, CZU Prague – has calculated how disturbances could transform Europe's forests by 2100. Even in the most optimistic scenario, the team foresees a substantial increase in damaged forest area—in the most pessimistic case, disturbances could even double.

How Fires, Windstorms, and Bark Beetles Will Affect the Future of European Forests

A new study has determined how European forests may be affected by fires, windstorms, and bark beetles by the year 2100.

By combining satellite data with forest development simulations for 13,000 locations across Europe, the authors developed an artificial intelligence–based model that estimates the extent of forest damage at the continental scale.

In all future development scenarios, the level of damage exceeds current levels, with significant impacts on forests and on the ecosystem services they provide to society.

Tree mortality is not new; it is a part of natural forest dynamics—where old trees die, young trees regenerate and form the next generation of canopy trees. What is new is the scale at which wildfires, storms, and bark beetles—fueled by climate change— are reshaping forests. Recent years have already shown dramatic levels of forest

damage in Central Europe, but until now it was unclear how much forest area might be affected by disturbances in the future. Disturbances determine how much carbon forests can store, how much timber they can provide, and which species they provide habitat for—making the findings highly relevant for policymakers and society.

Dr. Laura Dobor and Professor Tomáš Hlásny, co-authors of the study from the Faculty of Forestry and Wood Sciences at the Czech University of Life Sciences, Prague, state: "The Czech Republic has already experienced an extreme increase in forest damage linked to climate change – the bark beetle outbreak of 2018–2022. The results of the study should be taken seriously. They indicate that similar events – especially large-scale bark beetle outbreaks and forest fires – are likely to become more frequent in the coming decades. Preparing our forests and forestry for them requires thinking ahead and better connecting research, forest policy-making, and forest management."

The researchers estimate that with global warming of just over 4 degrees Celsius, the area disturbed by fires, storms, and bark beetles could more than double by 2100. As a baseline, the researchers used remotely sensed data from 1986 to 2020 – a period that already saw unusually high levels of forest disturbance. Even in the best-case scenario, with warming limited to roughly 2 degrees Celsius, the researchers expect more forest damage in the future than during this reference period.

The team used an AI-based simulation model trained on 135 million data points from forest simulations across 13,000 European locations in combination with multi-decadal satellite data on forest disturbances. This allowed them to simulate future forest development and the occurrence and impacts of disturbances down to the level of a single hectare, yielding highly precise insights into regional differences in future forest disturbance trajectories. The study is also groundbreaking in its use of artificial intelligence to evaluate forest development at the scale of an entire continent.

Large regional differences

According to the study, forests in Southern and Western Europe will be particularly affected and will undergo the strongest changes in forest disturbance. Northern Europe is expected to be less severely impacted overall, though hotspots of future forest damage are also likely to emerge there. "Disturbances are increasingly becoming a cross-regional issue, disrupting timber markets across Europe and threatening the ecosystem services forests provide for society," says Rupert Seidl.

The authors of the study therefore see an urgent need for forest policy and management to account for increasing disturbance levels: "We need to be prepared

for significant forest damage in the coming years. On one hand, this means we must prepare for and buffer against stronger fluctuations in the services forests provide. On the other hand, disturbances also offer the opportunity to establish new, climate-resilient forests—they act as catalysts for change. Forestry must address both the risks and opportunities of rising disturbance levels, supported by new scientific methods and insights," Seidl explains.

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Czech University of Life Sciences Prague (CZU) is the fourth or fifth largest university in the Czech Republic. It combines a strong academic tradition with the latest technologies and progressive research in agriculture and forestry, ecology and environmental sciences, technology and engineering, as well as economics and management. Modern laboratories with excellent facilities, together with the university's successful training enterprises, provide high-quality education and opportunities for personal development, including involvement in scientific projects both in the Czech Republic and abroad.

According to international rankings, the university belongs to the top two and a half percent of universities worldwide. In the most recent Times Higher Education World University Rankings, it moved from third to second place among the best Czech universities. In the global comparison, it improved from the 801–1000 band in 2024 to the current 601–800 band. According to the Academic Ranking of World Universities (the Shanghai Ranking), in 2025 it ranked in the 801–900 band worldwide and shared fourth to fifth place among the universities in the Czech Republic included in the ranking. The university is also the only one in the Czech Republic with three subjects ranked within the global top 100, and its main field, Agriculture and Forestry, ranks 28th among universities worldwide and fifth in Europe. According to the latest UI GreenMetric World University Rankings, CZU is the 31st most environmentally sustainable university in the world and the top-ranked university in the Czech Republic in this ranking.