CLIMTREE: Ecological and socioeconomic impacts of climate-induced tree diebacks in highland forests

Call: Mountains as Sentinels of Change
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Climate change affects mountain forests by increasing the intensity and frequency of disturbances such as drought, insect and pathogen outbreaks, fire, wind and ice storms. As a result widespread tree mortality has been reported in recent decades. Most mountain forests support a rich community of organisms, so the loss or replacement of any tree species implies a change in species composition and a financial and economic cost. Understanding which species are lost and which are resilient to these environmental changes is crucial in order to take reasoned management decisions for mitigation. In addition, the presence of large numbers of dead trees and the replacement of dying native trees by exotic species have an impact on human inhabitants, tourists, and forest owners and can lead to local social conflicts over whether resources should be expended on maintaining traditional landscapes. To study the impact of climate change and forest management on the biodiversity of highland forests, we will quantify changes in species richness and composition of a wide range of terrestrial and freshwater organisms, along tree-dieback gradients of four highland conifers in European and Chinese mountains, using cutting-edge molecular technology. We will also measure changes in functional diversity for several focal groups recognized as regulators and indicators of key water and soil processes and ecosystem services. To study the perception of climate change by local populations and the socioeconomic impact of climate-induced mountain forest diebacks and tree replacement strategies on local communities we will carry out both qualitative and quantitative surveys in Europe and China. This project involves a multidisciplinary team of ecologists, sociologists, economists, geographers, forest entomologists, limnologists, mycologists, molecular biologists, forest managers and policy makers. We will work with stakeholders to disseminate the results of the project and facilitate the adoption of newly generated tools and indicators by policy makers.