

## Submitted Abstract

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## Abstract

Mountain forests fulfil essential socio-ecological functions. They provide goods and services fundamental for ensuring adequate livelihood and wellbeing of local communities, while ensuring protection against natural hazards and mitigating global climate change effects. Nonetheless, mountain forests are among the most vulnerable ecosystems to climate change and are exposed to a growing number of stressors.

The increase in frequency and intensity of natural and human-induced disturbances play a central role in incrementing the vulnerability of mountain forests. Among natural disturbances, windstorms have been identified as the main disturbing abiotic agents for European forests, affecting a multiplicity of socio-environmental dimensions. Considering current and future scenarios, it is mandatory to investigate windstorm consequences with an integrated and systemic approach able fully represents the broad range of impacts and cascade effects among all the dimensions composing mountain forest socio-ecological systems.

Despite the existence of a vast literature documenting windstorm repercussions on forests, a relevant gap of knowledge in terms of multidimensional analysis of impacts exists. Research mainly adopts a uni-dimensional and sector specific approach, prioritizing impacts on environmental dimensions, leaving aside the understanding of human-nature interactions in shaping overall resilience of forest mountain system.

Through the adoption of an interdisciplinary approach this contribution aims at improving current knowledge on windstorm impacts on European mountain forests. Within the framework of Vaia-Front project, a detailed literature review was developed to simultaneously disentangle windstorm impacts on multiple forest related dimensions. A systemic approach was used to collect most relevant direct and indirect windstorm impacts on ecological, pest risk, geomorphological, forest operations, economic, socio-cultural and institutional forest related dimensions. Direct impacts and cascade effects retrieved are summarized and visualized in a causal map. The map aims at giving a detailed overview of cascade dynamics arising from windstorms repercussions on forests SESs and at improving the comprehension of human-nature interactions that influence socio and ecological resilience and post windstorm recovery in mountain forest SESs. Our study stresses the importance of implementing a multidisciplinary approach to assess windstorms and, more in general, extreme events impacts in order to design effective and long term recovery strategies, and tackle multiple challenges connected to natural hazards intensification.