

EGU21-8635

<https://doi.org/10.5194/egusphere-egu21-8635>

EGU General Assembly 2021

© Author(s) 2022. This work is distributed under the Creative Commons Attribution 4.0 License.



The impact of drought on tree growth in Mediterranean sites

Giovanna Battipaglia, Francesco Niccoli, and Arturo Pacheco-Solana

University of Campania, Dendrolab, Department of Environmental, Biological and Pharmaceutical Sciences and Technologies, Caserta, Italy (giovanna.battipaglia@unicampania.it)

Climate-induced forest mortality is a critical issue in the Mediterranean basin, with major consequences for the functioning of these key ecosystems. Indeed, in Mediterranean ecosystems, where water stress is already the most limiting factor for tree performance, climatic changes are expected to entail an increase in water deficit. In this context, annual growth rings can provide short- (e.g., years) and long-term (e.g., decades) information on how trees respond to drought events. With climate change, *Pinus pinaster* and *Pinus pinea* L. are expected to reduce their distribution range in the region, being displaced at low altitudes by more drought tolerant taxa such as sub Mediterranean *Quercus* spp.

This study aims was to assess the physiological response of *Pinus* and *Quercus* species growing in the Vesuvio National park, located in Southern Italy and where an increase of temperature and drought events has been recorded in the recent years. Our preliminary results underlined the importance of temperature on the tree ring width of all the analyses species. The high temperatures can cause a change in the constant kinetics of the RuBisCo, leading to a consequent decrease in carboxylation rate and thus to a reduction in tree growth. On the other hand, also precipitation seemed to affect the growth of the sampled trees: indeed, in all the chronologies a reduction in growth was found after particular dry years: for example, the low rainfall in 1999 (455 mm/year) determined a drastic decline in growth in 2000 in all the species. In addition to the climatic factors, competition can also play an important role in the growth rate: dendrochronological analyzes have highlighted how stand specific properties (i.e. density, structure and composition) can influence individual tree responses to drought events. The knowledge of those researches should be integrated into sustainable forest management strategies to minimize the potential impacts of climate change on forest ecosystems.