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Survey on the vulnerability and resilience of southern Italian forests to extreme climate events

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Forest dieback phenomena occur all over the world and have been mainly attributed to extreme droughts and heatwaves. These phenomena are more pronounced in the Mediterranean basin, causing a significant impact on the structure, composition, and productivity of forests. Understanding the response of Mediterranean forests to extreme climate events is of paramount importance to assess their vulnerability to such phenomena. The present study combined both radial growth data and remotely sensed indices (i.e., Normalized Difference Vegetation Index, NDVI) to analyse the vegetation status of selected deciduous forest stands impacted by the summer 2017 heatwave. We surveyed several sites of the Southern Apennines mountains range in order to: I) investigate the growth response of forest vegetation in terms of resilience and resistance and II) characterize their ability to recover after extreme climatic events. Overall, we observe a significant reduction in radial growth after 2017 in all studied stands. Moreover, the vegetation shows clear signs of "recovery" that are strictly dependent on species-specific and site-specific conditions. In this study we will highlight how these stands responded to the heatwave occurred in the 2017 and how these events can affect the future vegetation dynamics either in terms of growth and evolution of Mediterranean ecosystems.