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## Responses of *Fagus sylvatica* growing in Southern Italy to climate change: insight from sap flow continuous monitoring

**Jerzy Piotr Kabala**, Francesco Niccoli, and Giovanna Battipaglia

Department of Environmental, Biological and Pharmaceutical Sciences and Technologies, University of Campania "L. Vanvitelli", Via Vivaldi 43, 81100, Caserta, Italy

The ongoing climate change, with altered precipitation regimes and altered evaporative demand due to the increase in temperature are affecting hydrological conditions in most forest sites in Europe. This change has strong consequences on the distribution, composition and ecological functioning of forest species. *Fagus sylvatica* is one of the most important species in Europe, spanning from southern Scandinavia to the Mediterranean region. Species distribution models forecast a reduction of the area of distribution of *F. sylvatica* in Italy under the climate change scenarios. The hydraulic behaviour and transpiration responses of the beech to climate conditions have been studied in central Europe. However, this has been scarcely addressed in the southernmost part of its distribution area, where this knowledge might be critical in understanding the physiological responses of this species to climate change, and then its capability to persist in the area.

This study aims to understand the responses of the transpiration of a *Fagus sylvatica* forest to meteorological variables in the southern Apennines (Matese Regional Park, Italy). The forest stand has been continuously monitored for 2 years with the TreeTalker devices, that record sap flux data at an hourly scale, along with several microenvironmental parameters. The monitoring period encompasses the droughty 2022 year, with high temperatures and precipitations well below the average.

The forest stand studied varies its sap flux in response to the environmental conditions, by reducing its transpiration in late summer, when VPD is high, but water availability is low. This conservative hydraulic behaviour seems to protect the trees from immediate damage due to drought periods, as no tree mortality has been observed. These results suggest that even if in the past *Fagus sylvatica* has been considered an anisohydric species, the southern ecotypes show a more isohydric behaviour than expected. The prosecution of this monitoring might provide further information about long-term trends in the ecophysiology of this forest.