



Soil water dynamics in forested and irrigated sites in Cyprus

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The water storage in soil is a dynamic process that changes with soil, vegetation and climate properties. Water retention curves, that describe the relationship between the soil water content (θ) and the soil water potential (ψ), are used to model soil water flow and root water uptake by the plants. The overall objective of this study is to derive the retention curves of soils at two forested (Agia Marina, Platania) and two irrigated (Galata, Strakka) sites in Cyprus from in-situ soil moisture and soil water potential observations.

The long-term (1980 – 2010) average annual rainfall at Strakka olive grove (255 m elevation), Agia Marina P. brutia forest (640 m), Galata peach orchard (784 m) and Platania P. brutia forest (1160 m) is 298, 425, 502 and 839 mm, respectively. The average soil depth at Agia Marina is 14 cm, while at other sites it is around 1 m. We installed a total of 18 TEROS21 soil water potential sensors, 37 5TM and 19 SMT100 soil moisture sensors, at different soil depths at the four sites.

Results from January 2019 to January 2021 show differences in the water retention curves of the four sites due to different soil textures. At the forested sites, θ reached wilting point at the summer period, indicating that trees extend their roots beyond the soil profile, to the bedrock in order to survive. At the irrigated sites, θ exceeds field capacity during irrigation, indicating over-irrigation. We found different water retention relations after rainfall and after irrigation, indicating that irrigation has an uneven spatial distribution. These findings suggest that the irrigation in these fields is not optimal and farmers may need to increase the number of irrigation drippers, while reducing the irrigation amount per dripper. From a monitoring perspective, increasing the number of sensors may give a better representation of the soil moisture conditions.

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