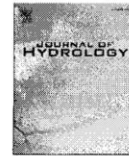




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Evapotranspiration from a Mediterranean evergreen oak savannah: The role of trees and pasture

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SUMMARY

Mediterranean evergreen oak woodlands of southern Portugal (*montados*) are savannah-type ecosystems with a widely sparse tree cover, over extensive grassland. Therefore, ecosystem water fluxes derive from two quite differentiated sources: the trees and the pasture. Partitioning of fluxes according to these different sources is necessary to quantify overall ecosystem water losses as well as to improve knowledge on its functional behaviour. In southern Iberia, these woodlands are subjected to recurrent droughts. Therefore, reaction/resilience to water stress becomes an essential feature of vegetation on these ecosystems. Long-term tree transpiration was recorded for 6 years from a sample of holm oak (*Quercus ilex* ssp. *rotundifolia*) trees, using the *Granier* sap flow method. Ecosystem transpiration was measured by the eddy covariance technique for an 11-month period (February to December 2005), partly coincident with a drought year. Pasture transpiration was estimated as the difference between ecosystem (eddy covariance) and tree (sap flow) transpiration. Pasture transpiration stopped during the summer, when the surface soil dried up. In the other seasons, pasture transpiration showed a strong dependence on rainfall occurrence and on top soil water. Conversely, trees were able to maintain transpiration throughout the summer due to the deep root access to groundwater. *Q. ilex* trees showed a high resilience to both seasonal and annual drought. Tree transpiration represented more than half of ecosystem transpiration, in spite of the low tree density (30 trees ha⁻¹) and crown cover fraction (21%). Tree evapotranspiration was dominated by transpiration (76%), and interception loss represented only 24% of overall tree evaporation.

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