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Hydrology and Earth System Sciences Discussions

Interactive comment on "Transpiration of montane *Pinus sylvestris* L. and *Quercus pubescens* Willd. forest stands measured with sap flow sensors in NE Spain" *by* R. Poyatos et al.

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The topic of this paper is important because: i) drought, especially exceptional events like in summer 2003, drives forest trees functioning, ii) the comparison between Scots pine and pubescent oak brings useful information in terms of impact of severe drought on forest ecosystems. The most interesting findings are: 1) the large difference in stand transpiration between oak and pine, 2) their contrasted response to drought.

Positive points: - Mediterranean area: not so much field studies in this region - The two plots are comparable (height, LAI) - The use of 12 sap flow sensors per tree

Suggestions/questions: - Does the method used for calibrating the transpiration model in Scots pine give the same parameterisation than non-linear multi-variate methods?

- E0 is calculated with the Penman-Monteith formula; the fact that non-linear relationships are obtained between Ec and E0 probably results from the canopy conductance. A model could be proposed by: 1) calculating canopy conductance from sap flow and climate measurements, 2) modelling the canopy conductance variation with climate and soil water deficit, 3) include this model in the Penman-Monteith equation. Anyway I would suggest a model calibrated using the 2003 data and validated on the 2004 data. - Transpiration in oak plot seem quite low; note also that in the paper of Bréda and Granier (1996), sessile oak transpiration was compared to Penman PET, not to Penman-Monteith. T/PET ratio is lower using Penman. - Why more data points in figure 1a than in figure 1b? - Why a transpiration model cannot be built in oak?

Negative points: - Soil measured only in the first 30cm soil depth (probably impossible to install the TDR probes deeper); anyway, this limits the use of soil moisture deficit. As stated in this paper, there is probably water extraction below. - I am not convinced that the scaling procedure in oak sapflow is correct. The sapwood thickness in Q pubescens is probably larger than 10 mm. The paper by Nadezhdina et al (1992) does not give data in this species.

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