

Interactive comment on “Time-series analysis of the long-term hydrologic impacts of afforestation in the Águeda watershed of North-Central Portugal” by D. Hawtree et al.

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General comments This is an interesting study and it deals with an important issue – hydrologic response to afforestation. The trend analyses appear to be sound, and the interpretation of the results is reasonable. My major concern is the overly-conjectural nature of the paper, and the heavy reliance on studies done by others in trying to interpret the present findings. This is partly understandable given that the authors have not conducted the types of detailed process studies that might validate some of the conclusions they have drawn from the trend analyses (e.g. changes in hydrophobicity, changes in interception). Nevertheless, I think there are analyses that

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the authors could conduct or include that would strengthen their arguments regarding the processes responsible for the trend results. For example, it might be useful to present the results of the conductivity mass-balance work that were used to support the baseflow values obtained by the digital filter approach (a Figure plotting one vs. the other for the 2001-2009 period might suffice). I have suggested another analysis that could be used to support the assumed role of soil hydrophobicity in my specific comments below. Specific comments page/line 12239/8-9 What are the actual values of tree densities in the plantations? 12240/12 In addition to more baseflow, baseflow comprised a larger fraction of total runoff. 12241/6-10 The authors could test this hypothesis (that soil hydrophobicity was responsible for the reduction in baseflow) by conducting a quickflow separation (using the Hewlett and Hibbert relation, or a similar separation method), and examining whether there has been any change in the number and magnitude of quickflow events and the ratio of quickflow to precipitation. This would provide at least indirect support for the contention that hydrophobic soil conditions were responsible for the decline in baseflow, since one might expect greater quickflow generation from hydrophobic surfaces. 12241/12-14 Should the order of this argument be reversed? I would have thought that a delay in breaking soil water repellency would lead to a longer recovery of soil moisture levels, since water would continue to move laterally over the surface of hydrophobic soils. Table 2 Include baseflow amounts. Figure 6 This should also include the baseflow quantity data and trend results.

Please also note the supplement to this comment:

<http://www.hydrol-earth-syst-sci-discuss.net/11/C5053/2014/hessd-11-C5053-2014-supplement.pdf>

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