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Hydrology and Earth System Sciences Discussions

Interactive comment on "The impact of forest regeneration on streamflow in 12 meso-scale humid tropical catchments" *by* H. E. Beck et al.

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General comments: The main scientific contribution of this paper is the use of a conceptual rainfall-runoff model to explore whether forest regeneration has had a demonstrable impact of metrics of high, average and low streamflows from basins in Puerto Rico. This is a very worthwhile exercise, since forest and water managers alike are increasingly faced with questions related to the implications of land use change for streamflow from relatively large drainage basins (greater in size than the experimental basins that have generally been used to explore hydrological response to land use change). The modelling approach used in the paper to estimate the "pre-change" condition is appropriate given the challenges of conducting a traditional "paired-basin" study at these spatial scales. I found the jackknife approach to estimating the devi-

ation between observed and model-predicted streamflow behaviour to be particularly interesting and appropriate. I also feel that the authors did a very good job of deriving estimates of the key drivers (precipitation, evapotranspiration) for the modelling of several relatively large basins. However, given that 7 and in some cases 8 model parameter values had to be estimated via calibration, I was surprised to not see any mention of the issue of model equifinality and its implications for the estimated deviation between observed and predicted streamflow behaviour. The authors might want to consider including a brief discussion of this issue in the paper. The paper also presents a valuable review of the possible reasons why no clear impact of forest regeneration on streamflow could be detected. The paper is generally well-written (although I have some very minor suggested editorial changes noted in my specific comments) and well-argued, and I feel that it makes a worthwhile contribution to our understanding of the issue of streamflow response to land use change at fairly large spatial scales.

Specific comments: Page/Line 3048/20 Not sure of the appropriateness of the word "solid". 3048/21 Sentence beginning "This is a relatively high-quality long-term hydroclimatic records ..." is a bit awkward. 3052/19 Sentence beginning "Daily P from the Global Historical Climatology Network-Daily ..." is incomplete. 3052/21 Use "the" rather than "The". 3055/1 Use "by" rather than "times"? 3059/16 "data" are plural – thus, "are" rather than "is". 3063/6 Sentence beginning "Figure 6 shows regressions between ..." – I would reorganize this sentence such that it is the dependent variable (the cumulative change in D) being regressed on the independent variable (the change in the amount of urban and forest area) 3066/13 Sentence beginning "Additionally, given that the Rio Fajardo catchment ..." – I take the authors' point that this catchment may be an outlier; however, the preceding discussion is in terms of Qtot, and this catchment is an outlier for dry-season flow and Q0.05, not Qtot according to Figure 6. 3066/14 No comma needed after "(Figs. 6e and 6f)". 3066/28 Should be "around 3.0 (ïĆś0.1) mm d-1". 3067/20 It is not clear to me how the authors arrived at the values of -340 (ïĆś 480) mm yr-1; when I scale up the response from 26% forest cover to 100% forest cover I get values of -330 (ïĆś 477) mm yr-1. Is the difference between the two

values due to the change in urban land cover? Regardless, I think a bit more detail on how these values were obtained is needed. 3068/7 “However, this explanation does not apply to the present study, since the catchments were exploited as pastures or agricultural fields for a sustained period of time prior to their abandonment and subsequent forest regeneration” – I am not clear as to how this points negates the idea of rapid forest regeneration after abandonment. Are the authors arguing that long-term use of the land for agricultural practices precludes rapid forest regeneration? If so, this point should be backed up with reference to the literature. 3070/27 Fig. 5g should be Fig. 6g? 3071/22 “generation of Q” rather than “Q is generated”? References These need to be in a consistent format. Table 1 Footnotes: “Van Dijk, 2010” should be in parentheses.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 10, 3045, 2013.