

Interactive comment on “Afforestation by natural regeneration or by tree planting: examples of opposite hydrological impacts evidenced by long-term field monitoring in the humid tropics” by G. Lacombe et al.

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We thank the two anonymous referees for their positive comments on our manuscript and for their specific suggestions that helped us to improve the article. Here below, we have pasted all comments and questions from the two referees and have responded to each of them. ‘Authors:’ is written at the beginning of each of our responses.

Anonymous referee 1

General comments This article presents a study that emphasizes the impact of af-

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forestation (natural and plantation) on hydrological properties of catchments in humid tropics. They showed that plantation increased streamflow while natural regeneration decreased streamflow. The results that are discussed here are novel and interesting for the scientific community as well as for managers. Besides the good quality of the analyses, the article is well written and results clearly presented. I recommend this article to be published in HESS. Comments are given below. Title The title is good but quite long. It may be an advantage to shorten the title

Authors: we agree and have shortened our original title that included 22 words. We propose a new title including 13 words: 'Contrasting hydrological impacts of afforestation in the humid tropics: a long-term field monitoring'

Introduction After reading the introduction, it seems that you will use second approach described on page 3 line 32-33. However, you used a method that differs from this second approach, especially concerning the calibration method. Could you clarify this in the introduction on page 4, line 13? I was expected a calibration of the model before afforestation, while you used the 13 years for calibration.

Authors: we have split the second objective in two distinct objectives (2 and 3) to provide more information: "2. Use a conceptual monthly-lumped rainfall-runoff model repeatedly calibrated over successive 1-year periods and used in simulation mode with specific rainfall input to generate a cross simulation matrix for each study catchment, 3. Apply correlation analyses and a non-parametric trend detection test to simulated flows to assess how these land-use changes have modified the hydrological behaviour of the catchments, and whether the hydrological changes are statistically significant,"

Material and methods Page 4, Line 26: Annual runoff amount was calculated before afforestation or after, or for the whole period?

Authors: it is now mentioned in the text that annual runoff and rainfall amounts were averaged over the whole study period in order to provide general information about the two catchments in the sub-section "study site".

Page 5, line 5: check the scientific name of Job's tears. "Coix lacrima-jobi"??

Authors: we have corrected the scientific name in the text: Coix Lacryma-jobi.

Page 5, line 28-33: description of land-use in Dong Cao needs to be clarified. Dates and surface cover of afforestation are missing here. This is needed for model calibration, right? (cf. my comment above in the introduction). It was well exposed for Laos line 18-19.

Authors: we have added a sentence that provides details on dates and surface cover of afforestation in the Dong Cao catchment: "most of the tree plantations and annual crops were finally abandoned, leading to the natural re-growth of forest communities whose percentage surface area over the Dong Cao Catchment nearly doubled between 2001 (45%) and 2013 (84%)."

Figure 1: symbol of meteorological station and water level recorder are not easy to see on the map. Please make it more different.

Authors: the symbol of water level recorder has been changed to a rectangle and that of the meteorological station has been slightly enlarged.

Page 7: figure numbers do not appear in the right order in the text.

Authors: we have modified the text and switched the numbers of Figures 6 and 7 so that figures are cited consecutively in the text.

Page 8, Line 23: "simulated flow values" without "s" for flow?

Authors: this error has been corrected.

Results and discussion Page 10, Line 5-10: prefer the description of the most important results rather than repeating what is displayed on the figure 5. How was the variation? Describe more precisely how (negative, positive) the correlation between the inter-annual variations of the curve and the variation in simulated season flows is. Same comment for the description of results in Vietnam. Page 11, line 17: "positively

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correlated”, please indicate how the correlation is

Authors: instead of describing the content of the figure already available in the figure caption, we directly described the main correlations observed and indicated their sign.

Anonymous referee 2 General comments: In this paper the authors present an interesting study on how the manner in which forests are generated effects hydrology. They find that stream flows are impacted in different ways with different afforestation approaches. I found the paper to be very well written, easy to understand and the analysis sufficiently rigorous. I would recommend publication with modest review. Specific comments First off, I think the title could be more concise.

Authors: as indicated above in our response to referee 1, we have shortened the title.

Abstract line 6. Instead of “controlling”, use “which controls”. I found the awkward.

Authors: done

Intro line 21. I would use “strem flows” “flows is vague.

Authors: all “flow” have been replaced by “streamflow” in the introduction

Intro line 23. Wilcox and Huang should be 2010.

Authors: corrected

Intro page 3, line 9. Calibration comes in here but is not described, I wasn’t sure what you were talking about.

Authors: we have modified the previous sentence to clarify the meaning of calibration in this context: "Paired catchment studies establish statistical relationships for outflow variables, during a calibration period, between two neighbouring catchments ideally similar in geomorphology, area, land-use and climate."

Study sites, page 4 line 13. What do you mean by low input?

Authors: we have replaced “low input” by “with very limited external input such as
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fertilizers and pesticides”.

Study sites, last paragraph. It seems that there should be more references, or is the history word of mouth?

Authors: several references describing the evolution of the land use in Dong Cao catchment until 2008 were already cited in the text: Clément et al, 2007, 2009; Podwojewski et al., 2008. But we confirm that the most recent land-use changes (after 2008) were observed and mapped as part of the present study, as indicated in the section 2.2 ‘Data collection’, hence the absence of citations for this last sub-period.

Figures seem to be called out of order Starting on page 4.

Authors: as mentioned in our response to reviewer 1, figures are now cited consecutively in the text.

Page 5, Section 2.3, line 7. List model reservoirs.

Authors: the production store and the routing store are now explicitly mentioned in the text.

Page 6, Section 2.3, line 23. “resp” is only used here, be consistent.

Authors: “resp.” has been changed to “respectively” each time it appeared in the text.

Figure 1 needs scale bars for catchments

Authors: one scale bar similar for the two catchments was already included in Figure 1. We have moved it closer to the catchments for greater clarity.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 12, 12615, 2015.

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