

## ***Interactive comment on “Technical Note: A hydrological routing scheme for the Ecosystem Demography model (ED2+R)” by F. F. Pereira et al.***

**Anonymous Referee #2**

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The paper submitted by the Authors demonstrates the application of the Ecosystem Demography (ED2) Model which has been improved by including a river routing routine. The model was applied to the Tapajós River Basin. While the model shows improvements, the approach is not particularly novel and I believe that the value of the paper could be improved by providing more detail on the input parameters and variables used in the model. By considering the input parameters, the discussion could be improved by describing them in light of understanding the hydrological processes in the Basin and therefore improve the interpretation of the results. In its present form, the results only really illustrate that the model improved the simulation and gives little hydrological interpretation as to why. I think the introduction could be improved by giving a brief review of the significance of river-routing routines in hydrological modelling as well as what the “state-of-the-art” is in terms of large scale river basin model development.

C1

Specific technical corrections are listed below: Pg 3 L22 Remove the word “of” after ...investigating of how...

Pg 4 L23 What is the word heterogeneity referring to? Is it the landuse, rainfall, soils etc.?

Pg 4 Sect. 2 As mentioned earlier, I believe a brief description of the model parameters and variables would be useful. This would add value to the paper so that the results could be reproduced by other researchers. In the papers present form, the reader would certainly not be able to reproduce the results. The parameters/variables used could be presented in a table format.

Pg 5 L26 the IPH-MGB model routing routine forms the foundation for the ED2+R model. This needs to be briefly expanded on and mentioned in the Introduction of the paper.

Pg 5 L27 move the word “used” in front of the word “extensively” (i.e. ...used extensively... rather than extensively used.)

Pg 6 L9 I don't think Annex A is required in this paper. Therefore, the reference to Annex A can be removed.

Pg 6 Sect 4. The catchment characteristics need to be described. For example, what is the landuse, altitude, geology, slope, soil depth and texture etc., as well as a climate description such as rainfall, evaporation temperature, seasonality etc.

Pg 7 L13 what are parameters  $\alpha$  and  $\beta$ ? what is there range (i.e. 1-10 or 1-100 etc).

Pg 7 L15 change the word “was” to “were”

Pg 7 L20 this is the first time parameters CS, CI and CB are referred to, by no description of what they are is given. The first time they are described is in Annex B.

Pg 8 L18 Avoid vague terms like “reasonably well”. Try and quantify such statements.

C2

Pg 8 L 31 As above, avoid vague terms such as “excellent match”. Quantify what makes this and excellent match.

Pg 9 L 17 How much of an impact does deep groundwater have on the streamflow and therefore on the routing routine? This could be determined by doing a sensitivity analysis of CS, CI and CB.

Pg 9 L26 &27 What makes the ED2+R models principal advantage its ability to predict the sensitivity to global environmental change? This statements needs to be substantiated and once again, the input parameters need to be described. For example, is the model able to simulated changes in transpiration due to increases in CO2 which has a knock-on effect on streamflow.

Pg 9 L27-29 The sentence “As mentioned.....modelling framework.” Is repetition. Therefore, this could be deleted.

Pg 10 L3-9 This sentence does not form part of a conclusion, but is merely a repeat of what is said in the introduction. Therefore, this could be deleted and the conclusion begin from “. . .In this Technical Note. . .”

Pg 10 Sect 7. As mentioned previously, without some description of the model parameters and inputs, it is difficult to draw hydrological conclusions when there is no transparency as to what has been input into the model. If the input parameters are known, then better conclusions can be drawn as to whether it is the input data that requires attention rather than the parametrisation of another routine, which in this case is the river-routing routine.

Pg 11 Annex B I think Annex B should be incorporated into the paper rather than as a separate Annex. A chapter on the calibration of the model is important.

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