We would like to thank again the four reviewers who produced significant comments and raised important issues that we hope to address convincingly in order to strengthen the paper.

- **On the slopes issues:** going further than our previous reply, we ran two more simulations using the reference case, and multiplying the slopes by a factor 2 and a factor 0.5. The results are given below in terms of mean + standard deviations over the 6 years period for the different budget components. Other test cases are presented for comparison.

	ET (mm)	Q (mm)	S (mm)
reference	839 ± 64	454 ± 151	8 ± 26
No Inland valley	830 ± 64	463 ± 153	8 ± 24
trees	944 ± 53	361 ± 144	-5 ± 54
herb	791 ± 72	500 ± 151	10 ± 17
saprolite	793 ± 60	495 ± 153	13 ± 36
mixed	816 ± 62	475 ± 154	10 ± 28
Slope ref x 0.5	**933 ± 62**	**354 ± 154**	**14 ± 28**
Slope ref x 2	**773 ± 64**	**526 ± 157**	**1 ± 21**

Table 1: summary of the annual average and standard deviation for the 6 simulated years and for each budget component. Reference case with slopes multiplied by 0.5 and 2 are also shown.

There is an insignificant impact on the interannual variability (standard deviation), but a significant impact on yearly averages. The slope values taken in this short experiment are extreme cases as compared to the regional topography where inland-valleys are found (see previous comment). Yet their impact is comparable to the impact of vegetation distribution (trees case ~ slope ref x0.5 ; herb case ~ slope ref x2). Lower slopes (resp. higher) decrease (resp. increase) lateral transfers to the benefit (resp. cost) of evapotranspiration. This short analysis can be added to the paper, together with the references given in our previous reply to comments.

The goal of the paper is not to reproduce absolutely the behavior of our benchmark catchment say, by using the real topography, as we want to derive the controlling factors of inland valley critical zone systems -through virtual experiments- among factors that are either susceptible to evolve (land cover), that characterize inland valleys (thalweg clay lens) or are still largely unknown (subsurface lithology). To this respect, slopes are not unknowns nor susceptible to evolve much (as land cover which have been observed to change significantly, and are also projected to do so) and are not targets of this study. However, catchment slopes may significantly impact the water budgets as shown by these two experiments, and impact our ability to generalize the inland valley functioning based on this study only.

- **On the synthetic vs case study issue** (reviewer #3): We indeed used a “well-informed case study”, from which we drew schematic configurations to build virtual experiments, also based on our knowledge and litterature review of other inland valleys configurations. From these results we draw conclusions on the sensitivity of such critical zone system to its unknown and likely-to-evolve components (vegetation, clay lens, lithology). We will add some lines in the introduction, abstract & conclusion to clarify this approach.

- **On the study transferability to other inland valleys** (reviewer #3):

The modeled synthetic case is built based on our knowledge of inland valleys. The model is not intended to reproduce every single inland valley behavior, but instead draw the first order lines of the impact of main inland valleys characteristics (clay lens), of their sensitivity to changes (in land cover) and to largely unknowns parameters (susbsurface lithology). We reckon that further explanations should be added to the introduction, and we will do so.

- **On the reproducibility of the study** (reviewer #4):

Thank you for pointing that out. We will indeed attach the main ParFlow configuration script, and link to the ParFlow code. We will investigate the feasibility of a Docker container for the PF environment.

Minor comments of reviewer #3:

- ‘elementary’ refers to the usual term : the smallest catchment (two hillslopes) draining into first order streams. We will add this precision.

- The meteorological forcing is indeed homogeneous over the domain. The domain extent is small enough to justify this. We will mention this precision in the text, thank you!

- The data is evaluation data (as in section 2.5 title): we will replace the single occurrence of ‘validation’ by evaluation because this is indeed evaluation of a synthetic case. Thanks much for pointing that out.

- We will replace Sudanian area by Sudanian Savanna.

- On the EOF modes: Mode 2 accounts for about 8% of the total variance, and this is why we did not discuss it. However, you are right, the interanual storage variations are present in this mode, but together with some residuals at the seasonal level. As our hybrid gravity data only covers 2 years, which is limited for interanual terms comparison, and because of the low level of variance explained (there is much more signal at the seasonal level than the interanual one), we did not choose to show other modes than mode 1. We will add a line to mention the content of mode 2, as explained above.

Minor comments of reviewer #4:

-the Geology is metamorphic, thank you for pointing out this omission.

- Many thanks also for the reference given, which we did not know, but significantly strengthen the current study. This inland valley study describes the same hydrological behavior between the perched water table and the permanent water table : a disconnexion in the valley thalweg and some lateral connexion upstream, as described in Figure 13 in Hector, B., Séguis, L., Hinderer, J., Cohard, J.-M., Wubda, M., Descloitres, M., Benarrosh, N. and Boy, J.-P.: Water storage changes as a marker for base flow generation processes in a tropical humid basement catchment (Benin): Insights from hybrid gravimetry, Water Resour. Res., doi:10.1002/2014WR015773, 2015.

We will discuss our settings and results with respect to their study.