COMMENTS TO REVISIONS

The revised manuscript has two focuses: model evaluation and investigation of temporal evaporation characteristics relevant for understanding of moisture recycling. Following suggestions from referees, we have reorganized the manuscript to elaborate on the time scales of evaporation fluxes and removed the sections on land-use change. We have explicitly written out our research questions and rationale of the model development. In addition, we have improved the connection to Part 2 and explain much more how this manuscript contributes to the understanding of moisture recycling. The abstract, introduction, and conclusions are largely rewritten to adapt to these changes. New to this revision are also analyses of evaporation partitioning with time since precipitation, evaporation efficiency of different evaporation fluxes in rainy or dry conditions, and robustness of results depending on storage uncertainties. These analyses are relevant for understanding the contrasting roles of different evaporation fluxes for moisture recycling and useful for interpreting Part 2.

A list of revisions is provided below. They address all the comments raised by the referees, indicated in the right column (G for general comments, S for specific comments). Unless otherwise stated, references to tables and figures to the manuscript in open discussion prior to revision. The sections under the column "Applies to" are, however, the sections of the revised manuscript.

OVERVIEW OF MANUSCRIPT REVISIONS

Applies to	Change	R#
General	Improved the writing and paper organization to better clarify the links between the analysis, results and conclusions. The scientific questions are clearly written out. Proof reading by native speaker.	1G
	We intended to add reference to specific figures in Supplementary materials, but decided to instead incorporate the supplementary materials in the main body. All figures are referenced to.	1S
	Removed the land-use change experiment and related figures and table. Removed Appendix C and related figures.	5
	Reduced the number of significant digits.	2S
Terminology	Eliminated the use of "physical/biophysical".	
	Eliminated "ground" to consistently use "floor". "Ground" is used only in "ground and litter surface" (to define floor), "ground heat flux", and "leaf area per ground area".	1S
Tables and figures	To aid the reader in the revised manuscript, the caption now includes a reference to the section in the manuscript that describes the figure.	2S
	Using color blind friendly maps.	1S
	We combined Table 1 and 3.	1S
Title	Changed to adapt to the revised manuscript.	
Abstract	Rewritten to adapt to the revised manuscript.	
1. Introduction	The rationale for two companion papers stated much clearer already in Part 1, as this does not become obvious until Part 2.	1G
	The scientific goal of the paper is clarified.	1G
	Revised introduction	1S
	Highlighted the strengths and uniqueness of STEAM in the context of what has previously been done.	2G, 3,4,5
	We replaced "the available evaporation energy" with "the already limited energy available for evaporation". (at p. 205 L12-14)	2S
2. Model description	Model description before data description.	1S
	Included monthly ground heat flux as a function of monthly mean air	2S

	temperatures.	
	We modified the beginning of Sect. 3.2 to make clear that the set of equation is run at 3 hour time step	De jeu
	We acknowledge the limitation of the Pellarin relationship.	De Jeu
3. Data	We condensed Data section.	3,4,5
4. Methods	Section 4.3. Page 220. Line 17: 'considered to be on the high side'. We rephrased to "higher than several other satellite and/or gauge-based precipitation datasets".	1S
	Condensed the method section. We moved the section of land-use parameters to the appendices.	3,4,5
	Formulated runoff calculation in equation format.	4
5. Results: Model evaluation	Included reference to Jasechko's reply and recent critiques of isotope estimates.	1S, Miralles
	Cited Jackson et al. (1996) and Canadell et al. (1996).	2S
	Removed the section on land-use change experiment.	2S
	The discussion on rooting depth is moved to Methods – Storage capacities.	2S
	Corrected citation: Miralles 2011 instead of Miralles 2010 at one place.	Miralles
	Cited Sutanto 2014.	2S
6. Results: Temporal characteristics	Added the analyses of the evaporation partitioning since precipitation.	2G
	Added sensitivity analysis of interception storage capacity (and storage capacity of the unsaturated zone).	1S
	Plotted a Hovmöller diagram for time scales.	2S
	Added how differences in evaporation time scale may be relevant for moisture recycling.	
7. Summary and conclusion	Rewritten to adapt to the revised manuscript.	
	Expanded the discussion on the limitations of STEAM.	2G
	Expanded the literature review to include some of the learnings from previous model inter-comparison studies.	2G, Miralles
	Explained possible applications of STEAM more detailed in the revised manuscript.	5
Appendices	Appendix D Sensitivity to precipitation: Cited Materia et al. (2010).	2S
	Land-use parameters (part of methods) moved to Appendix to slim the main method section.	3,4,5
	Removed daylength equation.	5
	At p. 230, L27-29 rewritten as: "This is not surprising, because precipitation uncertainties have been shown to translate almost entirely into uncertainty in runoff in wet regions, but not at all in arid regions (e.g., Fekete et al., 2004)."	2S
	P231 L11: Present tense used.	2S
Supplementary materials	Supplementary material (LandFlux-EVAL comparison) moved to the main body. Replaced line agreement figures with world map figures.	2G, 2S, miralles