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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Providing a non-deterministic representation of spatial variability of precipitation in the Everest region" *by* Judith Eeckman et al.

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The responses are organized according to the organization of the questions. When necessary, the beginning of the question is repeated.

1. In order to answer this question in the paper, I will replace the text from P11L333 to P12L335 by the following text: The optimization method is highly sensitive to the choice of initial values for the beta1, beta2, z1 and z2 parameters. Several attempts have been done and the choices of initial ranges presented TABLE 6 are justified by the following arguments : - minimal and maximal values for the altitudinal thresholds z1 and z2 are chosen accordingly to both literature review (Barros et al. 2000,Anders

et al. 2006,Bookhagen and Burbank 2006, Shrestha et al. 2012, Nepal 2012, Savéan 2014) and observations. The first inquired altitudinal threshold is described in literature between 2000 m and 3000 m and the second threshold is described above 4000 m. These intervals have been enlarged to also test related values. - maximal (minimal) value for beta1 (beta2) are chosen about 10 times larger than the value computed based on observation. Considering the definition of the beta coefficient, a value of beta greater than 2kmˆ-1 would lead to a multiplication of precipitation by 1.22 (by 0.82) within 100m. When applied to the precipitation observed at stations, this would lead to inconsistent precipitation when increasing altitude by 100m. - beta3 coefficient has to be negative because a positive value would lead to an unrealistic value at high summits. Moreover, the minimal value is chosen to be significantly smaller than the value computed for beta3 based on observations, but also to remain higher than the value computed for beta2 based on observations.

2. The IDW interpolation is performed over a 1 km resolution grid. This is specified P9L255.

3. The ECOCLIMAP2 product is only available for Europe (see Faroux et al., 2013). The studied area is not covered by ECOCLIMAP2. Consequently, I won't modify this point in the manuscript.

Minor remarks: I will correct the underlined minor remarksÂă: P3L107: these stations are presented TABLE 2 P7L201-202: The decreasing of precipitation with altitude is characterized P12L344: Based on values

In particular: - P4L121: replace "aleatory" by "random" I agree that the term 'random' would be more grammatically correct here. However, the term 'aleatory' is chosen in order to match the classification of uncertainties proposed by Beven,2016. In Beven,2016, aleatory error is defined as 'uncertainty with stationary statistical characteristics. May be structured (bias, autocorrelation, long term persistence) but can be reduced to a stationary random distribution'. Consequently, I won't modify this point in

the manuscript.

- P12L349-362: What are behavioral and nonbehavioral parameter sets? Please explain more detailed.

Behavioral parameter sets are defined P9L248: A behavioral parameter set is a set that respects conditions (maximum or minimum thresholds) on the output of the orographic precipitation model. At P12L338, I will insert the following sentence : A behavioral parameter set is a set that leads to an annual amount of total precipiation for both catchments comprised between the minimal and maximal values presented Table7. A parameter sets that does not meet these conditions is considered as non-behavioral.

- Discussion paperP13L373: The years 2013 and 2014 are used as spin-up period. Why such a long spin-up time?? The hydrological year that runs from April,1st 2013 to March, 31rd 2014 (i.e. 365 days) is used as spin-up period. 365 days are considered to be a necessary spin-up period to set up all reservoirs at a representative volume, in particular for snow pack and soil water storage. P13L373 , I will add: The 2013–2014 hydrological year was used [...]

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