Reply to the comments of Referee # 1

Anonymous Referee #1

This manuscript presents a methodology to calibrate or optimize the parameters for highly distributed models. It fits well within the scope of this journal. However, I feel that the authors should try harder to bring out the innovative aspects of this work. For example, "improved PSO" is mentioned. But it is hard to tell whether the improvements were proposed by the authors themselves, or simply adopted from other studies. If the latter is the case, then the authors should not claim "improved" in this study. The writing is ok, but still a lot of room to improve, as listed (limited examples only) below.

Thank the reviewer for his/her comments, and revisions will be down based on the reviewer's comments. For the "improved PSO", it is the improvement to the originally proposed PSO, there is no improvement to this method in this paper, but is used for parameter optimization of PBDHMs that is not used by others before. The term of improved PSO is used here because it is used in the cited reference, so in this paper, just to keep it.

Following are responses to the reviewer's comments one by one.

1. P10604, L6, introduce "PBDHM" immediately after "physically based distributed hydrological models".

Will be down in the revision.

2. P10607, L24, "requirrment" –> "requirement".

Will be down in the revision.

3. P10608, L1-2. L 2-6. Long sentences. Please break into a few short ones for better readability.

Will be rewritten, and will be separated into 3 short sentences as "In this method, every parameters are adjusted manually with a factor or a multiplicator(scalar) based on the initially derived parameters from the terrain properties. The scalars for the same parameter in different cells are taken the same values, so the parameters to be adjusted are only a few. This is feassible computationally, and proven to be effective.".

4. P10609, L5. "ease" –> "easy".

Will be down in the revision.

5. P10612, L21-25. "kinematical" –> "kinematic".

Rephrase this part for better readability.

The whole paragraph will be revised as "There are 5 different runoff routings in Liuxihe model, including hill slope routing, river channel routing, interflow routing, reservoir routing and underground flow routing. Hill slope routing routes the surface

runoff produced in one hill slope cell to its neighbouring cell, and the kinematic wave approximation is employed to make this routing. For the river channel routing, the shape of the channel cross-section is assumed to be trapezoid, which makes it estimated by satellite images, and the one dimensional diffusive wave approximation is employed to make this routing.”.