

**Hydrology and Earth System Sciences**

**Inclusion of flood diversion canal operation in the H08 hydrological model with a case study from the Chao Phraya River Basin – Part 1: Model development and validation**

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**COMMENTS FROM EDITOR**  
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Dear Authors,

both Referees are very satisfied with your revised manuscript.

Ref#1 has submitted a few additional comments, suggesting some technical corrections based on a few remaining doubts on the procedure. I invite you to try to address also such points, since the clarifications asked by referee will certainly be beneficial also to other readers who may have the same doubts.

Many thanks again for having submitted your interesting work to HESS,

best wishes,

Elena Toth

**Response to Editors comments**

Dear Editor,

Thank you very much for the positive editorial decision. We are also thankful to both the reviewers for assessing and evaluating the revised version of our manuscript. Their constructive reviews for the improvement of the manuscript are highly appreciated.

We have addressed the three additional questions raised by Reviewer 1 and the manuscript has carefully revised according to these questions. The text that has been added or modified was underlined in the revised manuscript. Also, we have utilized the note tool of Microsoft Word

to add comments to the corresponding changes made by the authors. The following are the reviewer's comments and the corresponding point-by-point replies.

### **Comments from Reviewer #1:**

Many thanks to the authors for their serious response to reviewers' comments. The revised manuscript has greatly improved in clarity. The added information in Table S1 is especially helpful for understanding the results in Figure 5. I now only have three additional questions where clarification from the authors would be appreciated, and I look forward to seeing the paper published soon.

**Reply:** Thank you very much for your positive feedback on our revised manuscript. We highly appreciate your review comments that provided valuable insights for further modifications of the initial version of our manuscript.

The detailed point-by-point replies to all your concerns are given below. Once again thank you for enlightening us with your valuable comments and suggestions.

### **Comments**

1. Based on Table S1, REG/GEN parameters are not that different for Chainat-Pasak, are the large differences in the second half of the year related to the excessive canal discharge under GEN simulation at Makham Thao - Uthong?

Thank you very much for your comment. We agree with your point that the large differences in the diverted canal flow during the second half of the year is due to the increased canal carrying capacity under the GEN scheme for the Makham Thao – Uthong canal. The canal carrying capacity values under the GEN scheme are very high compared with the OBS and REG scheme values (Table S1). This is because the primary purpose of all canals under the GEN scheme is flood control (because flood control is the primary objective of this study) and fixes the canal carrying capacity at the  $Q_{50}$  value, leading to the overestimation of canal flow under this scheme. This GEN scheme can be improved by differentiating the purpose of each canal in the simulations, similar to the approach in the REG simulation. We have already incorporated such discussion in the manuscript (Section 4.4; Line 520-530).

2. Is there any uncertainty associated with the observed carrying capacities, which are solely determined by their cross-sections (Line 285)? This discharge is determined by cross

section area multiplied by flow speed right? While the former can be measured with good accuracy, how is the maximum flow speed before flooding estimated, and does this change with time?

Thank you very much for your comment. Before addressing the comment, we would like to clarify that the observed carrying capacities were not computed by the authors, instead these are the values collected by literature review (JICA, 2013; Tamada et al., 2013) as well as from the Royal Irrigation Department, Thailand. Of course, there will be uncertainty associated with the observed carrying capacities because the maximum flow rate varies over time. However, for this modelling purpose, we have used the available observed data based on the review of literature. To avoid confusion, we have clearly mentioned in the manuscript that the observed values were accessed from the existing literature. **Line 285**

JICA (Japan International Cooperation Agency): Project for the comprehensive flood management plan for the Chao Phraya River basin, Final report, Volume 1: Summary Report, CTI Engineering International Co., Ltd., Oriental Consultants Co., Ltd., Nippon Koei Co., Ltd., CTI Engineering Co., Ltd., available at: <https://openjicareport.jica.go.jp/pdf/12127205.pdf>, September 2013.

Tamada, Y., Hoshikawa, K. and Funatsu, T. (Eds.): The 2011 Thailand Floods: Lessons and Records, Josei-Bunseki Report No.22, Institute of Developing Economies, IDE-JETRO, Japan, 2013.

3. I now understand better "immediate neighboring cell" thanks to updated Figure 2 and corresponding text. So a total of 20% discharge is supplied (10% to the cell that canal flows through, and 10% to the other nearest cell) each time canal flow through a grid right? Then if the initial discharge is 100, after one cell it becomes 80, and after next cell it becomes 64? I am not quite sure how to identify the immediate neighboring cell when the flow first turns toward southeast (Figure 2): it seems the cell on its bottom is equally close to the cell on its right, do you compute the Euclidean distance of each neighboring cell to canal vector in order to determine the immediate neighbor?

Thank you very much for your comment. The authors are happy to know that our explanations enhanced your understanding regarding the "immediate neighbouring cell". We would like to clarify that the immediate neighbouring cells are decided based on the presence of croplands, not by the distance from the canal. If the immediate neighbouring grid cells are croplands (both

left and right of the canal), then 10% of the canal water is supplied to each of these grid cells and a total of 30% canal discharge is supplied each time the canal water flow through a grid. Conversely, if no cropland was identified in the immediate grid cell, only 10% of discharge is supplied to the cell that canal flows through. We are extremely sorry for not clarifying this point in the revised manuscript. Based on this comment, we have added these explanations to the revised manuscript and once again thank you very much for reminding this point. **Line 192**