

# ***Interactive comment on “Indicators of Necessary Storages for Flood and Drought Management: Towards Global Maps” by Kuniyoshi Takeuchi and Muhammad Masood***

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## **RESPONSE TO THE REVIEWER #1'S COMMENTS**

We are grateful to Reviewer #1 for the helpful and insightful comments. The provided comments have contributed substantially to improving the manuscript. Accordingly, we have made significant efforts to revise the manuscript with the details being explained as follows.

### **General comments Point #1**

COMMENT: Impact of climate change on necessary storages is assessed based on assumed target  $QT = Q_{\text{mean}}, 3Q_{\text{mean}}, 0.5Q_{\text{mean}}$ . How can be applied for realistic

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conditions of the basin? If storage from 75 artificial dams in the Ganges are included as flood detention capacity or flood channel capacity, what will be necessary storage during flood?

RESPONSE: Thanks for the comments. Although the proposed indicator claims that its use extends to climate change impact assessment, it is only on a basic nature in this paper and there is no intention for concrete practical assessment. Adaptation with existing 75 reservoirs is a major question but it is out of the scope of this paper. The focus is limited to variability of discharge due to hydrological heterogeneity and not socio-economic activities. In order to avoid confusion, we revised the paper omitting climate change impact assessment (4.1.2 and related paragraphs).

Specific comments Point #1

COMMENT: P5 L2: “: : = AOEB” should be “: : = ADEB”.

RESPONSE: Thanks for the comment. Indeed! Accordingly, we have revised it.

Point #2

COMMENT: P5L9: not found “: : :discussed in 5.1”

RESPONSE: Thanks for the comments. Corrected it to 4.2.1.

Point #3

COMMENT: P5L19: if  $m' = 150$  days, it is not consistent with the location of it on horizontal axis in Figure 3, where  $m'$  should be less than 50 days.

RESPONSE: Yes, it is. The schematic DDC curve has been changed to a more realistic one to avoid such confusion.

Point #4

COMMENT: P5L30: “: : = A'OEB' ” should be “: : = A'D'EB' “..

RESPONSE: Thanks for the comments. It has been corrected accordingly.

#### Point #5

COMMENT: P9L29: what is the duration (m) for the results in Figure 7.

RESPONSE: Thanks for your comments. “m” is different at each point and geographical distribution of m opens another interesting discussion of hydrological heterogeneity. It is not treated here.

#### Point #6

COMMENT: P10L5: “: : in Fig. 5.” should be “: : in Fig. 6.”

RESPONSE: Thanks for your comments. Yes, it has been corrected accordingly.

#### Point #7

COMMENT: P11L9-10: “: : in Fig.9a” should be “: : in Fig. 10a”, “: : in Fig.9b” should be “: : in Fig. 10b”. Define (a) and (b) in Figure 10.

RESPONSE: Thanks for your comments. The differences between necessary storage in km<sup>3</sup> and months are indicated not only in Fig. 10a and b but also 7a and b, 8a and b, 10a and b and 11a and b. They all are corrected and (a) and (b) are indicated in the Figures. According to the delete of climate change analyses, Fig. 10 and 11 were deleted.

#### Point #8

COMMENT: P11L20: what is the Hurst coefficient for GBM?

RESPONSE: Thanks for your comments. It is not calculated and beyond the scope of this paper.

#### Point #9

COMMENT: Figure 1: include legend for 5 10 20 50 years and long-term mean discharge.

RESPONSE: Thanks for your suggestion. Accordingly, the legend is included in Figure 1.

Point #10

COMMENT: Figure 3: if  $m'$  is on the left of  $m$ , the value of  $m' < 50$  days.

RESPONSE: Thanks for your comment. Yes, but for a drought discussion, it is more practical to be 150 days and accordingly the schematic DDC curve was changed to a more realistic one.

Point #11

COMMENT: Figure 6-8, 10-11, what is the unit of both axis? Basin boundary presented by green and/or red line make confusion with color legend of necessary storages.

RESPONSE: Thanks for your comment. E (degree East) and N (degree North) were added. The color of all boundaries was changed to black lines.

Point #12

COMMENT: Table 2: there is no comment and discussion for the result in this Table.

RESPONSE: Thanks for your comment. It is referred and discussed in the last para of 4.1.2. in page 11. But they all are deleted to omit climate change analysis.

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