Hydrol. Earth Syst. Sci. Discuss., 10, C6642–C6647, 2013
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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Eco-environmentally friendly operational regulation: an effective strategy to diminish the TDG supersaturation of reservoirs" *by* J. Feng et al.

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Comment: The paper presented an analysis of friendly operational regulation concerning the mitigation of the TDG supersaturation impact on ïňĄsh in deep reservoirs. It suggested a promising approach to mitigate the conïňĆict between dam spilling and ïňĄsh protection. It was of importance in the eco-environmental protection in the development of hydropower cascades. This paper was well written and structured. The methodology and conclusions were solidly supported. Generally speaking the paper can be accepted after minor revision.

Comment 1: Many researches have been focused on dissolved oxygen in natural rivers and reservoirs. Is there any connection between the dissolved oxygen and the total dissolved gas? The paper should give some reference citations in the section of 'Introduction'. AUTHORS' RESPONSE: Dissolved oxygen (DO) is chosen as the subject in the early studies on the negative impact on fish caused by dam spilling. Afterwards, total dissolved gas (TDG) is studied as a new subject. According to the investigation of Ma published on Fresenius Environmental Bulletin in 2013, it's difficult to find a stable relationship between DO and TDG. In the authors' previous studies (Li, R., et al. 2013, Journal of Environmental Engineering, 139(3): 385-390), it was found that the TDG dissipation process is quantitatively different from the reaeration process of DO. Some biological studies also indicate that the supersaturated TDG is more harmful to the fishes than the supersaturated DO. For these reasons, it is appropriate to choose TDG as the key variable to study the eco-environmental regulations for mitigating the conflict between dam spilling and fish protect in the paper. We have added the explanations and reference citations in the section of 'Introduction', at Line 13 in Page 4. And the additional references are listed in 'Reference'.

Comment 2. Dam spill usually occurs in summer. In Section 2, the paper introduced that there are many endemic ïňĄshes in the river. What growth period are the ïňĄshes in during the summer? Or what activities of the ïňĄshes will be inïňĆuenced by the dam spill? I suggest a description of the ïňĄsh growth should be given in the text. AUTHORS' RESPONSE: The breeding periods of the rare and protected fishes in Zumuzu River are mainly distributed in April to July, so the dam spill which usually occurs in the summer from June to September, influences the breeding and growth of the fishes. The clarification has been added in the text at Line 23 in Page 5.

Comment 3. Equation (5) is not clear. Please give the detained relationship between the density and temperature. The authors mentioned that "the ΦTDS and ΦISS are not incorporated in this simulation" (Line 8 in Page 7), thus ΦTDS and ΦISS should be removed from the equation and the context. AUTHORS' RESPONSE: The variable of

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ΦTDS and ΦISS have been removed from the text. A clear relationship between the density and temperature is given in Line 20 in Page 6.

Comment 4. Equation (10) illustrated the mass transfer coefficient in terms of wind speed. What substance or gas was the research focused on? DO or TDG? Will it bring any signiïňĄcant difference to the simulated results of TDG? AUTHORS' RESPONSE: the equation about the mass transfer coefficient is deducted by O'Connor in a theoretical way, and validated by laboratory and field data about reaeration of dissolved oxygen obtained by some researchers. For the lack of specific study on the transfer coefficient of TDG, we adopt the equation by O'Connor. The uncertainty of the equation needs to be investigated in the future.

Comment 5. The paper gave an in-depth analysis on the TDG variation in the reservoir under different regulation scenarios, but didn't discuss the TDG variation to the downstream through the power ïňĆow and the spill discharge. This should be mentioned or recommended for further study. AUTHORS' RESPONSE: The paper focus on the TDG distributions in the reservoir. We agree that the effect of the regulation on the downstream river is also another important and sophisticate problem that needs to be addressed respectively in the future. We have discussed the prospect in Line 11 of Page 17.

Comment 6. Line 21 in Page 4: Insert "adjusting" before "the manner". AUTHORS' RESPONSE: Fixed.

Comment 7. Line 6 in Page 5: Insert "time" before "cost". AUTHORS' RESPONSE: Fixed.

Comment 8. Line 6 in Page 7: "the water surface" should be "the water surface elevation". AUTHORS' RESPONSE: Fixed.

Comment 9. The ïňĄrst letters for the titles of longitudinal axes in Fig.4 should be capitalized. AUTHORS' RESPONSE: Fig.4 and Fig. 5 have been modified. The figures

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have been uploaded.

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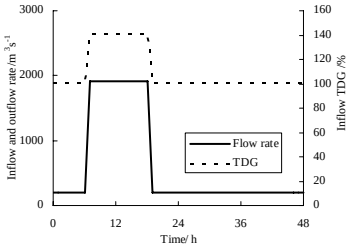

Fig. 1.

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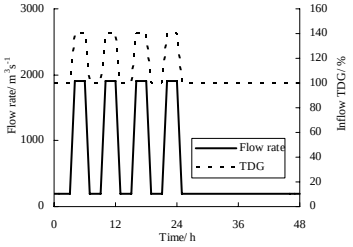

Fig. 2.

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