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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Portfolio optimisation for hydropower producers that balances riverine ecosystem protection and producer needs" *by* X. A. Yin et al.

Anonymous Referee #1

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In this manuscript, the goal of river ecosystem protection is incorporated into the stage of hydropower portfolio determinationto balance ecosystem needs and producer needs. This idea is interesting, but I still have several questions for the manuscript. 1)Lines 3-16 in Page 3 depict the ecosystem degradation caused by hydropower portfolio management. While in my opinion, the authors confuse the degradation caused by hydropower portfolio management with that caused by hydropower generation process. As the optimization framework in this paperaims at protecting the river ecosystem in the portfolio determination stage, the authors had better differentiate between these two stages and also the damages caused by these two stages. 2) What does the

sentence "the designed hydropower portfolio is a key factor influencing reservoir operation parameters"(Lines 21-23 in Page 3) mean? The authors should givedescription in details. 3) Lines17-27in Page 3 prove that it is really necessary to consider ecological needs in the portfolio management stage. However, according to the passages above-mentioned, hydropower portfolio design is based on risk management of future inflow and future price. Is the portfolio optimizationmethod more effective to protect river system than the hydropower operation optimizationmethod given that portfolio design has to deal with uncertainty problem while hydropower operation makes real-time regulation? 4) Line 4 in Page 8 shows the e-flow constraint equation "Rkj EFkj".As the EFkjmeans the minimum e-flows, I think that Rkjshould be no less than EFkj. So whyshould this equation not be "Rkj EFkj" ? 5) The equation "If AEkj-CLkj>0, DLkj=min [kkj(AEkj-CLkj)PDkj , ME-CLkj]" in Line 22 Page 8 is very important for the optimization framework. The authors consider that the bidding volume is in positive correlation with the available electricity volume and also in positive correlation with the day-ahead power price, and they assume that the effect weights of these two factors are the same. Under these premises, the equation is reasonable. Why should the equation not be other forms? A discussion or explanation is required. 6) Lines 25-28 in Page 10 shows that the contract load under the second e-flow strategy is higher than that under the first e-flow strategy because of the high flow pulses provision. It's certain that many factors influence the contract load, such as future inflow and future price, but how the high flow events influence the contract load? Why do not the high flow events make the bidding volume high on certain days?Is the authors' conclusion suitable for other study cases? 7) The authors infer that as the electricity in spot market has higher prices than the contract market, the mean annual revenue under the second e-flow strategy is lower than that under the first e-flow strategy, which has more electricity designed in the spot market.This is plausible, but the authors need to inform what causes the spot market price to be higher to make it more understandable.I wonder what if thespot market price is lower than contract price. 8) In Lines 5-14, Page 12, the authors present that the lowest degrees of alteration under the non and the first e-flow strategies are

the same (0.31), while the lowest degree of alteration under the second e-flow strategy is 0.21. My question is: Why the high flow plusescould still make difference under the lowest disturbance to make the alteration degree under the second strategy lower than that under the other two strategies? 9) According to Lines 11-12 in Page 12, the minimum mean annual revenue that all three strategies can achieve is 3.59ïĆť106 RMB, which is inconsistent with 3.89ïĆť106 RMB in Line 17 Page 12. I consider one of them might be mistaken. 10) The authors have discussed the revenue unachievable scenario in Lines 13-16, Page 13. They suggest participate in other electricity markets to solve this problem, but how? What if participating in other markets can still not achieve the planned revenue?

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 10, 15841, 2013.