Hydrol. Earth Syst. Sci. Discuss., 10, C7406–C7408, 2014
www.hydrol-earth-syst-sci-discuss.net/10/C7406/2014/

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 #2

Received and published: 24 January 2014

In this manuscript, the authors establish a framework to explore the optimal portfolio for hydropower reservoir that can meet both economic benefits and ecological needs. The authors also apply the proposed method to a case study of a hydropower reservoir and the results show the framework could be helpful to design eco-friendly portfolios for hydropower reservoir. The whole paper is innovative and practical in a certain degree. However, the manuscript still has some problems. I suggest the authors modify the manuscript according to the following comments. Then, the manuscript can be reviewed again for possible publication.

1. A slight disappointment is to see the Montana (Tennant) method applied to a Chi-

nese river, to set limits for certain e-flows. How do you now that Montana water level will be relevant to this Chinese river? They should be calibrated first. I suggest that the authors reconsider the justification for using the Montana method, or at least provide some evidence that the rules are relevant.

2. The sentence in line 1 on page 3, "However, none of the previous research considered the need to protect riverine ecosystems", seems to be too absolute. Some existing literatures have already considered the constraints of environmental protection on hydroelectric dams from an economic perspective (See in reference: (1) Kotchen et al., 2006. Environmental constraints on hydropower: an ex post benefit-cost analysis of dam relicensing in Michigan. Land Economics, 82(3), 384-403.; (2) Castelletti et al., 2008. Water reservoir control under economic, social and environmental constraints. Automatica, 44(6), 1595-1607.) The authors may draw a similar conclusion from the perspective of the hydropower producers.

3. The description of line 10-18 on page 4 is questionable. In line 12, the authors said that "Day-ahead and real-time balancing markets are also called spot markets", while in line 17 they said "The trading power volume and price will not change in a spot market". The spot market includes the real-time market. I don't think the trading power volume and price in real-time market don not change.

4. In section 2.2.3, the $D \leq D0$ is reasonable to act as the constraint. But why is it that the designed e-flow no more than the actual reservoir water releases ($Rkj \leq EFkj$) is used as the constraint?

5. In section 2.2.1 Range of variability approach, the variable G is the number of hydrological indicators. Is it equal to 32? Please give a clear definition.

6. There are some errors in detail as following: 1) On page 4, line 13, the first letter of the two words "Participants In" is capitalized at the same time. 2) On page 5, line 29, the sentence "However, the two objectives are in 28 conflict and cannot be achieved simultaneously; a typical multi-objective problem." is not a complete sentence.

7. Variables representation is not consistent in whole manuscript. 1) On page 7, line 1, the variable of “Dm” should be written in italic type; 2) On page 7, line 2 and line 4, the letter m of “mth” should be written in italic type; 3) On page 7, line 10 and line 12-13, the letter “G” and “D” in all three places should be written in italic type 4) On page 8, line 6, the variable of “PCkj” should be written in italic type.

8. Line 15-18 on page 15, the format of the Acknowledgement section is not alignment on both ends.

9. The reference style is not inconsistent. 1) On page 15, line 24, the reference is not complete for lack of a full stop. 2) On page 17, line 16, the “Regulated Rivers: Reaserch & Management” should be written as “Regul. Rivers: Res. Mgmt.” for short. 3) On page 17, line 7, the reference is in wrong format and should be modified as “Eichhorn, A., Heitsch, H., and Römisch, W.: Scenario tree approximation and risk aversion strategies for stochastic optimization of electricity production and trading, in: Optimization in the Energy Industry, Springer Berlin Heidelberg, 321-346, 2009.” 4) On page 17, line 16, the reference is in wrong format and should be modified as “Fleten, S. E., Wallace, S. W., and Ziemba, W. T.: Hedging electricity portfolios via stochastic programming, in: Decision making under uncertainty, Springer Verlag, New York, 71-93, 2002.” 5) On page 18, line 4, the magazine name should be modified as “The Electricity Journal” not “Electricity Journal”.

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