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Interactive comment on “Balancing energy and environmental concerns: the case of the Kayraktepe dam, Turkey” by Ö. Sever et al.

Anonymous Referee #1

Received and published: 9 November 2012

General comments

This paper discusses the options for reconfiguring a controversial dam project in Turkey. Instead of one large (125m) dam built for flood control, electricity generation and irrigation, the proposal is for a medium sized dam and five run of river dams. A third alternative which is for a single large dam (89.50m?) is mentioned but not evaluated in any detail.

The paper provides an interesting overview, but lacks comprehensive analyses of the different options. The focus of the paper is primarily on the flood mitigating effect of the two options and sediment flushing. Whilst these are important, the paper would be greatly strengthened with more in-depth analyses of other key issues such as the costs,

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the different numbers of people who will be displaced, and the differing environmental impacts (e.g. the implications for the “several endemic species”).

Specific comments

Page 11771 (line 3-7) A little more detail on the exact negative environmental impacts would be useful. What are the endemic species and what is the perceived risk to them? What is the name of the Ramsar site, why was it designated and how big is it?

Page 11771 (lines 8-9) It is not clear exactly why the high population is an issue. Are these people living upstream or downstream of the proposed dam. Without quantitative information on how many people would need to be relocated and, for instance, how much agricultural land would be inundated it is hard to put this in context.

Page 11771 (line 21-22) It is debatable if the WCD report was the biggest ever victory for environmentalists and NGOs. The report was intended to be a balanced review of the development impacts of large dams and outlined a new approach to decision-making in relation to large scale infrastructure projects. The WCD report is mentioned here, but there is no further discussion in the paper. It would be useful to consider somewhere what implications the WCD report has for the specific case of dams on the Goksu basin.

Page 11772 (line 5-6) It is not clear what is meant by “contractual matter of water usage rights have been edited with the publication of June 2003”.

Page 11772 (line 26) It would be useful if Table 1 included a summary of the changes to the scheme design on each of the key dates – 1982, 1997 and 2010. As I understand it: 1982 was the original 125 m high dam; 1997 was still a single dam but reduced to 89.50 m; 2010 was a single medium sized dam (height not specified here) in combination with 5 run of river dams. The scheme as discussed in this paper is the 2010 configuration.

Page 11773 (line 13) figure 1 is not very clear. It would be useful to indicate which dams have been built and which are planned.

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Page 11773 – general characteristics of the basin. It would be useful to include a bit more information on: i) altitude range within the basin; ii) something on why this basin is good for hydropower production; iii) typical livelihood activities – presumably agriculture; iv) landuse etc.

Page 11774 (line 5) – need to explain why the proposed lowering of the dam was “economically advantageous”. It would also be useful to know something (if only a little) about the likely change in environmental and social impacts arising from the first proposed reduction in the dam height (i.e. to 89.50 m)

Page 11774 (line 9) – there is a lot of information in table 2 but it would be useful to have a brief description of the Kayraktepe project. What is the height of the main dam in this case and a brief description of the run of river dams – all upstream? Will these run of river schemes affect flow in any way?

Page 11775 (line 5-6) – it would be useful to have a bit more detail of the cost-benefit ratio – exactly how was this computed and why is the 2010 formulation so much less costly than the 1997 formulation. How were the environmental costs incorporated within these analyses? What exactly are the costs of the three specified externalities in each of the different options?

Page 11775 (line 21-22) More detail of the flood frequency analyses would be useful. How did the use of additional flow data affect the floods with different return periods? A table or figure showing the flood magnitude with different return periods would be useful.

Page 11776 (line 4) Mention is made of “more advanced techniques” but these are not described. Why were these techniques not used in the analyses for this study?

Page 11776 (line 5) Why was the 500-year flood selected as the one for which the dam would offer downstream flood protection? Why not a flood with a longer return period? Has there been any consideration of the possible impacts of climate change on the

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flood frequency?

Page 11777 (line 26) Retrogradational is not a commonly used word – a definition would be useful.

Page 11778 (line 3) The erosion of >200,000 m² which is not due to damming but to changes in flow needs to be much better explained. Why and how have flows changed? Why is this causing erosion? How would the planned dams affect the sedimentation? It would also be useful to have some information on the size of the delta and total annual sediment deposits. This would enable these rates of erosion to be placed in context.

Page 11778 (line 13-22) A better explanation of the Basson diagram method would be useful. Maybe include it as a figure. It would also be useful to know why the 2010 configuration is more suitable for flushing than the 1997 configuration. Specifically, what is it about a medium size dam and five run of river dams that makes this option more suitable than a single large dam?

Page 11779 (line 10-16) This is the first mention of “numerous villages” that would be flooded but there is nowhere in the paper is there discussion of how many households/people are affected by the different schemes (both upstream and downstream)?

Technical corrections

The English could be tightened somewhat. The figures are not very clear and could be improved by including more detail. A figure showing the difference in area inundated by the different schemes would be useful.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 9, 11769, 2012.

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