

## ***Interactive comment on “Application of quantitative composite fingerprinting technique to identify the main sediment sources in two small catchments of Iran” by A. Kouhpeima et al.***

### **Anonymous Referee #1**

Received and published: 2 October 2010

#### General Comments

The manuscript provides an attempt to quantify the sources of sediments to two reservoirs in two catchments in Iran. The methodology follows very closely the published methodology of several papers published by Adrian Collins and Des Walling (and others) over several years. Therefore there is no real advancement of methodology or technique in this paper, it's novelty lies in its location, which in its current form is probably only of local interest with little to no applicability made to the wider picture. I have several concerns about the current form of the manuscript, mainly due to its lack of

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novelty and similarity to already published material and the limited discussion it provides. It is also missing some important aspects, e.g. a catchment map, raw data and a meaningful discussion. The introduction is very similar to a discussion provided by Collins and Walling (though it is referenced here) published in 2004. There are many other good research groups providing perspectives on quantitative unmixing of sediment sources but they are not alluded to in this manuscript. Whilst the work of Collins and Walling is excellent in this field I feel that the authors should at least make it aware to us in the introduction that they acknowledge these other perspectives. At the moment it appears that the authors read the work of Collins and Walling and simply followed their methodological 'recipe' in their catchments with little evaluation made of their results which makes the paper very limited in both interest and scope.

### Specific Comments

Page 6678, line 21: You say that your results indicate that the approach works well. How is this independently verified? How robust is this approach and how likely does it represent what happens in these catchments.

Page 6680, line 20: I would expect to see a detailed catchment map showing catchment boundaries, the river system, reservoir(s) and the distribution of the different geological formations for both catchments. Figure 1 doesn't show any of this and doesn't add anything to the manuscript. Additionally there is no reference to figure 1 in the text.

Page 6681, lines 5 and 19: I am confused as to the nature of the reservoirs and their sampling. Are they recently constructed or have they been there for an extended period. How deep are they? How big are they? (maybe include this information in the new figure 1). How do you recover undisturbed sediment samples from a reservoir with a spade? Are these reservoirs ephemeral? Do they dry out? If so then this needs to be explored as it has important implications for sediment delivery and/or erosion of what the reader assumes to be a fluvially dominated system.

Page 6682, line 14: Though you can't change this now, sediments and samples that

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are to be measured for their magnetic susceptibility should not be collected with a steel spades.

Page 6682, line 17: You don't present any raw data in this manuscript. I would as a bare minimum expect to see a table with average concentrations/data for each of the geologies and the reservoir sediments if not all the data in the study. What kind of variation exists within the geologies and the reservoir sediments? You move very quickly onto the unmixing process without setting the scene for the possibilities of such a study in these catchments.

Page 6683, line 15: You need to be more specific than to say 'almost' all of the mixing models met this criterion. How many models and how close are they to the 15% that is reported by Walling and Collins (2000).

Page 6685, line 1: Again you state the importance of gullies in the catchment but you don't state which geologies they are within and the lack of raw data makes it hard for the reader to visualise the difference between the subsurface material and the top-soil material.

Page 6685, line 4: The lack of a decent catchment map makes it hard to visualise the size of the geological contributions within the catchment and their connectivity to the river system and thus the potential contribution each has. You briefly mention the potential for the influence of channel connectivity later on the page in the Royan catchment but it is not really discussed for the Amrovan catchment.

Page 6685, line 22: Can you really say that contributions from one geology is dominant when the second and third contributions are only 1% and 4% lower. I would say that these are all dominant and the other 3 are less significant.

Page 6686: One of the main reservations I have about the manuscript is the lack of discussion of these results. There doesn't appear to be any. You go through the results gathering process and then jump straight to conclusions. There are a few brief

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sentences within each of the ‘source type contribution’ sections which make the reader think you are going to start discussing the results but then you don’t talk about some important aspects, including (but not restricted to); geomorphological interpretations of and reasons for the suggested source contributions (erodability, erosion risk, current land use etc), potential for the source contributions to be under/over represented (e.g. connectivity, distance to the reservoir), a fuller evaluation and interpretation in the text of contributions compared to areal extent not just the numbers, what these results mean for catchment management and what these results mean for the larger picture of catchment management in Iran and other similar localities. A lot more could be done and needs to be done with this manuscript in terms of discussion.

Page 6687, line 21: The section on suspended sediment seems out of place here, it looks like an afterthought which has just been tagged on; it isn’t concluding anything. Maybe this would be more appropriate in the introduction section.

#### Technical Corrections

Page 6680, line 5: geogimical should probably be geochemical

Page 6680, line 19: The study area section should not be in the materials and methods section. It should either be in a section of its own or within the introduction

Page 6682, line 6: Table 2 comes before table 1 in the text.

Page 6683, line 21: ‘up surface’ should probably be ‘sub-surface’

Page 6684, line 6: There should not be a new paragraph here, or even a period as it is the continuation of the sentence.

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Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 7, 6677, 2010.

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