

Interactive comment on “Contrasting watershed-scale trends in runoff and sediment yield complicate rangeland water resources planning” by M. D. Berg et al.

Anonymous Referee #2

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Historical pattern of hydrological behaviors in the context of climate change and human disturbance is a hot topic not only for retrospectively knowing the past and capture the present, but also for planning for the future. It is an interesting paper to test long-term trend of water and sediment yield at watershed scale in rangeland landscapes, and explore the effect of landscape changes. A variety of data sources were generated and interpreted at various temporal and spatial scales, but it also represent main aspects that need to be improved before it can be considered for publication. Therefore, I suggest a substantial major revision.

Firstly, above the two hydrological stations where streamflow data were applied in this paper, whether there are dams? Of course there must be. Consequently, annual

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streamflow data for analysis was inadequate because dams may repartition streamflow on seasonal basis. So, monthly streamflow data is needed to be further analysed. I deduce the hydrological insensitivity cannot be directly deduced from the non-directional trend of annual streamflow, maybe the precipitation-water relationship (not just runoff-rainfall ratio) is useful for analysis. Also, dams may mask the hydrological effect of landscape change on water yield at relatively large spatial scales.

Secondly, sediment yield is scale-dependent. It can be both changed at first-order watersheds by landscape change and at larger catchments by integration of landscape change and alteration of fluvial hydrological connectivity (e.g., dam construction). Cs-137 dating provides one time-marker (Cf. 1963) to separate the profile and reflecting sediment dynamics in first-order watersheds, but significant landscape change is consistent with this marker? Also, dating results can not reflect sediment status at downstream hydrological stations, which were not comparable relative to water yields at downstream hydrological stations.

Thirdly, of course, all these factors mentioned may be responsible for temporal changes of sediment dynamics. Interpretation and analysis can be carried out in more deep and specific way.

Detailed points: Page 4, line 17-19: where did the precipitation data come from? and its temporal length? Are they county-level average or watershed average? Page 6, line 19: runoff-rainfall ratio? Table 1: please add a column to indicate the core length or compaction factor for each core extracted from the individual reservoirs.

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