

## ***Interactive comment on “Changes in discharge and solute dynamics between a hillslope and a valley-bottom intermittent streams” by S. Bernal and F. Sabater***

### **Anonymous Referee #1**

Received and published: 11 November 2011

This manuscript presents an interesting set of data which allows the authors to study differences in runoff and solute concentrations/exports between different landscape units in a semiarid area. This is a potentially valuable contribution. However, I have some concerns with the manuscript in its current form. 1) The authors refer a lot to previous work, of which most comes from studies in humid, often boreal, catchments, without clearly discussing differences between the geographical setting. This needs to be clarified.

2) The authors further refer to previous studies with regard to the functioning of the

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riparian zone. In most of these studies the riparian zone is seen as a part of any head-water catchment, i.e. also the ‘hillslope’ catchment used here would have a riparian zone. This difference in definition should be clarified.

3) The authors claim that the difference of water export (=runoff volume) is related to climate conditions. That might be ok, but I do not agree with the motivation being based on the correlation of T and  $\Delta Q$  (fig 2b). This figure and the text indicate a causal relationship, which I find difficult. Rather the correlation is caused by seasonal variations of BOTH T and  $\Delta Q$ . Another problematic correlation analysis is fig 5. The correlation between  $\Delta Q$  and  $\Delta E$  (runoff and solute exports) is spurious as Q obviously is used to calculate the solute exports!

4) It is unfortunate that there are no groundwater level / concentration measurements. These would have allowed a better assessment of possible processes, which now remain rather speculative.

5) The importance of different landscape units is discussed in detail, whereas the importance of time variable flow pathways within the units is discussed less. In other studies, the latter has been found to be quite important. With higher gw-levels additional flow pathways can be activated, which might control stream chemistry, as has been shown for the case of DOC in several catchments

6) Please provide more information on the measurements. In particular please state how many salt-dilution measurements you made to establish the rating curves and which interval they include (e.g. exceeded in x % of the time)

7) It remained a bit unclear to me how many water samples were taken and which frequency, please clarify. I assume part of my confusion comes from the use of the term sample/sampling compared to sensing, which might be the better term in some cases. An example for this is P9513, 13 where it says that flow was interpolated between discharge at different ‘sampling’ dates. I would assume that flow/discharge is calculated based on continuous water level measurements, so honestly I do not understand what

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is meant here . . . .

Minor comments:

P9511, 10: remove reference to fig 2 here, fig 2 is already results P9511, 19: what do 2-3 cm mean in l/s? P9514, 24: what is a scattered distribution?

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