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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Surface water as a cause of land degradation from dryland salinity" *by* J. Nikolaus Callow et al.

J. Nikolaus Callow et al.

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We thank Reviewer 2 for their comments and respond below:

Reviewer2: This manuscript presents information that supports the important role of surface water process facilitating dryland salinity and land degradation in drylands and low gradient landscapes. The topic is interesting, the manuscript is well written and organized and suits the journal scope. I found it suitable for publication.

Response: We thank the reviewer for the positive response, helpful comments and recommendation to publish with minor corrections, which we would propose to accept and action all to improve the manuscript for publication.

Reviewer2: I have some minor comments to be addressed: L155 "salt can move salt"

can be replaced by "salts are moved"?

Response: We would accept and action this suggestion

Reviewer2: L 220, Fig 1, since I am not familiar with the study site, I would like to see a map at an intermediate scale showing information about the topographic gradient. For example: where is the valley, where the hillslope? which is the direction of the water/salt movement in the watershed?

Response: This is a good suggestion, we would propose to edit Figure 1 to include this detail.

Reviewer2: L280 please indicate the flow also in number of days, month and years instead of %.

Response: We would accept and action this suggestion, adding this detail to the relevant section

Reviewer2: L335: the authors stayed that at stage 3 the system dry-out, however, the cumulative rainfall increased and there was also a rainfall episode but there were no loggers to record the groundwater-surface interaction.

Response: As identified by Reviewer 2, there were a limited number of small rainfall events during the dry season (from October to March/April over the summer dry season), and the drying-out "Stage 3". While there was rainfall at the site, these events did not cause significant recharge. While the shallow and intermediate loggers had failed at this stage (as Reviewer 2 points out), the deep logger was working and shows that there was not significant recharge. While hydraulics gradients cannot be calculated due to failure of the shallow and intermediate loggers, the deep logger shows a response that is different to the April 2010 thunderstorm event and the winter 2009 which shows the deep (and shallow and intermediate loggers) responding in a very different way to rainfall. While two of three loggers had failed at this stage, the deep logger was working and supports our proposal that during Stage 3 there is not significantly

surface to groundwater connection and recharge. We would propose to add a brief comment to the discussion to address the point raised here and capture our response and justification.

Reviewer2: Figure 6- legend: replace Qq by Qg, define Qt It would be good to see more in the discussion section about the *practical* consequences of the new insight flow-fill-flood

Response: We would accept these suggestions – altering Figure 6, and adding to the discussion to better cover this point. We believe that we have covered the implication within section 5.3, but will more explicitly comment on the specific practical implications of the insight from the flow-fill-flood understanding of how these systems work, as suggested by Reviewer 2.

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