Hydrology and Earth System Sciences Discussions

Interactive comment on "Hydrological heterogeneity in Mediterranean reclaimed slopes: runoff and sediment yield at the patch and slope scales along a gradient of overland flow" *by* L. Merino-Martín et al.

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Issues to be clarified

Overall I think the presentation and structure needs to be improved and whilst the language is mostly fluent and precise, there are many minor typographical and grammatical errors which need correcting.

As proposed, we have improved the presentation and structure of the manuscript. Be-

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low, we discuss how we have dealt with each specific comment.

1) Methodology. Currently I do not think the description of experiments and calculations is sufficiently complete and precise to allow their reproduction by fellow scientists. A clear location map is required. The methodology also needs to be much more clearly explained. The text is currently too dense and hard to make sense of. For instance especially on P9933 it is difficult to understand how Gerlach troughs were used. Also why were TDR sensor deployed at 25 cm depths?

As proposed, we have improved these considerations in this section, improving the description of the study area, making the writing more comprehensive and clear, and adding a location map as a new figure (Fig. 1; Revision, section 2).

We placed the TDR sensors at 25cm depth because we wanted to study the interrelationships between patch cover and infiltration (mainly driven by macropores). The infiltration at that depth only would have happen in case of soils under a type of patch that would allow macropore flow. Moreover, the study area presents important weathering processes and we consider that if we would have placed the TDR at lower depth, soil moisture would have been more influenced by other factors not induced by the soil-vegetation interrelationships. We have better explained the criteria for installing the TDR sensors at that depth: "In order to test differences in soil water content between types of patches, TDR (Time Domain Reflectometry) sensors were horizontally installed at 25 cm into the soil. The TDR sensors were placed at 25 cm depth to study the interrelationships between patch cover and infiltration (mainly driven by macropores)." (Revision page 11, line 19).

2) I would also like more explanation and discussion of the distribution and characteristics of the plots around Table 2. This underpins the methodology and analysis and is hence crucial.

We have included the suggested changes in table 2 adding two more columns: slope where the patches appeared and the proportional area covered by each patch in each

slope (see Table 2 in Revision).

3) Results. I think that the results section is also too dense and too bitty and could be re-written to flow more easily. I also had trouble with the structure and wanted to see some of the discussions about vegetation patterns and sinks on P9939 and 9940 earlier. This could have been done at the point Table 3 is introduced.

We have re-written some parts of the results section to improve their flow. Furthermore, we have increased the data details regarding the patch types (e.g. proportional cover of each patch type in each slope, Table 2) and added some new discussions about the plot and patch scales (Revision, section 3.2.). Regarding vegetation patterns, we do not want to go deeper into that topic because we don't have enough data to extend the present discussion. We are currently working to get more data that will allow a more detailed discussion on the relationships between the spatial patterns of vegetation cover and the hydrological connectivity of the studied reclaimed slopes, with the inclusion of different types of patches.

4) I would also like more detail about the rainfall events which could easily be illustrated by the inclusion of relevant diagrams.

We agree with your suggestion. However, we monitored rainfall data every 15 minutes so we cannot perform detailed graphs of the storm events.

5) I also thought there was an important gap in the analysis around the runoff response of patches and hillslopes to rainfall and how this varied temporally and spatially within the study sites. I am keen for a discussion of this to be included in the results since it would underpin and develop the data analysis presented and make the paper much more comprehensive and hard hitting.

We have extended the information about this topic in the results (Revision, sections 3.2 and 3.6).

6) Discussion. I think this could do with splitting up using subsections.

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We have included the suggested modification in three subsections: 4.1. Patch scale hydrological heterogeneity: Ecohydrological role of micro-environments. 4.2. Slope scale hydrological heterogeneity: Effects of overland flow. 4.3. Applied ecohydrological concepts for the design of reclaimed slopes.

7) Missing references

We have included some of the suggested references (Turnbull et al., 2008; 2010, Bracken and Kirkby 2005).

Minor corrections

P9928 l4 change to '..of runoff and sediment source patches and sinks..' L7 'We conducted field research..' L8 'three reclaimed slopes originally used for mining in a ..' L11 '..associated with seven..' L23 need to define what is meant by 'resources' e.g. water, sediment nutrients etc. L25 '..roles..' L22-25 No link between the first two sentences. Need to develop this link and logical flow of ideas.

We have included the proposed modifications (Revision, page 2, lines 4, 7, 10, 13; page 4, lines 3, 4).

P9929 l7 '..transfer of water and sediment..' L13 need to also cite Turnbull et al, Wainwright et al L21 '..frequently associated with the .. L26 delete 'could' 'develop; rill...' L7 '..vegetation dynamics are affected..' L7 need to also cite Bracken and Kirkby 2005 here L22 '..developed rill networks (i.e. spatially continuous)...' L27 '..aimed to: (a)... L29 '..processes; and ..'

We have included the proposed modifications (Revision, page 4, lines 12, 20; page 5, lines 4, 8, 16, 19, 20; page 6, line 12, 17, 19)

P9931 l11 need to cite Smith et al ?? here L24 '..with an air frost..'

We have included the proposed modification regarding the typo (Revision, page 7, line 20); however, we have not cited the study by Smith et al. because we lacked the

complete reference.

P9932 l7 '..250cm clay loam overlying ..' L14 need to be explicit about geomorphological differences

We have included the proposed modifications (Revision, page 8, line 6; page 8, lines 14-21).

P9937 l2 types of sinks rather than kinds L11 '..describe the actual .. L12 delete 'the fact'

We have included the proposed modifications (Revision, page 15, line 20; page 15, lines 6, 7).

P9941 l14 Puidefabregas et al?

We have included the proposed modifications (Revision, page 21, line 25)

P9942 l29 need to also cite Bracken and Kirby 2005

We have included the suggestion (Revision, page 24, line 6).

References Check Aronson et al 1993 and Cerda 1997 are cited in the text.

We have double-checked the references and Aronson et al. 1993 was wrong, the reference was Bradshaw (1983).

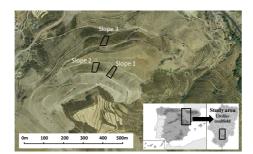Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 8, 9927, 2011.

Figure 1

Fig. 1.