Solid Earth Discuss., 7, C411–C419, 2015
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Interactive comment on "Assessing the determinants of rill erosion on roadcuts in the south eastern region of South Africa" *by* K. E. Seutloali and H. R. Beckedahl

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Reviewer's Comment 1

The major results of the paper are not novel (as expected): rill formation is higher in longer, steeper and with a lower percentage of vegetation cover roadcuts. It will be great if the authors could highlight the novel aspects of the study

Authors' response 1

The aim of the study was to understand why certain roadcuts are degraded while others are not by comparing their characteristics (gradient, length, vegetation cover and soil

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characteristics). So far, to the best of our knowledge, no study has investigated the relationship between the characteristics of roadcuts and rill erosion. Also, See Page 2 -3, L 48 – 69

Reviewer's Comment 2

It seems the study is based on the as assumption that soil characteristics, techniques of surface shrink eventually used and climate conditions were constant for all the roadcuts examined. I think the authors should clearly specify if it is. The description of the experiment is not sufficiently complete; authors should add details on: roadcut soil characteristics, techniques of surface shrink eventually used, precipitation characteristics, rill measurement technique, etc

Authors' response 2

We have now provided information on the soil characteristics (i.e. percentages of sand, silt and clay) of the studied roadcuts. Also, an assessment of rainfall patterns across the study area demonstrated that precipitation does not vary significantly in this area. Hence the choice of these roadcuts. For the rills, the field measurements were done as explained in section 2.2.3.

Reviewer's Comment 3

P394, L20-21: Quotable literature on the topic is very extensive, I suggest to add "among others".

Authors' response 3

"E.g." has now been added to indicate that the references provided are a few amongst others dealing with soil erosion. See Page 2, L33.

Reviewer's Comment 4

P396, L22: The value of 300 MJ mm ha-1 h-1 yr-1 does not seem very high. Please check.

SED

7, C411–C419, 2015

Authors' response 4

Although this value may seem to be low in global standards, however, the value of 300 MJ mm ha-1 h-1 yr-1 was considered high in this region in comparison to other areas of South Africa.

Reviewer's Comment 5

P397, L20: Add "natural" before "herbaceous vegetation cover".

Authors' response 5

"natural" has now been added before "herbaceous vegetation cover". See Page 5, L141.

Reviewer's Comment 6

P398, L3 and Fig. 2: The first transect is named "2nd "in Figure 2.

Authors' response 6

The first transact is now named "1st Transact" (See figure 2) as it has been stated in P398, L3.

Reviewer's Comment 7

P398, L8-9: The roadcut length was calculated by averaging the length of the three transects. Does it means that the ratio between the lengths of the three transects is almost constant in all the roadcuts examined? Otherwise, it wouldn't be more meaningful to use the maximum length?

Authors' response 7

The maximum length of the roadcut has now been used instead of the averages. See Page 6, L 157.

Reviewer's Comment 8

SED
7, C411–C419, 2015

P398, L15: 0.5 m width or length? P399, L22, and Fig. 4. It is not clear what means bars in Fig. 4.

Thank you for the notification, this was an oversight. “Width” has now been changed to “length”. See Page 6, L167 .We have now indicated in the figure caption (see figure 4) the meaning of the bars.

Reviewer’s Comment 9

P401, L15-23. The influence of the slope length on rill width and depth is well known (e.g. in Rejman, J., Brodowski, R., 2005. Rill characteristics and sediment transport as a function of slope length during a storm event on loess soil. Earth Surface Processes and Landforms 30, 231–239; C. Di Stefano, V. Ferro, V. Pampalone, F. Sanzone, 2013. Field investigation of rill and ephemeral gully erosion in the Sparacia experimental area, South Italy. Catena 101, 226–234). I think authors should try to explain their contrasting results in terms of length values of roadcuts examined in comparison to other studies.

Authors’ response 9

We have now explained our results as suggested and we have compared them with those available in the literature and the possible reasons for the contrasting findings have been explained. See Page 10, L 281 – 296.

Reviewer’s Comment 10

P401, L24-28: Some authors showed the angle of the slope was one of the main factors influencing vegetation on motorway slopes. E.g. Bochet, E. and García-Fayos, P., in Factors controlling vegetation establishment and water erosion on motorway slopes in Valencia, Spain, Restor. Ecol., 12, 166–174, 2004, showed vegetation was almost completely lacking on roadcuts with slopes greater than 45âÚę. From the statistical point of view, the effects of the interaction between slope angle and vegetation constitute a case of spurious correlation. Authors should check which part of the variance is

explained by the slope and vegetation, respectively.

Authors' response 10

The issue of spurious correlation was examined in the previous study "Khoboso. E. Seutloali*, Heinz R. Beckedahl, Timothy Dube, Mbulisi Sibanda, (In press) Geocarto international. An assessment of gully erosion along major armoured-roads in south-eastern region of South Africa: A remote sensing and GIS approach" and it was found that there is no multicollinearity between the two variables (vegetation and slope) hence their application in this study.

Please also note the supplement to this comment:
http://www.solid-earth-discuss.net/7/C411/2015/sed-7-C411-2015-supplement.pdf

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Interactive comment on Solid Earth Discuss., 7, 393, 2015.

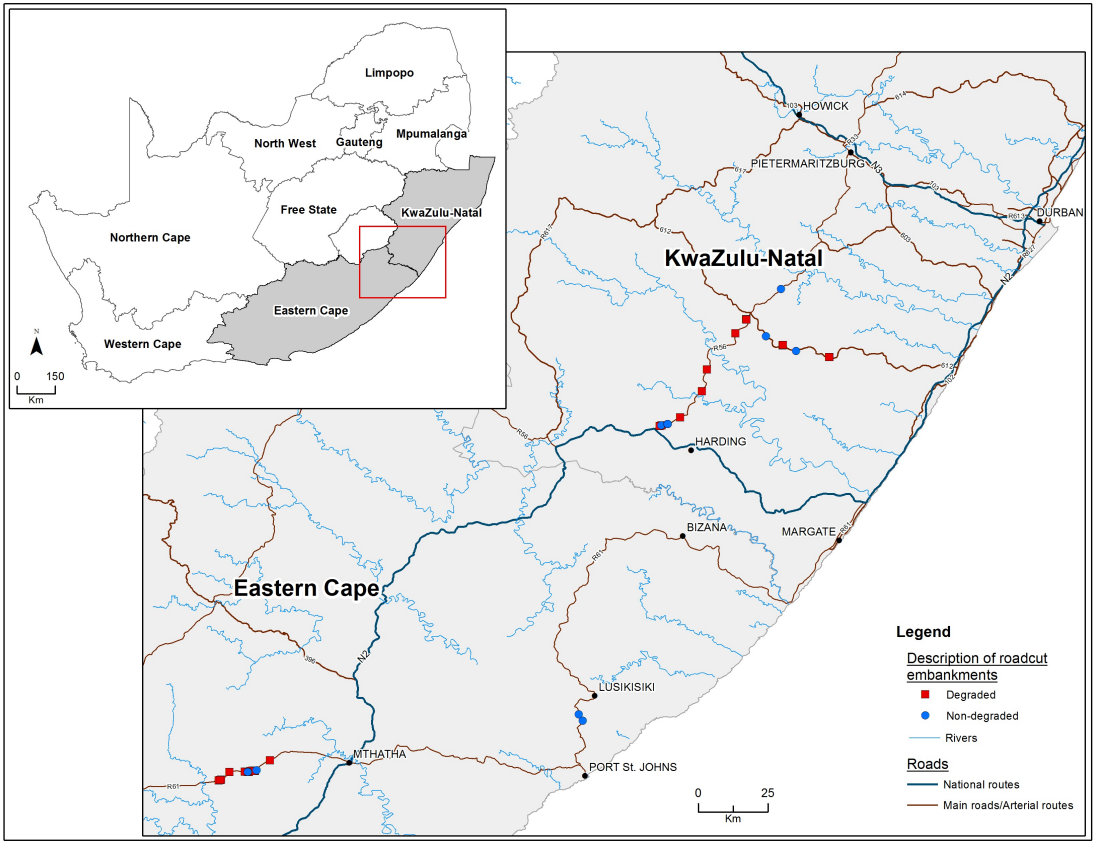

Fig. 1.

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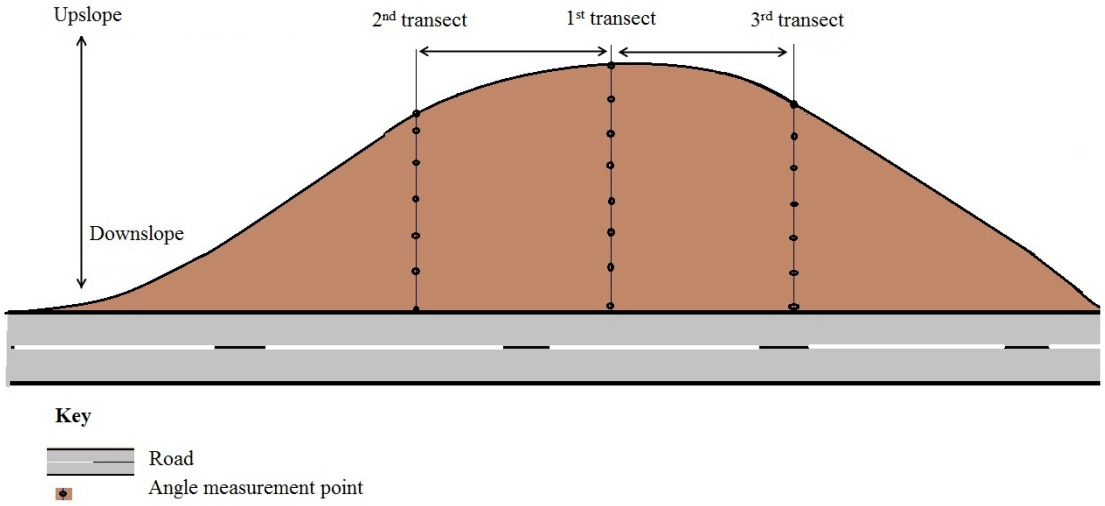

Fig. 2.

SED
7, C411–C419, 2015

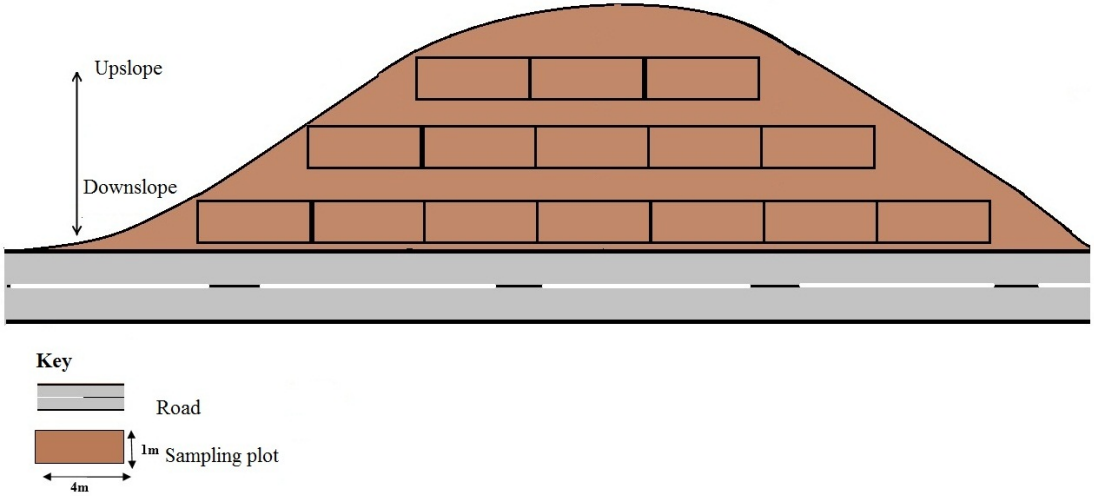

Fig. 3.

SED
7, C411–C419, 2015

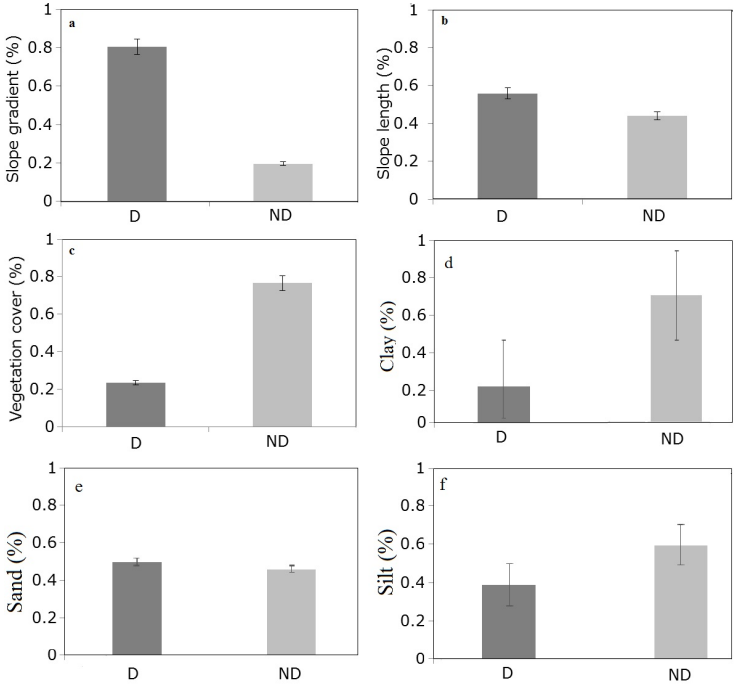

Fig. 4.

SED
7, C411–C419, 2015