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Biogeosciences Discussions

Interactive comment on "Microstructure and hydraulic properties of biological soil crusts on sand dunes: a comparison between arid and temperate climates" *by* T. Fischer et al.

Anonymous Referee #2

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Referee's Report #2

The aim of this study was to "test the hypothesis that BSCs possess a mechanism of self-stabilization through water redirection under various environmental conditions". The authors seek to test the effect of what thy identify from the literature as the main controls upon water redirection by BSCs, namely: (I) physico-chemical surface properties (water repellency, wettability), (II) slow water infiltration generating run-off, and (III) BSCs water storage which may reduce water infiltration into the rooting zone of vascular plants.

Testing these (subsidiary hypotheses) is undertaken using appropriate field, lab and

statistical methodology.

The slightly differing nature of the carbonate dominated geological substrates at the arid (Israel) and temperate (Germany) sites means that any effect upon BSC development and hence properties of differences in mineral geologic parameters cannot be controlled. Likewise whilst 'aspect' differs, (as mentioned by 1st referee). These differences are, however, less critical than the other more significant intentionally differing climatic differences between the two sites which is one of the key reasons for undertaking the study. Although geological factors are not controlled for directly, the measurements employed enable their likely effect to be dismissed as a dominant control upon the differing behaviour at the two sites. Thus, these uncontrolled difference do not to my mind neither invalidate nor its general conclusions.

Whilst replicates are limited, the statistical confidence of the appropriate methods employed is quoted and appropriately commented upon and in consequence the significance of results is not over claimed. The differences in the infiltration rate behaviour observed along the Liberose and Nizzana catena is then significant.

Thus overall I am happy to support publication of this manuscript. It makes a worthwhile contribution to the understanding of infiltration in BSc crusted soils subject to the minor corrections listed below.

Specific semantic / syntactic comments / revisions needed:

p12713, Line 17: 'both' refers to I and II. Move in the text to make this clearer. p12719, 17: Reword sentence to begin: Decreasing infiltration along the catena at p12720, line 11: Nonsensical at present –insert 'differences' after 'Insignificant' p127120, line 21/22: Unclear - meaning the dust distribution within the BSCs? That is gradation in dust concentration does not follow decrease in crust cover? Re-word. p127121, line 2/3: Needs rewording - poorly and confusingly expressed at present. Reword as: To ensure the ... . . . water to be supplied ... .. p127121, line 18 et seq.: Reword / reorder- nonsensical at present 'at the arid site' and 'superimposed in the wrong parts of the

BGD

9, C6060–C6062, 2012

sentence. Intended meaning: ... along the catena at the arid site the influence of ..... were superimposed. p127121, line 23/24/25. Reword start of / order of sentence: It is hypothesized that under temperate conditions

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Interactive comment on Biogeosciences Discuss., 9, 12711, 2012.