

Interactive comment on “Quantifying irreversible movement in steep fractured bedrock permafrost at Matterhorn (CH)” by Samuel Weber et al.

Anonymous Referee #1

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This paper presents seven years of rock-fracture movements from nine sites at Matterhorn, proposes a technique separating the total movements into several components. Both data and analysis are new and valuable. I recommend acceptance after minor modifications.

General comments: 1. Analysis methods are in places not understandable: e.g. Section 4.2. Some newly defined terms (e.g. OFST, LRM+) also do not seem to represent the actual features, so they are difficult to understand. 2. Why temperature is represented by data at 85 cm depth (instead of surface T)? Does the value best correlate with deformation? If it is true, why?

Specific comments: P1 L8 Insert ‘that’ after assuming. P2 L32 Does ‘thermal expansion’ here mean D2 or include also D3? Ice pressure and its release by melting can

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also produce reversible movement. P3 L4 Insert ‘us’ after allows. P6 L31 ...strong wind results in a preferential snow deposition in fractures... (Insert ‘s’ and delete comma.) P7 L4 Does ‘along fracture’ mean that the crackmeter does not cross a fracture? A photo or illustration of the installation will be helpful. P8 Fig.3 caption Scap of the 2003 rockfall... P8 L9 Why did you use T at 85 cm depth? P9 L3 Where is ‘ti’ in Eq. 2? P10 L8 Insert ‘of’ after ‘approximation’? P10 L16 What does ‘date(Trock < -1 C)|May 1’ mean? P10 L27-29 Should this be described in Section 4.4 (equation 6)? P11 L19 Perhaps ‘installation’ could be deleted. P12 Fig. 5 caption L2: I suggest to insert (a) after ‘at 85 cm depth’. L3: I suggest ‘... represented by (b) perpendicular to and (c) along fracture’. P13 Fig. 6 Why deformation does not start from zero (cf. Fig. 5). P13 Fig. 6 caption Replace ‘parallel’ by ‘along’? P13 L4-5 Note that...: I cannot understand this sentence. P14 L3 Insert comma after ‘Assuming’. P14 L13-14 Hinting on...: Also not understandable. Lacking a verb. P14 L17 Replace ‘Section 5’ by ‘Figure 5’? P15 Fig. 7 Why deformation does not start from zero? P18 L8-9 Which data do show ‘this summer offset seems to correlate slightly with an increasing total amount of energy available (TDD)’? P18 L32 What is ‘the hypothesis of Hasler et al. (2012)’? P19 L7-8 ‘the water can easily drain through the strongly fractured rock and the water availability is limited’: Does this situation fit any places in the rockwall? Aren’t there any locations topographically favorable for water storage?

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