

## ***Interactive comment on “Short-term velocity variations of three rock glaciers and their relationship with meteorological conditions” by V. Wirz et al.***

**V. Wirz et al.**

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Dear Editor and referees,

Firstly, as authors we would like to thank all three referees for their constructive comments and suggestions. We have set out to respond fully to both the content and spirit of each comment in full, and hope that the edited manuscript reflects these changes.

All three referees mentioned at the beginning of their review, that the data and methods presented in this study are novel and contribute to the current understanding of intra-annual velocity variations of rock glaciers. However, as main weaknesses the referees

C494

mentioned the following points: a) the focus of this paper (especially in the discussion section) is sometimes vague and the links between statistical analysis and the discussion processes should be strengthened, b) the processes mentioned in the discussion should be better introduced, c) the representativeness of the point measurements are insufficiently explained, d) part of the manuscript (mainly instrumentation section) are similar to the previous publication Wirz et al., 2015, and e) the geomorphological characteristics of the rock glaciers are insufficiently introduced. In our new version we have substantially rewritten and restructured the manuscript to address these points, paying special care to making the focus of the paper clearer. The following list presents the main changes we have made as a global summary – we list our detailed responses and changes made to each referee individually later in this document.

- We have restructured and rewritten the discussion section to make the focus of this paper (newly gained insights on short-term variability) clearer and to better link statistical analyses with discussed processes.

- We have rewritten the abstract to make the focus of this paper (short-term variations/ relation of velocity peaks to meteorological factors) clearer.

- We have rewritten (and shortened) the introduction to better set out the aims of the paper and to more clearly introduce current knowledge on rock glacier movement (mechanical) and the involved processes and related reaction/response times.

- We have shortened the results- and discussion- section on inter-annual variability (as here the data basis is limited with 3 years) to further strengthen the focus of our paper on intra-annual variability.

- We better introduced and explained the representativeness of our point measurements, by showing areas with rather homogenous velocity fields (as found in previous studies with higher spatial resolution of the measurements) in Fig. 2 and better introduced the selection of measurement locations. - Removed the section instrumentation of the study site and included main information in the sections “GPS and inclinometer

C495

data” and “auxiliary data”, to avoid repetition from previous publications (e.g. Wirz et al., 2015).

- We rewrote the sections “data” and “methods”: We made one section “data and methods” (section 3 in the new manuscript), and removed redundant parts from previous papers.

- We added a new Table (Table 2 in the new manuscript), updated Figure 2, to provide more information on the main characteristics of the rock glaciers regarding topography, geomorphology and kinematics (mean annual velocities of rock glacier lobes).

- We calculated the snow cover and zero curtain periods based on local iButtons only and updated logistic regression models and all results and related sections in the manuscript.

- We included one additional year of GST data for R7a and one additional year of GPS and GST data for R6a and R6b, because this data are now available. We now have three years of data (GST and GPS) for all stations.

- We changed the Fig. 1–6 and 10 according to the referees’ comments (see details below) to make easier to be read.

Full answer to all three referees, including figures and tables, in the enclosed pdf.

Please also note the supplement to this comment:

<http://www.earth-surf-dynam-discuss.net/3/C494/2015/esurfd-3-C494-2015-supplement.pdf>

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Interactive comment on Earth Surf. Dynam. Discuss., 3, 459, 2015.