

## ***Interactive comment on “A new permanent multi-parameter monitoring network in Central Asian high mountains – from measurements to data bases” by T. Schöne et al.***

**Anonymous Referee #2**

Received and published: 13 September 2012

**Review of "A permanent multi parameter monitoring network in Central Asian high mountains - from measurements to data bases" by T. Schöne, C. Zech, K. Unger-Shayesteh, V. Rudenko, H. Thoss, H.-U. Wetzel, and A. Zubovich**

General Statement

In this paper the technical setup and the data handling for a network of automated so called multi-parameter stations in Central Asia are described. The work described in the manuscript is of an applied nature: Solutions for operating unmanned remote

C154

multi-parameter stations and to efficiently handle the large amount of diverse data have been developed and are applied at the example of a station network in central Asia. The manuscript gives a very good overview to the technical side of the installations and the data management. To my opinion this manuscript provides valuable detailed background information to the design and operation of automated and remote weather (and other parameter) observation systems. Adding information on the following two topics would complete the good technical description: (1) On page 316 line 3 it is stated that the stations show excellent performance. I believe that some clarification of the station performance is missing: Why is the performance excellent? Have there been any technical issues during the three years since the installment of the first two stations? Which parts performed well and which parts/components/protocols caused problems and how were these addressed? I believe that such information is essential and would further improve the value of the detailed technical descriptions. (2) Information on the maintenance of the stations is missing. How often are these visited? Who is doing the ordinary/extraordinary maintenance (local experts/foreign specialists)? The authors also provide very little details on installation procedures. A (very brief) description might be of added value.

I understand that the here presented network of stations has a technical dimension but also involves aspects of development aid and practical application of the products. Although it is clear that the present manuscript is mainly dedicated to the first, I still miss a bit of background information on the second aspect. Thereby I ask myself who owns and maintains the stations now and in the future? Who uses the data at the moment and for what purposes? Again, this question might not be the main focus of the manuscript, but I believe the paper would benefit from a slightly clearer listing of the current (and maybe future) use of the data products. Closely related to this point is also the description of potential scientific use of the data products. The glaciological use of the Abramov station could be a bit more specific, and the same applies to the use as "ground truthing data for new space born monitoring techniques" (page 316, line 23) or the mentioned development of "early warning/multi hazard monitoring applications"

C155

(Page 316, line 8). I do not want to recommend a change in focus of the paper, but rather encourage the authors to clearer embed their detailed and valuable technical description in the context of real world applications.

#### Detailed Suggestions:

1. Page 302, lines 4–6: Maybe this sentence could be changed to: "Since 2009, GFZ and CAIAG, in cooperation with the National Hydrometeorological Services (NHMS) of Central Asia, are establishing such a regional monitoring network in Kazakhstan, Kyrgyzstan, Tajikistan, Uzbekistan, and Afghanistan to collect observations of meteorological and hydrological parameters and to deliver them to the end-users."
2. Page 307, line 26: I am personally somewhat reluctant towards citing brief conference abstracts as these contain a very limited amount of information. The planned use of the camera pictures could be outlined more comprehensible by citing Corripio (2004) (description of a method to geo-reference oblique photography) and e.g. Rabatel et al. (2005) (one of the various studies applying remotely sensed snow lines as a proxy for glacier mass balance).
3. Page 315, line 11: Related to the point above: such an application would benefit from glaciological observations on the glacier. Are such observations carried out or do you refer to pre-1999 data?
4. Page 315, line 11: To my opinion Kaser et al. (2003) is an inappropriate reference in this context. Please consider citing authors that specifically addressed the application of snow lines or equilibrium line altitudes to calculate glacier mass balance (e.g. Braithwaite, 1984; Rabatel et al., 2005; Jeanicke et al., 2006; Rabatel et al., 2008). A more common standard reference to mass balance observations using the glaciological method (stakes and snow pits) would be Østrem

C156

and Brugman (1991).

5. Figures 1 and 8: I would strongly suggest merging these two figures into one. Thereby I would enlarge Figure 1 and show all the stations therein. On the one hand this would allow to shorten the manuscript. On the other hand, a combined figure would clearly show which stations are situated in high mountains and which stations are situated at somewhat lower elevations close to rivers (river discharge measurements). The information which countries are situated at the headwaters and which countries are located mostly downstream (given in Figure 8) can be omitted as it is not discussed nor mentioned in the text.
6. Figure 9a: I have troubles finding the grey line denoting times where the input power exceeded current drain.

#### References

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C157

A. Rabatel, J-P. Dedieu, E. Thibert, A. Letréguilly, and C. Vincent. 25 years (1981-2005) of equilibrium-line altitude and mass-balance reconstruction on Glacier Blanc, French Alps, using remote-sensing methods and meteorological data. *Journal of Glaciology*, 54(185): 307–314, 2008.

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Interactive comment on Geosci. Instrum. Method. Data Syst. Discuss., 2, 301, 2012.