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Earth Surface Dynamics Discussions

Interactive comment on "The hydrological cycle in the high Pamir Mountains: how temperature and seasonal precipitation distribution influence stream flow in the Gunt catchment, Tajikistan" *by* E. Pohl et al.

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An increased understanding of the hydrological cycle of the Pamirs is beneficial for multiple research areas, including geomorphology, hydrology and climatology. The paper comprehends the hydrological cycle of the Pamirs, quantifying the contributions of several water stores to discharge. The study also provides a helpful review of several remote sensing datasets available for the region, helping to combat the lack of ground based monitoring stations.

Overall Comments:

1) The calibration period for the model is stated as the years 2002-2007 (page 1175, line 21). Are the results presented in figure 7 produced via cross validation or are they from the calibration procedure?

2) The study area is stated as being "characterised by a long lasting snow cover" (page 1161, lines 23-24). Available satellite images on google earth of the headwaters of the Gunt catchment are sparsely snow covered when the images were taken on the 10th April 2003. Furthermore, figure 1 in Lutz et al. (2012) depicts the headwaters of the Gunt catchment exhibiting a very small glacierised fraction. What data is available to highlight this long lasting snow cover?

3) It is stated that the Gunt catchment is considered representative for the central Pamirs (page 1160, lines 24-25). Figure 1 in Lutz et al. (2013) depicts the varied nature of glacierisation in the Pamirs, with greater glacierisation to the north of the Gunt catchment. In addition, figure 3 in Fuchs et al. (2013) depicts the variation in mean annual precipitation across the Pamirs, showing an order of magnitude increase in precipitation between the Gunt catchment and the areas north-west of the Gunt catchment. This information casts doubt on the representativeness of the Gunt catchment for the central Pamirs.

4) No reference is given to the possible effects of Lake Yashikul on the precipitation-discharge relationship. Could this lake possibly de-couple the headwaters of the Gunt catchment from the monitoring station downstream? Furthermore, could this play a role in the seemingly substantial amount of groundwater discharge that all models agreed on (page 1175, lines 24-25)?

5) It is stated that the "ISM extension reaching the eastern part of the Pamirs (Murghab and Shaimak) in summer" is responsible for the increase in summer precipitation at these two gauge stations (page 1161, lines 21-22). Previous studies have found that the Hindu Kush and Karakoram mountain ranges are a barrier to the northward move-

ment of the ISM, and therefore the ISM does not impact the precipitation of the Pamirs (Syed et al., 2006; Schiemann et al., 2007). Is it possible that the summer precipitation observed at these sites is caused by north or north westerly intrusions of air masses resulting in showers and thunderstorms over the mountains as described in Schiemann et al. (2008)? An improved physically based justification for attributing this precipitation to the ISM would be beneficial, expanding on what is stated on page 1187, lines 24-25.

Short comments:

6) In the abstract and conclusions it is stated that around 80

7) The addition of a time series plot of temperature to figure 7 could aid the conclusion that temperature is the dominant trigger of melt (page 1182, lines 18-19).

8) A Summary of the study's findings regarding glaciology (from figure 5) could help comparisons to be drawn with other studies findings that are currently summarised in the text (page 1183, line 17). âĂČ

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