

Interactive comment on “Role of glaciers in watershed hydrology: Himalayan catchment perspective” by R. J. Thayyen and J. T. Gergan

Anonymous Referee #1

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The importance of high mountain areas as sources of freshwater is highly recognized (Viviroli et al., 2004). The contribution of Thayyen and Gergan (2009) is surely a interesting piece of work that deserve attention from the scientific community.

In the abstract the authors declare their desire to contribute to a "global outlook on river flow response to cryospheric changes". It is therefore a pity that the findings are not embedded in a global perspective by comparing finding from studies in North America (e.g. Stahl et al., 2006), Europe (e.g. Verbunt et al., 2003) or the Andes (Coudrian et al., 2005).

The author decide to use a data-based approach in order to obtain their answers and focus on a six years data series for a small glacierized watershed. Even if the big effort on data collection in such region has to be greatly acknowledged, the available data

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sets are still rather thin for many of the interpretations presented here. A determination of variations within a six year period is not satisfying from a statistical point of view.

In the description of the basins more information should be given. I really miss a table where all used basins are listed with their area and portion of glaciated areas. In Table 1 the only the areas of the sub-catchments of the Din Gad Basin are indicated. The information on the area would be particularly useful for better interpreting Figure 3, where the discharge is declared in m³/s. These data should be also transformed in mm and the areas of the "Lidder valley" and of the "Ganglass catchment" belong in the Table I meant. Information on the Beas and Satluj rivers also belong in such a table. This is my only critical point to Section 3, which is all in all very informative an a well balanced summary on "Himalayan catchment" is.

In your results you present in Figure 7 values for a station at 3763 m.a.s.l., in the text you declare this information (452-10) as summer values for the Din Gad basin. This could raise up the thought that you speak about catchment averages. Please be very careful in indicating if the values you present concerns the whole basin, a portion of the basin, or a single local observing point.

This observation also applies for the data on Table 1. It is not clear enough, that the data refer on the sub-areas and not on the integral area up to the declared gauge. The wording you select is in some cases very dangerous. At 453-12 you declare "While discharge at Tela and Gujjar Hut stations were reduced by 58 and 50 percentage, respectively from 1998 to 2004, discharge from the glacier catchment showed comparatively steadied response". When reading this the reader might understand that from now on discharge in the lower bands would stay at a level that is much lower than the reference level of 1998. This problem is connected with the problem of the shortness of the time series.

Other points where raised by the other reviewer and an answer of the authors to these points was already posted when compiling this review.

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Summarizing I suggest a critical revision on the manuscript with the focus on interpreting the results with more caution as the data sources are still much to short.

References:

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Stahl K, Moore RD. 2006. Influence of watershed glacier coverage on summer streamflow in British Columbia, Canada, *Water Resour. Res.*, 42, W06201, doi:10.1029/2006WR005022.

Verbunt M, Gurtz J, Jasper K, Lang H, Warmerdam P, Zappa M. 2003. The hydrological role of snow and glaciers in alpine river basins and their distributed modeling. *Journal of Hydrology* 282: 36-55.

Viviroli D, Weingartner R. 2004. The hydrological significance of mountains - from regional to global scale. *Hydrology and Earth System Sciences* 8: 1016-1029.

Interactive comment on *The Cryosphere Discuss.*, 3, 443, 2009.