

Interactive comment on “

**Snow cover dynamics and hydrological regime of
the Hunza River basin, Karakoram Range,
Northern Pakistan” by A. A. Tahir et al.**

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RC 1. Trend detection over less than ten years of data is a truly dangerous exercise. I think interannual fluctuations can mask any real trend and decadal fluctuations can generate spurious detections, so I would rather eliminate this part or, at least, present it just as an euristic attempt. I think no conclusion on trends can be drawn from such a short time series.

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AR: This is true about Figure 8 where we have only 8 years data. But we tried to use the data available within the catchment. Moreover the trend found in the figure is supported by the MODIS snow cover data which shows an expansion of snow cover area (due to increased precipitation trends). Moreover, this comment is made by almost all the referees. We will discuss this issue with more precaution and results based on this time-series analysis will be stated as an assumption.

RC 2. Page 2833: "A significant inverse correlation between summer precipitation at Gilgit and runoff" sounds indeed strange. Maybe the authors should try to explore this issue more thoroughly - right now it is left vague in terms of understanding.

AR: It is because the runoff in the Hunza River is influenced highly by the snow and glacial melt in summer whereas the rainfall amount in summer is very weak to influence the discharge.

RC 3. Page 2834: "The correlation between winter and spring temperatures and runoff". Why winter temperatures are correlated with runoff? Is it because there is a correlation between winter temperatures and precipitation? It would be good to explore this issue.

AR: This analysis is done to show the correlation between the runoff and the temperature seasonality. This reason is given in the next lines.

RC 4. Page 2834 (and again 2838): "the Gilgit climate station can be replaced with the Hunza basin climate stations": But Gilgit is the only one which has a significant inverse correlation between summer precipitation and runoff... So it seems it behaves differently from the Hunza basin stations - unless the correlation is statistically significant but irrelevant.

AR: The Gilgit climate station was used previously by the researchers (Akhtar et al., 2008; Archer, 2003; Archer et al., 2004 etc.) to show the runoff control in the Hunza River because no data was available within the Hunza basin. But now the climate data

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over about 10 year period is available from the catchment. This data represents the catchment climate in a better way than the Gilgit climate station which is below 2000 m elevation whereas the 98% of the Hunza catchment area is above this elevation.

RC 5. Page 2835: "a significant expansion of the snow cover area in zone C". Again, maybe statistically significant but not really visible... and why only in zone C?

AR: The zone C is situated above 4500 m where the temperature remains negative almost throughout the year. An increasing trend in winter precipitation (Hewitt, 2005) above this elevation is instrumental in the expansion of snow cover area in this zone as explained on the page 2835-2836.

RC 6. There are a few language issues, such as the use of "most greatest" on page 2827, which should be polished.

AR: It was a mistake and will be corrected in revised submission.

Overall, the referee comments really helped us to improve the scientific quality of the manuscript.

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