

## ***Interactive comment on “The role of glaciers in stream flow from the Nepal Himalaya” by D. Alford and R. Armstrong***

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The basic precept of this paper is Occam's Razor, that the simplest procedure has the greatest probability of producing the correct result. Dr. Kaser recognized this fact in his preliminary remarks, stating, "...one can still come to reliable first order magnitudes if common sense and basic glaciological and hydrological concepts are used...." He also stated, however, that the topic of this paper has been, "...(a).. subject of controversial discussions". I did not wish to contribute to this controversy, but at the same time, I don't feel it is useful now to pretend that it never happened. I understand that Dr. Kaser did not subscribe to the conventional wisdom prevalent when this study was being discussed, conceptualized and undertaken (2007-2009), but, from the reviewed and "gray" literature of that period, it is evident that at least some of our peers did. This

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paper was written for them, in what I hoped was common English. From all but one of the TC reviews so far, I am beginning to believe that the paper could only be more incomprehensible if written in Martian.

If I interpret them correctly, Dr. Kaser's concerns fall into three categories: 1) grammar, semantics and composition, 2) concepts and terminology, 3) numbers. In no particular order, the basic concept of the study described in the paper is that glaciers exist at the latitude of the Himalaya primarily because of the altitude of these mountains, and that surface area, expressed as area-altitude distributions, is a major factor in determining the volumetric importance of both energy and water exchange processes. The concerns expressed with this concept seem to be related primarily to the choice of numbers quantifying the water and energy exchange. We came up with what we felt are reasonable approximations, but anyone familiar with the literature of water and energy exchange in the mountains of south Asia understands that these numbers cannot be verified from the literature, no matter how extensive the search. The questions should be: are the concepts and results reasonable? If not, how can they be improved? I am confident this will not be accomplished as a result of a literature review.

A few responses to specific comments: 1) the term "Arctic Desert" is from a Swiss geologist, Tony Hagen, who used it to describe the environment he encountered at high altitudes during his years of mapping in the Nepal Himalaya. As Dr. Kaser knows, it is the air mass, not the mountains, that has a connection to the sub-tropics, if not the tropics. 2) I understand Dr. Kaser's concern with my use of the ELA concept. At the same time, it is a concept that grew out of studies in the Alps, and western North America, and the possibility that it needs revision to be applicable to the Himalaya should at least be considered, 3) My skill in English grammar and composition are what they are. It is probably too late now to assume with a little effort, I could begin to influence discussions such as this through learning to use my language with more precision.

Finally, my studies of mountain hydrology have been strongly influenced by the writ-

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ings of Vit Klemes, in particular "The modelling of mountain hydrology: the ultimate challenge", as well as his papers on the importance of scale. I continue to recommend Klenes to all those with an interest in mountain hydrology, the main topic of this paper.

Having said all this, I have learned from Dr. Kaser's comments, and am very appreciative of the time he took to review the paper so thoroughly. As a second child often benefits from mistakes made raising the first-born, I will try to do better next time. At the same time, I have dug my snow pit above 5000 meters. This was enough to convince me that an alternate glaciology is essential for mountains, and glaciers, that rise above this altitude. I will continue to push the conversation in that direction.

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Interactive comment on The Cryosphere Discuss., 4, 469, 2010.

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