Hydrol. Earth Syst. Sci. Discuss., 12, C3352–C3354, 2015
www.hydrol-earth-syst-sci-discuss.net/12/C3352/2015/
© Author(s) 2015. This work is distributed under
the Creative Commons Attribute 3.0 License.

Hydrology and Earth System Sciences
Discussions

Interactive comment on "South Asia river flow projections and their implications for water resources" *by* C. Mathison et al.

B. Schaefli (Editor)

bettina.schaefli@epfl.ch

Received and published: 27 August 2015

As already stated by the two reviews, this paper makes an important contribution on the hydrology of a world region where there are not many extensive studies on potential future river flows. It is, accordingly, of foremost importance to be extremely clear about the potential and limitations of the used methodology to project climate change impacts on river flow.

I agree with reviewer 1, that in its current form, the manuscript does not concisely discuss how useful the routed RCM simulations are to understand changes in riverflow via simulation (one of the stated objectives of this paper).

Hydrological climate change impact studies are challenging for many reasons; besides

the fundamental question whether the used climate projection covers the range of possible future situations, it is essential A) to assess wether the hydrological model is able to reproduce actual streamflow and B) future simulation results have to be assessed against natural variability.

A) In the presented setting, the quality of the hydrological model (routed RCM outputs) cannot be easily assessed via comparison to observed streamflow (lack of good observations, no glacier model, no groundwater recharge, no hydraulic infrastructure). Accordingly, I think that the methods section of the paper should give a concise presentation of the methodology developed to assess the quality of the streamflow simulations despite of the fact that the model does not simulate the same quantity as the observed one. How robust are the conclusions on potential changes given this model evaluation methodology?

B) In the presented work, natural variability is taken = 1.5 the standard deviation, which is an simplification and is perhaps not appropriate for environments with strong seasonal patterns.

Furthermore, in light also of the comments of reviewer 2, I think that the paper could do a better job in explaining which modifications of the climate regime actually cause the identified modifications of river flow.

Some additional detailed comments:

- part of the rather long section 4 discusses interesting issues but without direct relation to the presented results

- consider to include a reference to the recent HESSD <ahref="http://www.hydrol-earth-syst-sci-discuss.net/12/4755/2015/hessd-12-4755-2015-discussion.html">paper by Immerzee et al.

- The PNAS paper by Kaser et al. on the importance of glaciers for downstream regimes (including Indus,

Ganges and Brahmaputra) might also be useful for the discussion of the results (there are several papers on the effect of climate change in Himalayan glaciers; it could be discussed how their projected changes would add up to findings presented here)

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 12, 5789, 2015.