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Hydrology and Earth System Sciences Discussions

Interactive comment on "Modelling the impact of prescribed global warming on water resources of headwater catchments of the Irrawaddy River and their implications for Loktak Lake, northeast India" *by* C. R. Singh et al.

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We thank R. Kumar for his constructive comments on the paper. Our responses to the specific issues identified are detailed below:

1. Hydrological regimes of rivers and the lake etc

Some reference to the variability in lake levels and lake depth is provided in Section 2 whilst, of course, the river regimes and hydrological regime of the lake are shown graphically when model results are compared to observations. In revising the paper we will provide some additional information within Section 2 including the flashy nature of river flows, periods of peak/low river flow and lake water levels in order to address the referee's comments.

2. Regulation of rivers

At present the major water resources schemes within the Loktak Lake catchment are within the Heirok and Sekmai sub-catchments. These have resulted in diversion of the water from these rivers away from Loktak Lake (Page 2785, line 22-24). For this reason, both of these sub-catchments have been excluded from the lake water balance calculations (Page 2790, lines 5-6). Although two other schemes have been proposed (within the Khuga and Iril sub-catchments) they are not operational so that the models of these two sub-catchments represent the unregulated conditions. Reference to these two proposed schemes will be made in the revised paper although our approach of modelling these schemes in their current unregulated state is considered appropriate.

3. Phumdis

Research by Singh (2010) (to be presented in a paper currently in preparation) which compares lake water depths and the thickness of the phumdis derived from extensive field surveys shows that the high water levels are impacting phumdis throughout Loktak Lake not just within the Keibul Lamjao National Park (KLNP). KLNP rightly deserves special attention given its protected status but deterioration of the phumdis is a lake-wide phenomenon.

4. Uncertainties

The issues referred to by the referee are similar to some identified by Anonymous

Referee #1. Our response to these earlier comments such as model grid size selection, parameters changing with climate change and reducing the uncertainty of GCM projections will therefore address these issues.

5. Sensitivity of the lake ecosystem to other factors

In revising the paper we will, as suggested by the referee, refer to other issues which might impact the lake ecosystem. These will include the potential schemes proposed within the Khuga and Iril sub-catchments (referred to above) as well as the issue of sedimentation identified by Anonymous Referee #1.

References

Singh, C.R. 2010. Hydrological and hydraulic modelling for the restoration and management of Loktak Lake, Northeast India. PhD thesis, UCL, London, UK.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 7, 2781, 2010.