



## **Glaciological and hydrological sensitivities in the Hindu Kush - Himalaya**

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Glacier responses to future climate change will affect hydrology at subbasin-scales. The main goal of this study is to assess glaciological and hydrological sensitivities of sub-basins throughout the Hindu Kush - Himalaya (HKH) region. We use a simple geometrical analysis based on a full glacier inventory and digital elevation model (DEM) to estimate sub-basin equilibrium line altitudes (ELA) from assumptions of steady-state accumulation area ratios (AARs). The ELA response to an increase in temperature is expressed as a function of mean annual precipitation, derived from a range of high-altitude studies. Changes in glacier contributions to streamflow in response to increased temperatures are examined for scenarios of both static and adjusted glacier geometries. On average, glacier contributions to streamflow increase by approximately 50% for a +1K warming based on a static geometry. Large decreases (-60% on average) occur in all basins when glacier geometries are instantaneously adjusted to reflect the new ELA. Finally, we provide estimates of sub-basin glacier response times that suggest a majority of basins will experience declining glacier contributions by the year 2100.