High Mountain Asia Glacier and Climate Change in High Mountain Asia over the Modern Era

Despite significant effort and associated progress in addressing High Mountain Asia (HMA) glacier and climatic change, there is still significant uncertainty in HMA glacier sensitivity to climate change and in glacier contributions to local and regional water resources. The uncertainty is due in part to the limited in-situ climate and glacier data available for this topographically complex region. The lack of data and associated uncertainties have limited our ability to quantify the spatial and temporal variability in climate across the region, giving rise to significant uncertainty in the causes of glacier change and associated impacts on downstream populations. This work aims to (1) quantify glacier mass balance changes over the modern era using historical satellite imagery, (2) evaluate and improve estimates of climate, particularly precipitation, in HMA over the same period through statistical and dynamical modeling, and (3) assess the role of precipitation variability and trends in observed glacier change using surface energy and mass balance modeling. We will present the results of the glacier mass balance changes since the 1970's across the Himalaya-Karakoram-Hindu Kush regions, and discuss the preliminary results of the modeling efforts employed to evaluate the climate drivers of those glacier changes.