



Improving Understanding of Glacier Melt Contribution to High Asian River Discharge through Collaboration and Capacity Building with High Asian CHARIS Partner Institutions

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The Contribution to High Asia Runoff from Ice & Snow (CHARIS) project uses remote sensing data combined with modeling from 2000 to the present to improve proportional estimates of melt from glaciers and seasonal snow surfaces. Based at the National Snow and Ice Data Center (NSIDC), University of Colorado, Boulder, USA, the CHARIS project objectives are twofold: 1) capacity-building efforts with CHARIS partners from eight High Asian countries to better forecast future availability and vulnerability of water resources in the region, and 2) improving our ability to systematically assess the role of glaciers and seasonal snow in the freshwater resources of High Asia. Capacity-building efforts include working with CHARIS partners from Bhutan, Nepal, India, Pakistan, Afghanistan, Kazakhstan, Kyrgyzstan and Tajikistan. Our capacity-building activities include training, data sharing, supporting fieldwork, graduate student education and infrastructure development. Because of the scarcity of in situ data in this High Asian region, we are using the wealth of available remote sensing data to characterize digital elevation, daily maps of fractional snow-cover, annual maps of glacier and permanent snow cover area and downscaled reanalysis temperature data in snow melt models to estimate the relative proportions of river runoff from glacierized and seasonally snow-covered surfaces. Current collaboration with Qinghua Ye, visiting scientist at NSIDC from the Institute of Tibetan Plateau Research, CAS, focuses on remote sensing methods to detect changes in the mountain cryosphere. Collaboration with our Asian partners supports the systematic analysis of the annual cycle of seasonal snow and glacier ice melt across the High Mountain Asia region. With our Asian partners, we have derived reciprocal benefits, learning from their specialized local knowledge and obtaining access to their in situ data. We expect that the improved understanding of runoff from snow and glacier surfaces will inform the development of adaptation and mitigation measures. The CHARIS Project is funded by USAID.