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Title	Spatiotemporal Analysis Of The Snow Cover Extent In Data-Scarce Upper Kabul River Basin Through Remote Sensing.
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Abstract

Snowcover is the principal source of streamflow, groundwater recharge, irrigation and environmental flows in the Hindukush Himalaya (HKH) region of Afghanistan. For estimation of water availability as a essential information for water management, it is important to investigate the spatiotemporal variation in the snow cover area (SCA). Therefore, the objective of this study was to assess the spatiotemporal variation in snow cover in the Upper Kabul River Basin (i.e. Panjshir Watershed) which constitutes around 4.87% land area of the Kabul River Basin. For this purpose, the improved Moderate Resolution Imaging Spectroradiometer (MODIS) product (i.e. MOYDGL06) was used which covers a period of 2003 – 2018. The results indicate that usually, the snow accumulates from September to February; the annual maximum SCA during the study period was found to be 3519 km2 in February. From March onward, as the temperature rise, the snowmelt starts until the end of August when the SCA is least (i.e. 11 km2), mostly in the high elevation zones. The mean annual SCA during this period was 1876 ± 35.7 km2 which accounts for about 52.8% of the total area of the target region. The results of this study highlight the MODIS snow cover products' capability to assess the spatiotemporal dynamics of snow cover over the mountainous areas of complex river basins. Moreover, using satellite products in data-scarce regions for water availability estimations is the best feasible alternative. The detailed estimation of SCA both in space and time will help the long-term planning and development initiatives in the field of water resources management.