Variability of the Snowline Altitude at Different Region in the Eastern Tibetan Plateau in Recent 20 Years

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Abstract : These Glaciers are thought of as natural water reservoirs and are of vital importance to hydrological models and industrial production, and glacial changes act as significant indicators of climate change. The glacier snowline can be used as an indicator of the equilibrium line, which may be a key parameter to study the effect of climate change on glaciers. Using Google Earth Engine, we select optical satellite imageries and implement the Otsu thresholding method on a near-infrared band to detect snowline altitudes (SLAs) of 26 glaciers in three regions of the eastern Tibetan Plateau. Three different study regions in the eastern Tibetan Plateau have different climate regimes, which are Sepu Kangri (SK, maritime glacier), Bu'Gyai Kangri (BK, continental glacier) and west of Qiajajima (WQ, continental glacier), along a latitudinal transect from south to north. We analyzed the effects of climatic factors on the SLA changes from 1995 to 2016. SLAs are fluctuating upward, and the rising values are 100 m, 60 m, and 34 m from south to north during the 22 years. We also observed that the climatic factor that affects the variability of SLA gradually changes from precipitation to temperature from south to north. The northern continental glaciers are mainly affected by temperature, and the southern maritime glaciers affected by precipitation. Owing to the influence of primary climatic factors, continental glaciers are found to have higher SLAs on the south slope, while maritime glaciers have higher SLAs on the north slope.

Keywords : climate change, glacier, snowline altitude, tibetan plateau
Conference Title : ICGRSG 2020 : International Conference on Geodetic Remote Sensing and Geomatics
Conference Location : Miami, United States
Conference Dates : March 12-13, 2020