A Big Earth Data Platform for Three Poles

**Temperature data of six glaciers in high altitude area of Qinghai Tibet Plateau (2019)**

1、Description

Near-surface air temperature variability and the reliability of temperature extrapolation within glacierized regions are important issues for hydrological and glaciological studies that remain elusive because of the scarcity of high-elevation observations. Based on air temperature data in 2019 collected from 12 automatic weather stations, 43 temperature loggers and 6 national meteorological stations in six different catchments, this study presents air temperature variability in different glacierized/nonglacierized regions and assesses the robustness of different temperature extrapolations to reduce errors in melt estimation. The results show high spatial variability in temperature lapse rates (LRs) in different climatic contexts, with the steepest LRs located on the cold-dry northwestern Tibetan Plateau and the lowest LRs located on the warm-humid monsoonal-influenced southeastern Tibetan Plateau. Near-surface air temperatures in high-elevation glacierized regions of the western and central Tibetan Plateau are less influenced by katabatic winds and thus can be linearly extrapolated from off-glacier records. In contrast, the local katabatic winds prevailing on the temperate glaciers of the southeastern Tibetan Plateau exert pronounced cooling effects on the ambient air temperature, and thus, on-glacier air temperatures are significantly lower than that in elevation-equivalent nonglacierized regions. Consequently, linear temperature extrapolation from low-elevation nonglacierized stations may lead to as much as 40% overestimation of positive degree days, particularly with respect to large glaciers with a long flowline distances and significant cooling effects. These findings provide noteworthy evidence that the different LRs and relevant cooling effects on high-elevation glaciers under distinct climatic regimes should be carefully accounted for when estimating glacier melting on the Tibetan Plateau.

2、Keywords

Theme：Temperature,Glaciers,Glacier(Ice Sheet),Air temperature,Glacier climate
Discipline：Atmosphere,Cryosphere
Places：Tibetan Plateau
Time：2019-2020

3、Data details

1.Scale：None

2.Projection：

3.Filesize：4.59MB

4.Data format：None

4、Space scope

|  |  |  |
| --- | --- | --- |
| - | north：38.111 | - |
| west：79.7 | - | east：96.956 |
| - | south：29.244 | - |

5、Time frame:2018-12-31 16:00:00+00:00--2019-10-31 15:30:00+00:00

6、Reference method

References to data:

YANG Wei. Temperature data of six glaciers in high altitude area of Qinghai Tibet Plateau (2019). A Big Earth Data Platform for Three Poles, doi:10.11888/Cryos.tpdc.2719162021

References to articles:

Yang, W., Zhu, M., Guo, X., & Zhao, H. (2021). Air temperature variability in high-elevation glacierized regions: observations from six catchments on the Tibetan Plateau. Journal of Applied Meteorology and Climatology, DOI: 10.1175/JAMC-D-21-0122.1

7、Supporting project information

Second Tibetan Plateau Scientific Expedition Program

8、Data resource provider

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