

Researchers release integrated dataset of hydrological and thermal deformation in Qinghai-Tibet engineering corridor

October 15 2021, by Zhang Nannan

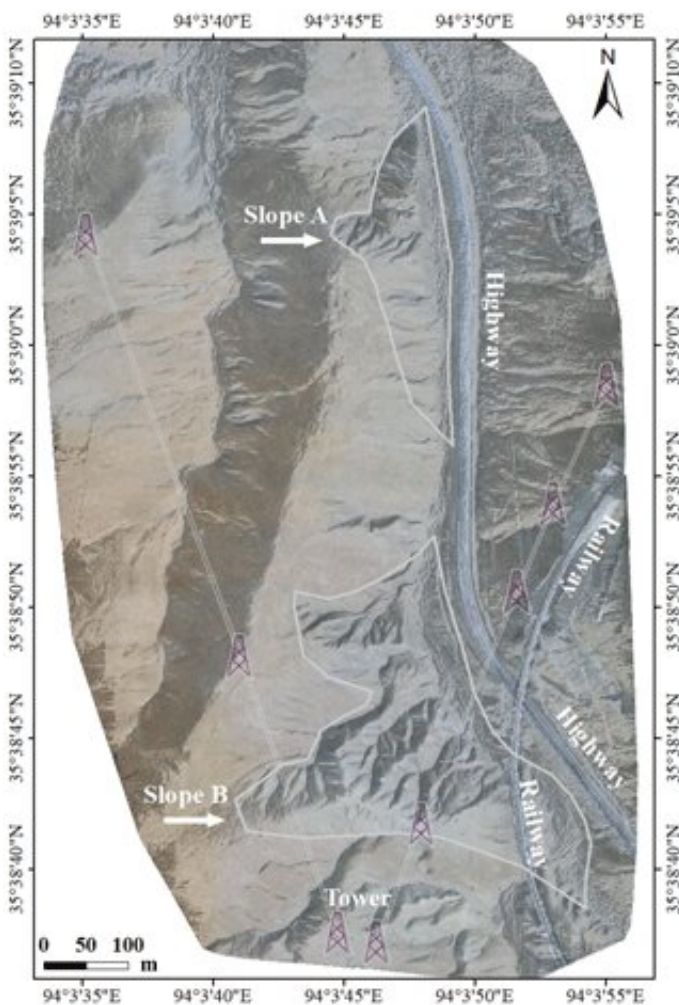


Figure 1. Geography of the study area, including the two permafrost slopes A and B, the Qinghai–Tibet Highway and Qinghai–Tibet Railway, and power and communication towers. Credit: DOI: 10.5194/essd-13-4035-2021

Chinese researchers recently released an integrated observation dataset of the hydrological and thermal deformation covering permafrost engineering and slope areas in the Qinghai-Tibet Engineering Corridor (QTEC).

This synthesis dataset for [permafrost](#) engineering and slopes includes measured air and ground temperatures and moisture, mean annual air temperature, mean annual ground surface temperature, terrestrial laser scanning point cloud data, and RGB and thermal infrared images.

QTEC is a narrow engineering corridor with widely distributed slopes, where a variety of important infrastructures are concentrated. However, slope failures caused by permafrost degradation and ground ice melting in permafrost regions happened frequently, endangering the safety of large facilities in the QTEC. Therefore, it is necessary to conduct a long-term monitoring of geological activities in this area.

Researchers from the Northwest Institute of Eco-Environment and Resources of the Chinese Academy of Sciences (CAS) implemented a variety of sensors to monitor the hydrological and thermal deformation between permafrost slopes and permafrost engineering projects in the corridor.

They also used soil temperature and moisture sensors to monitor hydrothermal changes, and adopted global navigation satellite system (GNSS), terrestrial laser scanning (TLS) and UAVs to observe the spatial distribution of thermal deformation.

To fully understand and leverage existing datasets and to allow for full transparency and repeatability, the researchers also provide comprehensive information and metadata, including complete documentation of the dataset and technical methods.

The dataset will be of great value to examine the hydrological and thermal deformation of permafrost slopes under the influence of climate change and engineering disturbances, as well as to reveal the mutual feedback between the slopes and engineering [infrastructure](#).

In addition, this dataset also evaluates the potential hazards of long-term stability and safety operation of the engineering infrastructure and slopes, and provides data support for the safety range and layout of the proposed permafrost engineering infrastructure.

The research has been published in *Earth System Science Data*, titled "An integrated observation [dataset](#) of the hydrological and thermal deformation in permafrost slopes and engineering infrastructure in the Qinghai–Tibet Engineering Corridor."

More information: Lihui Luo et al, An integrated observation dataset of the hydrological and thermal deformation in permafrost slopes and engineering infrastructure in the Qinghai–Tibet Engineering Corridor, *Earth System Science Data* (2021). [DOI: 10.5194/essd-13-4035-2021](https://doi.org/10.5194/essd-13-4035-2021)

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