Supplementary Materials: A GIS-Based Assessment of Vulnerability to Aeolian Desertification in the Source Areas of the Yangtze and Yellow Rivers

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Distribution of Areas of High-Altitude Frozen Ground in the Study Area

The whole study area is underlain by extensive areas of high-altitude frozen ground (Supplemental Figure S1) [1], which mainly consists of discontinuous alpine permafrost and seasonally frozen ground. The area with discontinuous alpine permafrost is mostly distributed in the source areas of the Yangtze River, where it covers an area of 1.2×10^6 km^2 (91.3% of this region). In contrast, seasonally frozen ground cover 6.0% of the area, island alpine permafrost cover 2.5%, and mountain permafrost covers 0.2%. The seasonally frozen ground mainly occurs in the source areas of the Yellow River, covering an area of 9×10^5 km^2 (68.5% of this region); the areas of discontinuous alpine permafrost and mountain permafrost account for 25.9% and 5.6% of the region, respectively.

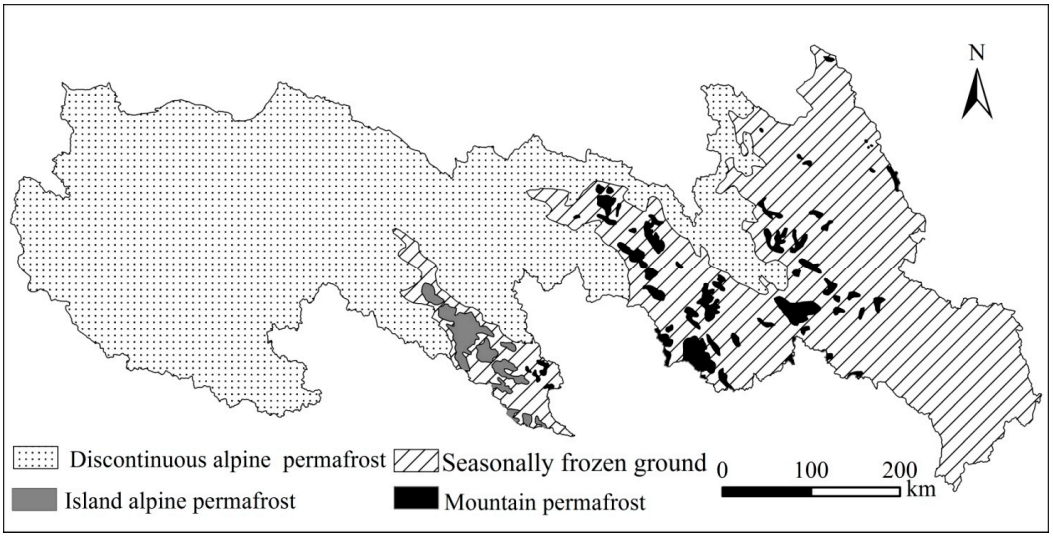

Figure S1. Distribution of permafrost in the study area. Source: [1].

In the source areas of the Yangtze River, aeolian desertified land is mainly distributed in the region of discontinuous alpine permafrost, where it covers 33,044.0 km^2, and a small amount of desertified land is distributed the areas with seasonally frozen soil, where it covers 181.8 km^2. In the source areas of the Yellow River, aeolian desertified land covers 12,233.7 km^2 in the area with seasonally frozen ground, versus 4183.2 km^2 in the area with discontinuous alpine permafrost and 797.9 km^2 in the area with mountain permafrost. Therefore, changes in the areas of each type of frozen soil (e.g., in response to climate change) are likely to affect the risk of aeolian desertification. The data set is provided by Cold and Arid Regions Sciences Data Center at Lanzhou (http://westdc.westgis.ac.cn).

Reference

1. Li, S.D.; Cheng, G.D. *Map of Frozen Ground on Qinghai Xizang Plateau*; Gansu Culture Press: Lanzhou, China, 1996. (In Chinese)