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Supplement of

TPRoGI: a comprehensive rock glacier inventory for the Tibetan Plateau using deep learning

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Table S1. Summary of previous inventory works of rock glaciers on the Tibetan Plateau.

Reference	Study area	Dataset	Method	Number of inventoried rock glaciers	Number of intact rock glaciers	Number of relict rock glaciers	Source of inventory dataset
Jones et al. (2018)	Nepalese Himalaya	Google Earth	Visual analysis	6,239	4,226	2,013	Supplementary data of the article, containing 6,239 rock glacier locations, and 1,137 boundaries
Ran and Liu (2018)	Daxue Shan	Google Earth	Visual analysis	295	Unknown	Unknown	Supplementary data of the article, containing 295 rock glacier boundaries
Jones et al. (2021b)	Himalaya	Google Earth	Visual analysis	24,968	16,334	8,634	https://data.mendeley.com/datasets/c9k7nwdkc3/1, containing 2,070 rock glacier boundaries
Hassan et al. (2021)	Hunza River Basin	Google Earth	Visual analysis	616	450	166	Supplementary data of the article, containing 616 rock glacier boundaries
Reinosch et al. (2021)	western Nyainqêntanglha Range	Sentinel-1, Sentinel-2, Landsat 8, TanDEM-X, Bing Maps, Google Earth, Zoom Earth	InSAR, visual analysis	1,433	1,210	0	https://doi.org/10.1594/PANGAEA.928971, containing 1,433 rock glacier locations and boundaries
Cai et al. (2021)	Daxue Shan	Sentinel-1, Google Earth	InSAR, visual analysis	344	344	0	https://zenodo.org/ record/5607677, including 344 rock glacier boundaries
Zhang et al. (2021)	Central Himalayas	Sentinel-1, Bing Maps, Google Earth, ESRI satellite maps	InSAR, visual analysis	4,962	4,783	81	N/A
Bolch et al. (2022)	Poiqu River Basin	Pléiades, Google Earth	Visual analysis	370	370	0	N/A
Zhang et al. (2022)	Gangdise Mountains	LocaSpace Viewer	Visual analysis	132	Unknown	Unknown	Supplementary data of the article, containing 132 rock glacier boundaries
Hu et al. (2023)	Western Kunlun Shan	ALOS-1 PALSAR-1, Sentinel-2, Google Earth	InSAR, deep learning, visual analysis	413	413	0	https://doi.pangaea.de/10.1594/PANGAEA.938686, containing 413 rock glacier boundaries
Zhang et al. (2023)	Nyainqêntanglha	Sentinel-1, Gaofen-2	InSAR, visual analysis	20,531	19,595	308	N/A
Li et al. (2024)	Guokalariju	Google Earth	Visual analysis	5,057	3673	1384	Supplementary data of the article, containing 5,053 rock glacier boundaries
Hu et al. (2024)	Qilian Mountains	Google Earth, ESRI maps, Bing maps, and Yandex images	Visual analysis	1,530	1,210	329	N/A

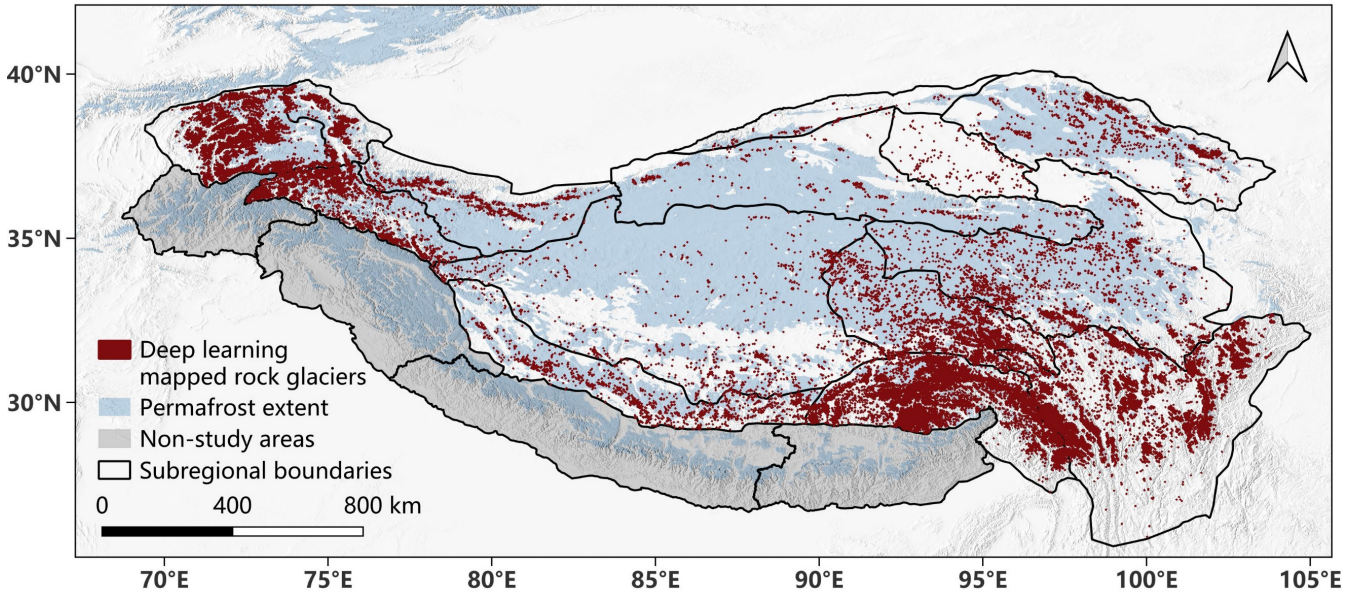

Figure S1. Deep learning mapped candidate rock glacier polygons on the Tibetan Plateau. The permafrost in Hengduan Shan is overlapped by the rock glaciers thus not visible on the map. The permafrost extent map is from Obu et al. (2018).

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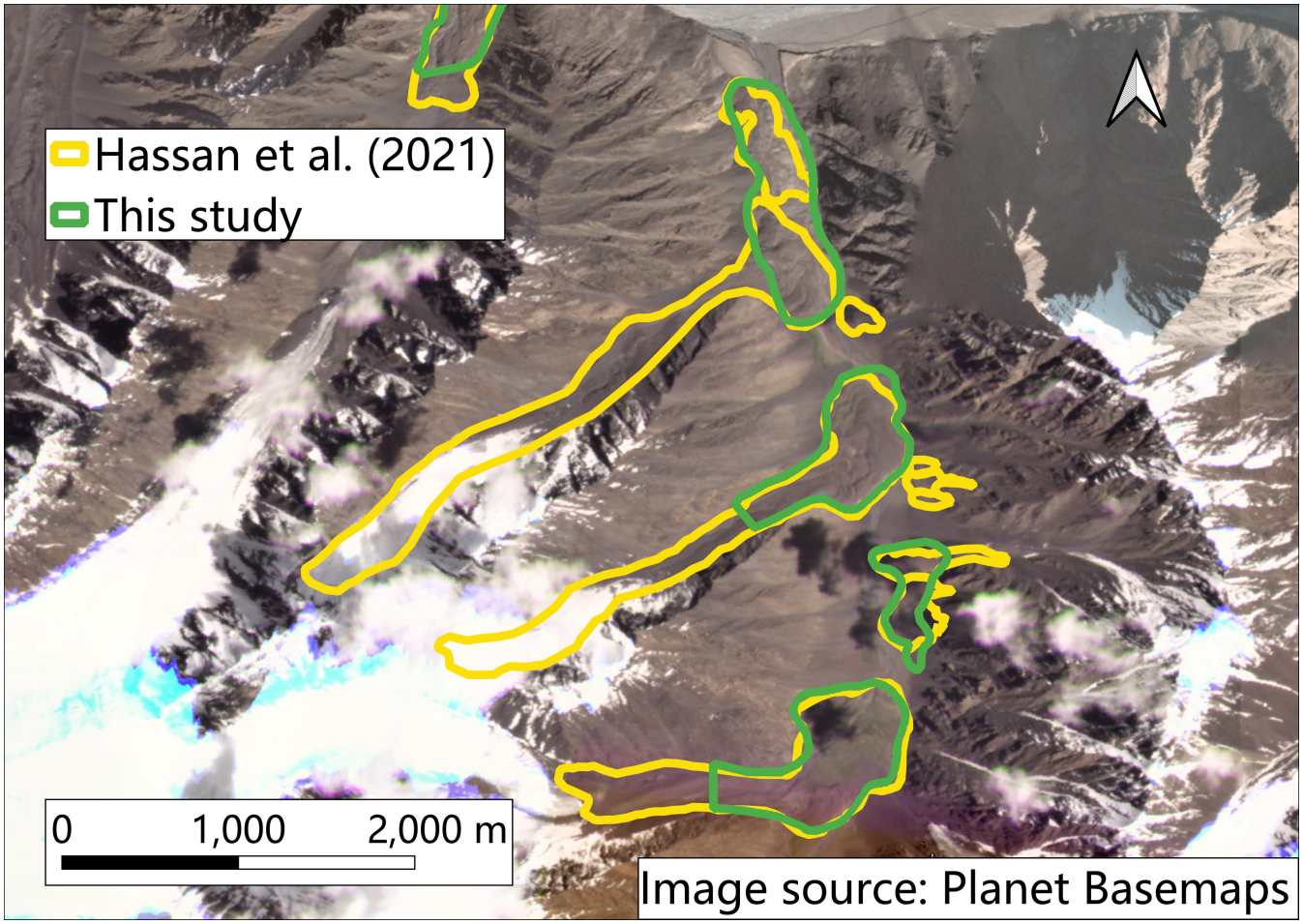

Figure S2. Example showing the comparison between Hassan et al. (2021)'s inventory and our inventory in Hunza Basin. The upper boundary located in the rooting zone are higher in our inventory than those in Hassan et al. (2021)'s inventory. The areas where the distinction between rock glaciers and debris-covered glaciers is ambiguous are excluded in our inventory. This example is centered at 75°22'22"E, 36°36'14"N.

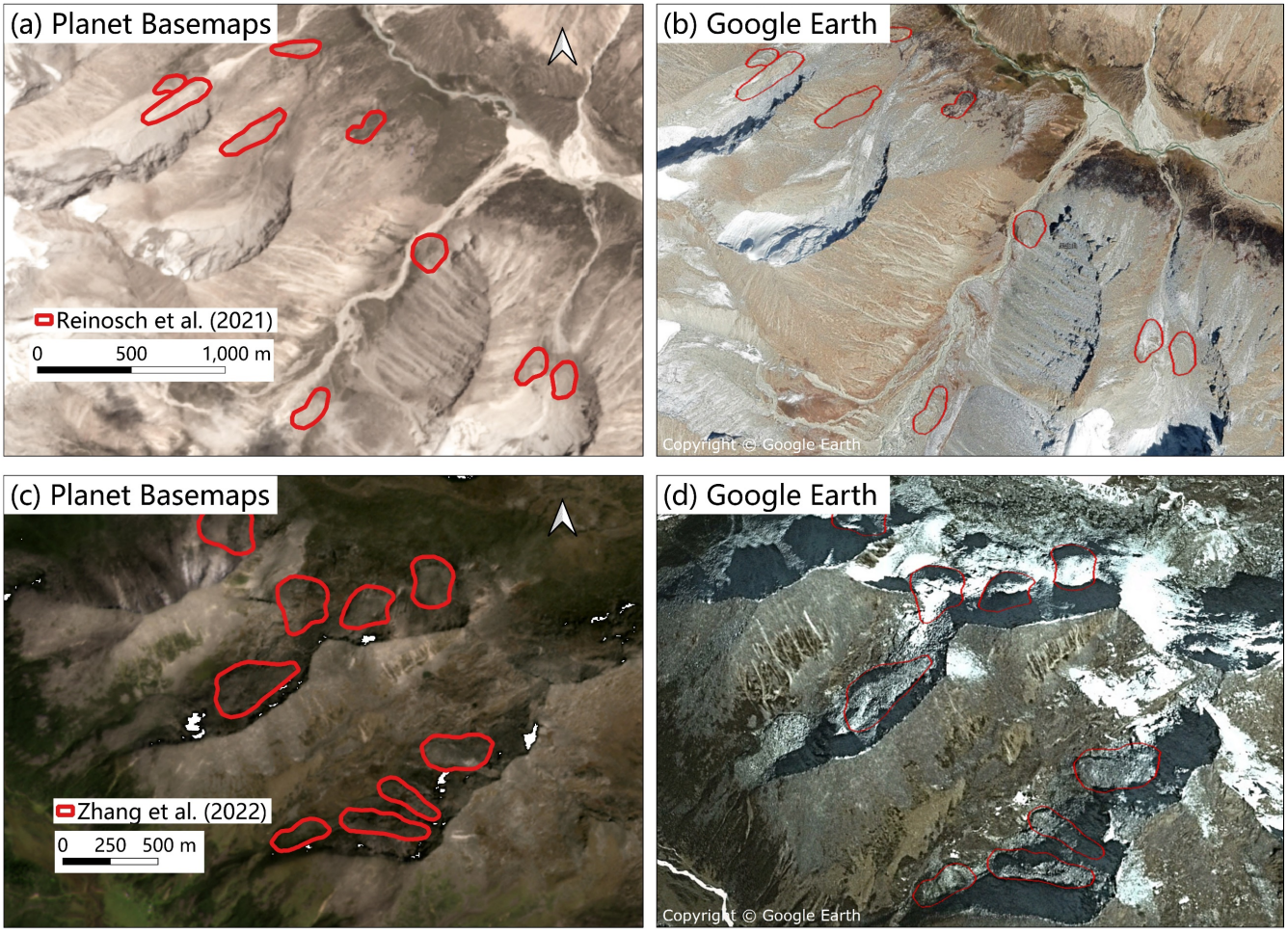

Figure S3. Examples of small landforms that lack pronounced geomorphological features associated with rock glaciers on Planet Basemaps images and have been overlooked in our inventory. Small rock glaciers in Reinosch et al. (2021)'s inventory in western Nyainqêntanglha Range on (a) Planet Basemaps images and (b) Google Earth images. This example is centered at 30°14'2"N, 90°19'57"E. Small rock glaciers in Li et al. (2024)'s inventory at Guokalariju on (c) Planet Basemaps images and (d) Google Earth images. This example is centered at 29°26'22"N, 93°47'19"E.

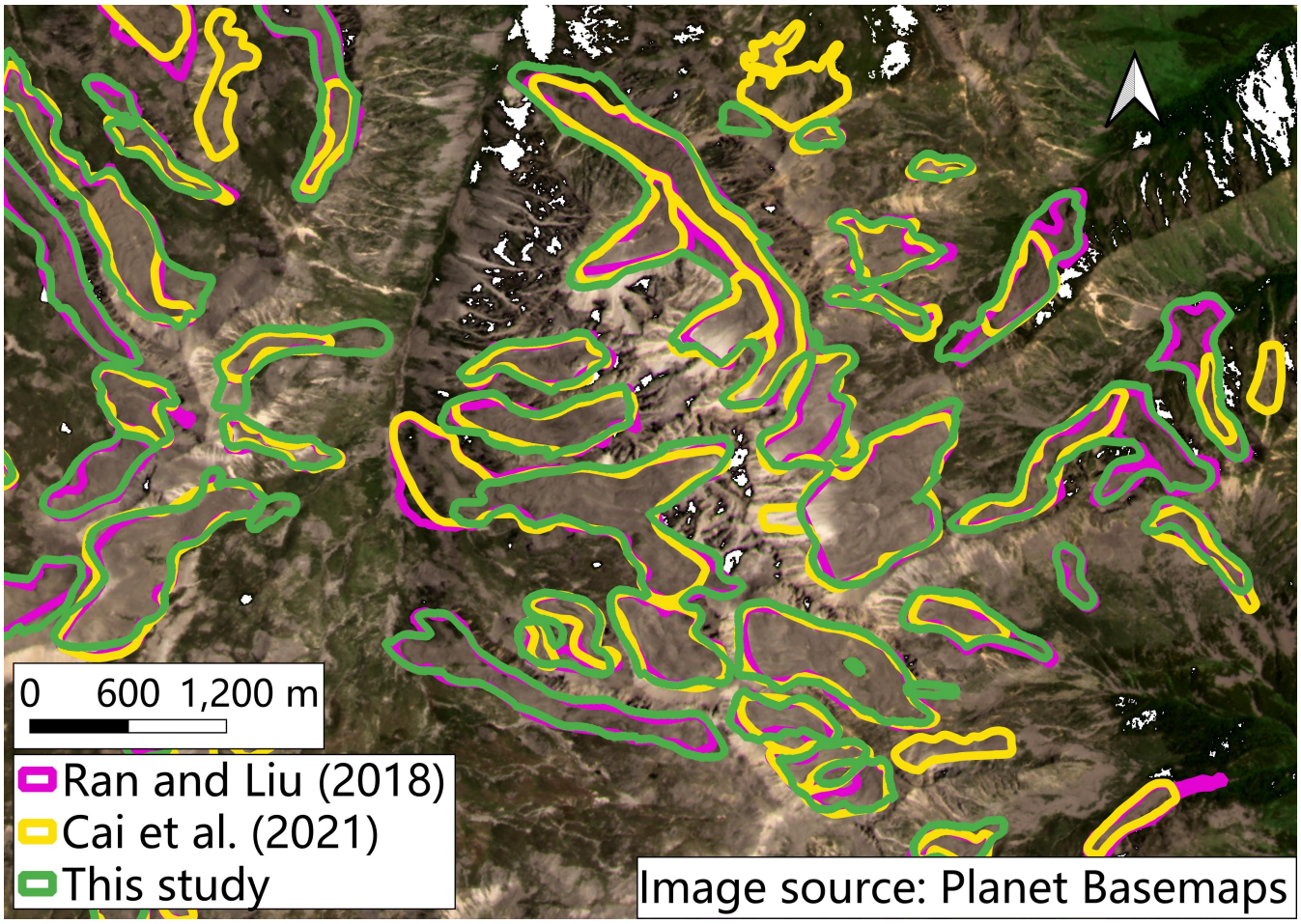

Figure S4. Example showing the comparison between Ran and Liu (2018)'s and Cai et al. (2021)'s inventories and our inventory in Daxue Shan. A good agreement can be found in the mapped rock glacier areas among different inventories, while some rock glacier systems are not separated in our inventory. This example is centered at 101°49'13"E, 30°13'14"N.

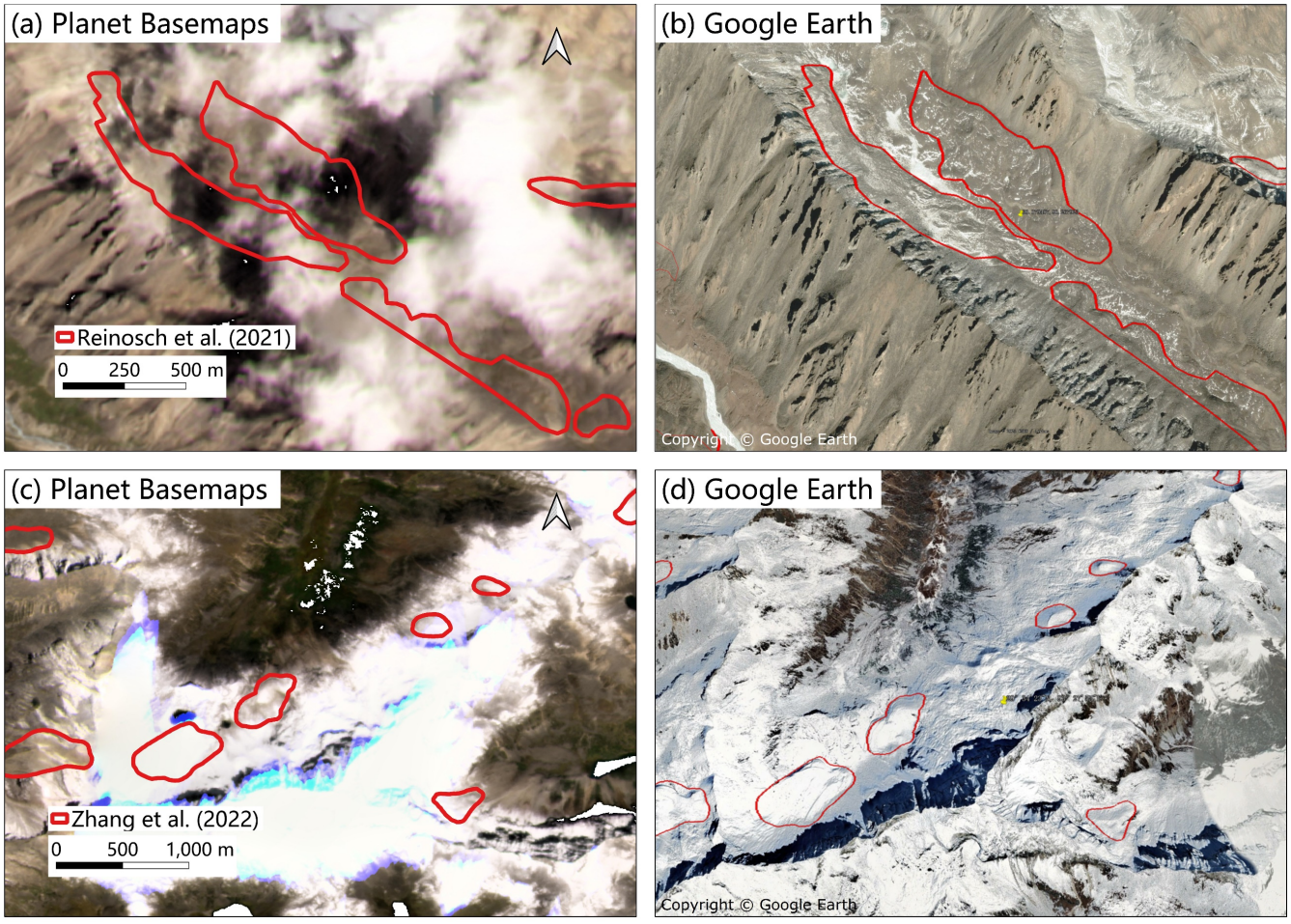

Figure S5. Examples of rock glaciers situated in regions with image quality issues that have been missed by deep learning model and our inventory. Rock glaciers in Reinosch et al. (2021)'s inventory at western Nyainqêntanglha Range that are blocked by clouds in (a) Planet Basemaps images but can be clearly seen on (b) Google Earth images. This example is at 30°4'46"N, 90°16'5"E. Rock glaciers in Li et al. (2024)'s inventory at Guokalariju that are severely influenced by snow and artifacts (c) Planet Basemaps images and are covered by snow on (d) Google Earth images. This example is centered at 29°34'23"N, 93°27'55"E.

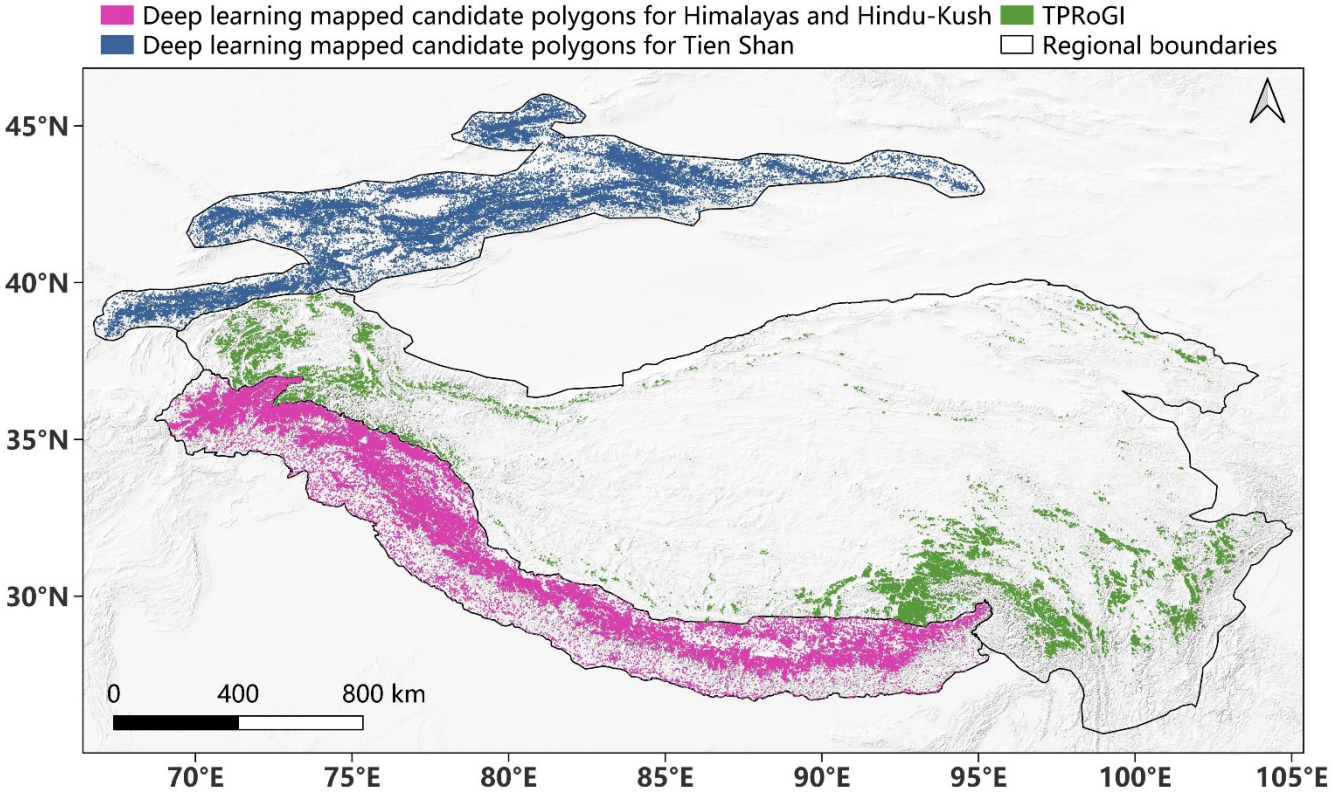

Figure S6. Deep-learning-mapped rock glaciers for High Mountain Asia.