Global Peatland Hotspot Atlas:
The State of the World's Peatlands in Maps
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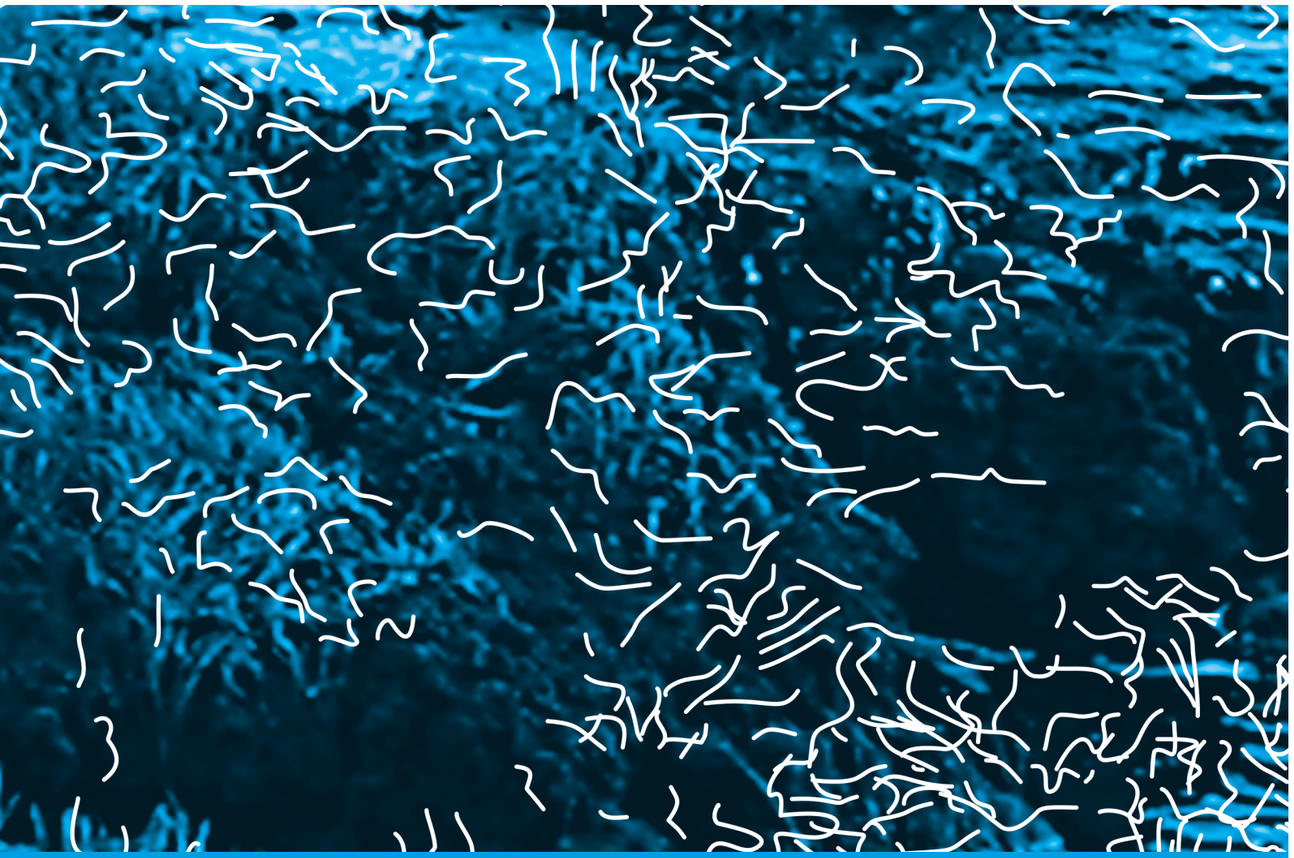
UN environment programme

Mountain peatland and water supply

Mountain peatlands are vital headwaters for rivers and water bodies, essential for supplying water to both biodiversity and humans. Altitude influences temperature and precipitation, resulting in slowed organic matter decomposition and increased carbon accumulation at higher elevations in these ecosystems.



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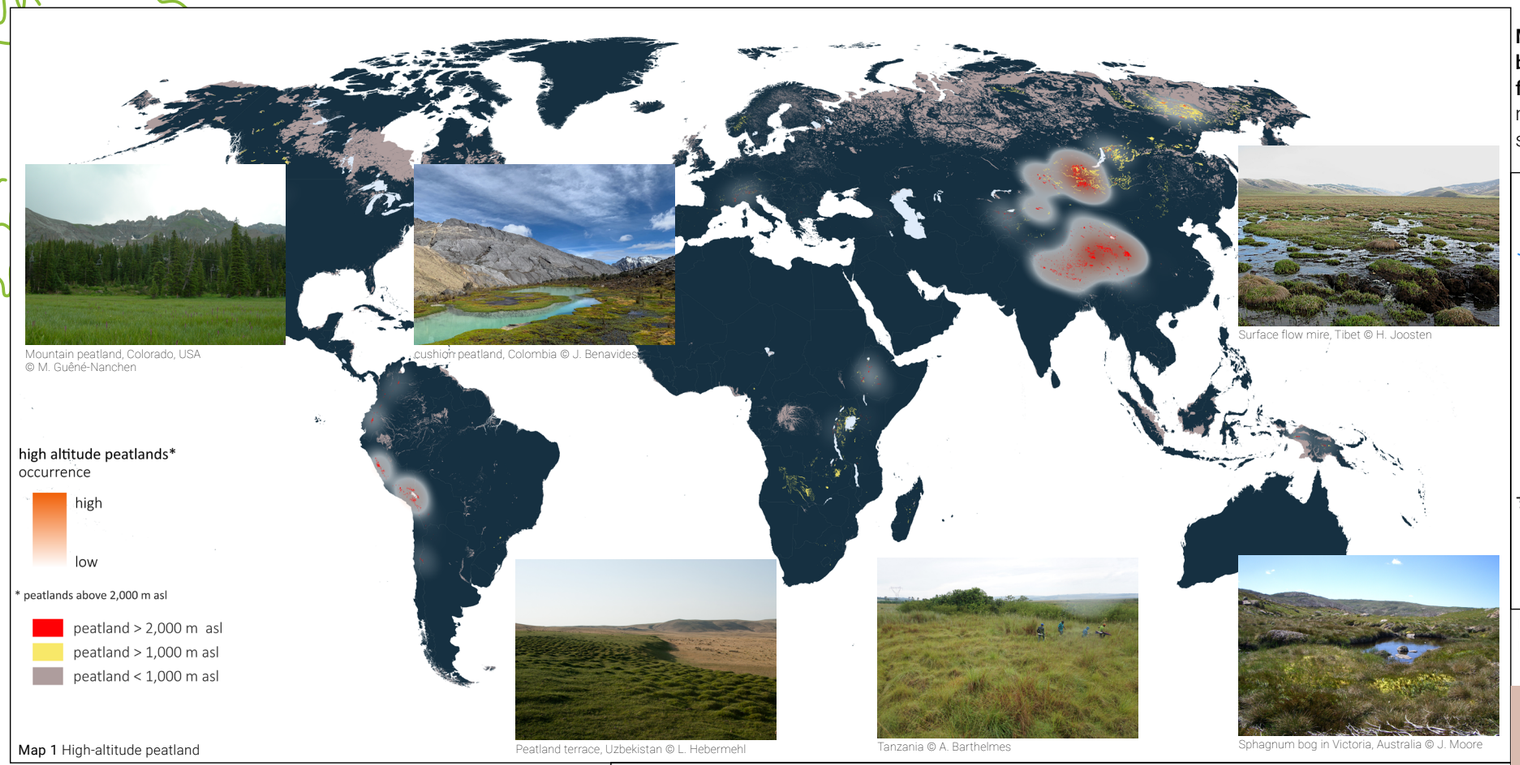

Mountain peatland, Colorado, USA © M. Guêné-Nanchen

cushion peatland, Colombia © J. Benavides

Surface flow mire, Tibet © H. Joosten

Peatland terrace, Uzbekistan © L. Hebermehl

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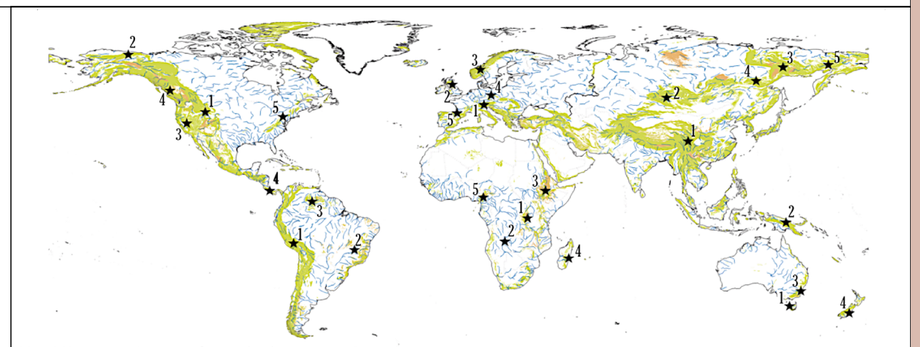
Sphagnum bog in Victoria, Australia © J. Moore

Map 1 High-altitude peatland

Mountains are characterized by extreme spatial heterogeneity. The combination of altitude, climate, topography and land cover creates complex, nested mosaics of habitat conditions across various spatial scales. Globally, higher elevations receive more precipitation and experience lower temperatures, and the **slowed down organic matter decomposition eventually leads to peat and carbon accumulation in very wet terrain depressions, valley bottoms, plateaus, or as blankets in alpine climates.** However, the climate of different mountain ranges varies significantly worldwide, as mountain climates are regional variations of broader climatic conditions in higher altitudes [2, 3].



Map 2 Key mountain ranges for peatland occurrence

The most important mountain ranges for the occurrence of peatlands per continent and their connection to large rivers [4, 7] as their source area/head waters . For numbers see table (left). green >1000 m.a.s.l. and orange >2000 m.a.s.l. [9]

Table 1 The most important mountain ranges for the occurrence of peatlands per continent (Map 2 [1, 4]). Please note that the GPM 2.0 does not provide adequate coverage for all these mountain ranges yet.

ASIA	NORTH AMERICA	LATIN AMERICA	EUROPE	AFRICA	AUSTRALASIA
1. Himalaya (IND, CHN, PAK)	1. Rocky Mountains (USA, CAN)	1. Andes (PER, COL, ECU, CHL, ARG)	1. Alps (GER, AUT, CHE, ITA, FRA)	1. Albertine Rift Valley	1. West Coast Range (Tasmania, AUS)
2. Altai Mountains & Mongolian Highlands (MNG, TJK, RUS, KAZ)	2. Brooks Range of Alaska (USA , Canada)	2. Brazilian Highlands (BRA)	2. Grampian Mountains (Scotland, GBR)	2. Angola Highlands (AGO)	2. New Guinea Highlands (PNG)
3. Verkhoyansk Mountain System (RUS)	3. Sierra Nevada (USA)	3. Guiana Highlands (BRA, VEN)	3. SW Scandinavian Mountains (NOR)	3. Ethiopian Highlands (ETH)	3. Australian Alps (AUS)
4. Aldan Mountains (RUS)	4. Coast and Cascade Ranges (W-USA, W-CAN)	4. Cordillera Central (PAN, CRI)	4. Central European Uplands (GER, FRA, CZE, SVK, POL)	4. Ankaratra Massif (MDG)	4. Southern Alps (NZL)
5. Kolyma Mountains (RUS)	5. Appalachian Mountains (USA)		5. Pyrenees (FRA, ESP)	5. Cameroone Line (CMR)	

Mountain peatlands differ in both structure and function from lowland peatlands. While mountain peatlands are typically smaller with relatively lower carbon storage capacity, they occur in the headwaters of many rivers, making them crucial for water supply. As islands of wet habitat amidst steep slopes and well-drained surroundings, these peatlands play a vital role as water sources for local biodiversity, migrating species, and human communities alike [1, 3].

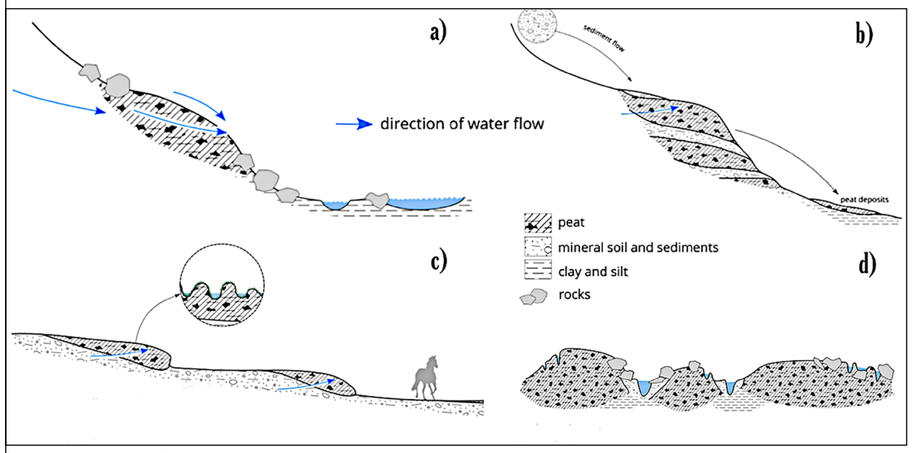


Figure 1 Stratigraphy of typical high altitude mires in Uzbekistan: a) sloping mire, b) sloping spring mire, c) spring mire, d) sloping mire with peat hills erodet by intersecting water channels [8].

Mountains are highly significant regions in the context of climate change and sustainable development, situated at the crossroads of accelerated global warming and significant human dependence. As highly fragile and vulnerable environments, mountains are hotspots of climate-related losses in ecosystems and habitability, often accompanied by challenging socioeconomic circumstances for the rural communities residing within them [5, 6].

Mountain peatlands are vital headwaters for rivers and water bodies, essential for supplying water to both biodiversity and humans. Altitude influences temperature and precipitation, resulting in slowed organic matter decomposition and increased carbon accumulation at higher elevations in these ecosystems.

Sources: 1. UNEP (2022) Global Peatlands Assessment – The State of the World's Peatlands: Evidence for action toward the conservation, restoration, and sustainable management of peatlands. Main Report. Global Peatlands Initiative. United Nations Environment Programme, Nairobi. 2. Greifswald Mire Centre (2022) Global Peatland Map 2.0. Underlying dataset of the UNEP Global Peatland Assessment. 21. Cleef A, Grundling P-L, Joosten H. (eds.) (2014/15). Mountain Peatlands. Mires and Peat 15: 1–3, 4. Snethlage, M.A., Geschke, J., Spehn, E.M., Ranipeta, A., Yocoya, N.G., et al. (2022) GMBA Mountain Inventory v2. GMBA-EarthEnv. https://doi.org/10.48601/earthenv-t9k2-1407. 5. Pepin, N. C., Arnone, E., Gobiet, A., Haslinger, K., Kotlarski, S., et al. (2022). Climate changes and their elevational patterns in the mountains of the world. Reviews of Geophysics, 60, e2020RG000730. 6. Adler, C.P., Wester, I., Bhatt, C., Huggel, G.E., Insarov, M.D., et al. (2022) Cross-Chapter Paper 5: Mountains. In: Climate Change 2022: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (Pörtner, H.O, Roberts, D.C., Tignor, M., Poloczanska, E.S., Mintenbeck, K., et al (eds.). Cambridge University Press, Cambridge, UK and New York, NY, USA, pp. 2273–2318. 7. GRDC Major River Basins of the World (MRB), 2nd, revised edition 2020. https://grdc.bafg.de/GRDC/EN/02_srvcs/22_gslrs/221_MRB/riverbasins.html. 8. http://www.math.yorku.ca/SCS/Gallery/images/humboldt/humboldt1805-chimborazo.jpg. 8. Hebermehl, L. (2021) A first assessment of the potential distribution of peatlands in Uzbekistan. Proceedings of the Greifswald Mire Centre 03/2021 (self-published, ISSN 2627-910X), 113 S. 9. Jarvis, A., et al. (2008) Hole-Filled Seamless SRTM Data V4. International Centre for Tropical Agriculture (CIAT).