UN environment programme

Peatland fires

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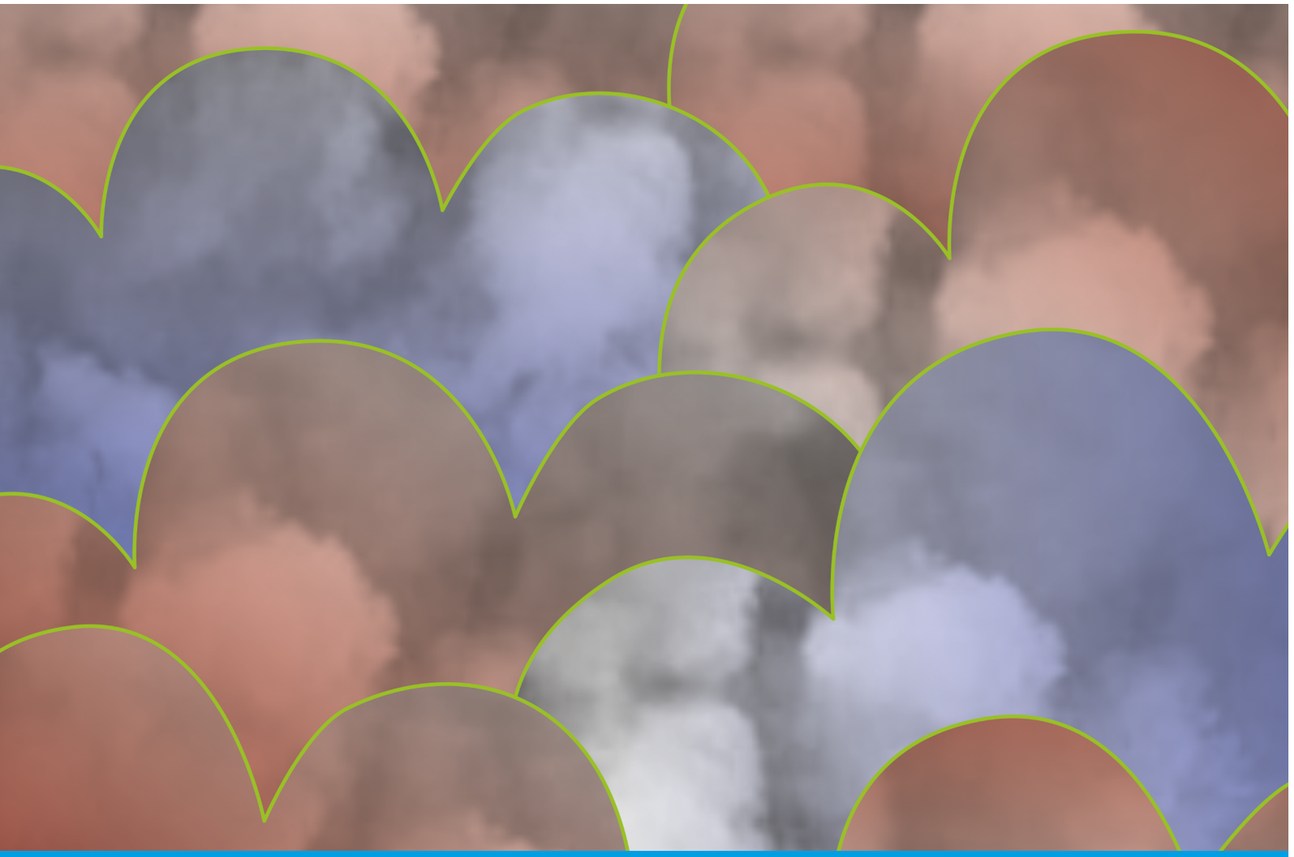

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Authors
Alexandra Barthelmes (GMC/DUENE e.V.),
Cosima Tegetmeyer (GMC/DUENE e.V.), Hans Joosten (GMC/University of Greifswald), Patrick Scheel (UNEP).

Production, Coordination and Review
Patrick Scheel (UNEP), Jan Peters (GMC/MSF),
Dianna Kopansky (UNEP).

Design and layout
igel+ente, Büro für Gestaltung, Fotografie und Kommunikation Greifswald, Germany
Anna Knüppel & Michael Schröder (www.igelundente.de)
Nora Prinz (www.noraprinz.de)

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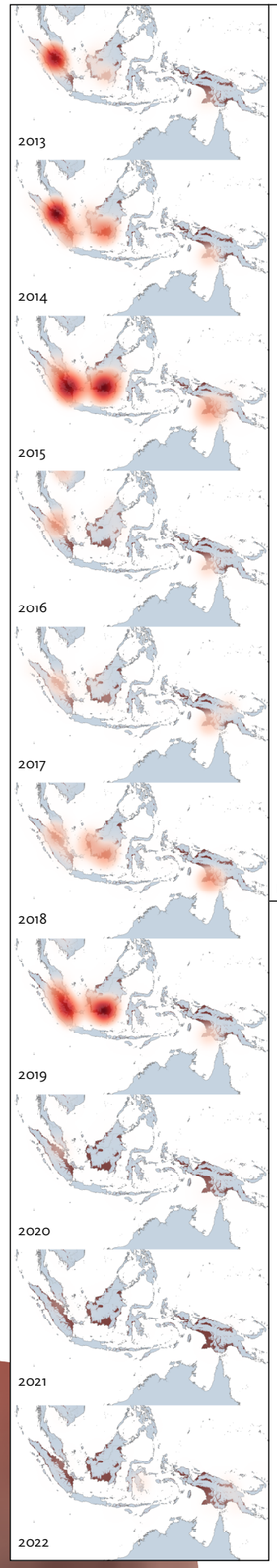
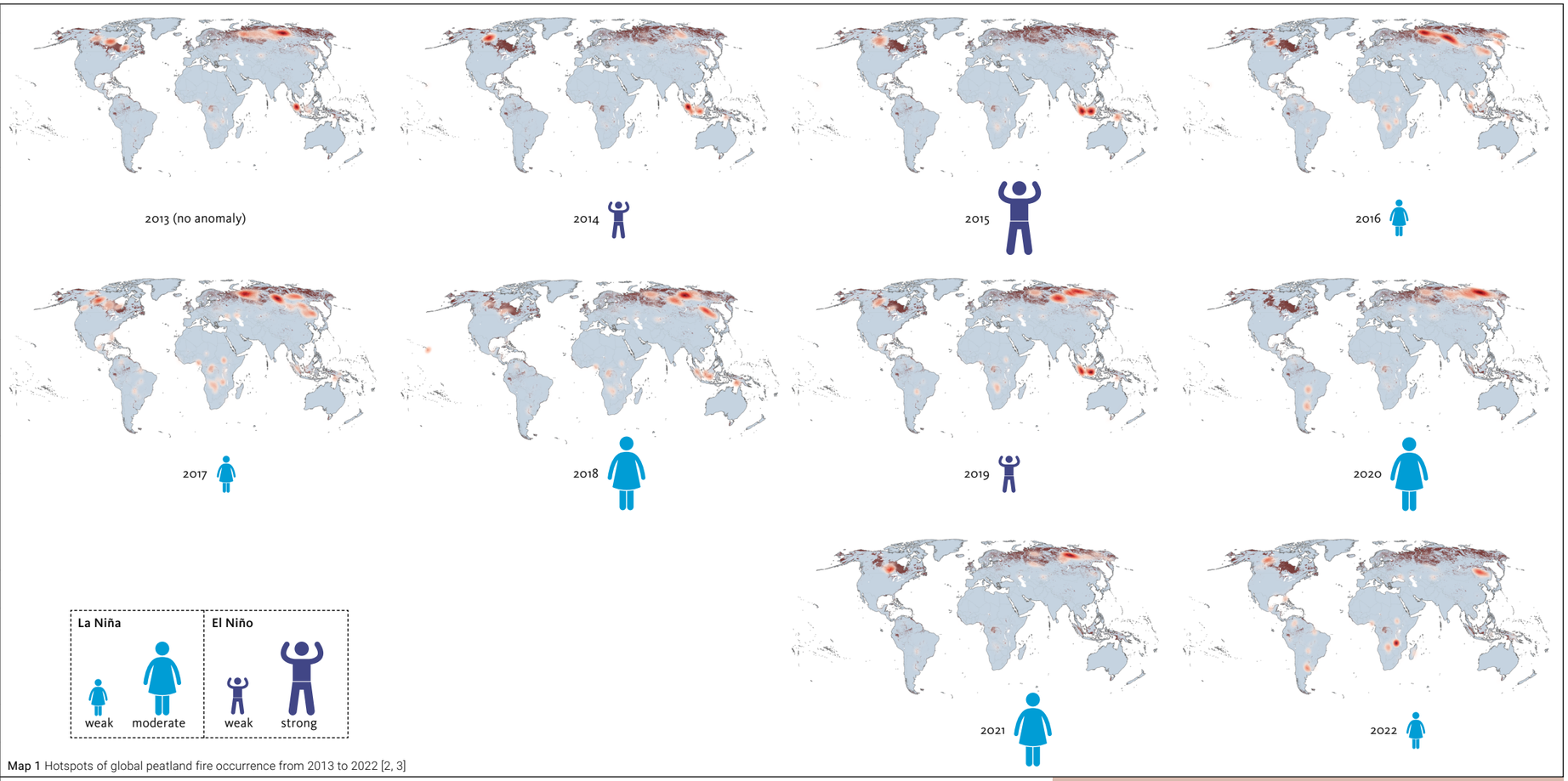
Peatland fires





Map 1 Hotspots of global peatland fire occurrence from 2013 to 2022 [2, 3]

Map 2 Hotspots of peatland fire occurrence in Indonesia from 2013 to 2022 [2, 3]

Undrained peatlands in regions where regular fires are part of the natural ecosystem dynamics usually experience rapid burns that affect only the aboveground biomass over a limited area, rather than penetrating into the peat body. Such fire regime is typical for peatlands the boreal and arctic climate zones of North America and Asia, as well as in the flooded savannah landscapes across Africa (Map 1). However, also there fires are increasing in frequency and intensity in recent years due to prolonged dry periods, triggered by climate change. Human activities such as logging, post-harvest slash-and-burn agriculture, and biomass burning or infrastructure development further exacerbate this trend [1, 4].

Deep and long-term drained peatlands are vulnerable to large-scale, deep-seated, and long-lasting smoldering peat fires fueled by dry peat and dead biomass accumulated after land abandonment. During climate anomalies such as El Niño years in Indonesia, extreme peat and forest fires as may occur, like during the El Niño years of 2014, 2015, and 2019 (Map 2 [1, 2, 3, 5]). The El Niño Southern Oscillation (ENSO) cycle refers to the climate phenomenon when the sea surface temperatures in the eastern Pacific Ocean become warmer than average, leading to increased rainfall and flooding in the Eastern Pacific, while causing drier-than-normal conditions in the Western Pacific. La Niña is the opposite phase, characterized by cooler-than-average sea surface temperatures in the eastern Pacific, which influences global weather patterns in the opposite direction. As a response to the devastating peat fires in 2015, Indonesia has started an ambitious programme to monitor and rewet drained peatland over currently almost 4 million ha, mainly by legally prescribing that water levels should not drop lower than 40 cm below ground level. Although these 40 cm are not fully secured and insufficient to stop subsidence, emissions and fires completely, this policy has reduced these hazards substantially [6].

Undrained peatlands do experience surface fires but these do not penetrate into the peat body. In contrast, drained peatlands may suffer prolonged smoldering fires, particularly during El Niño events, resulting in significant GHG emissions and hazardous haze detrimental to human health.

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Figure 1 Arctic wildfires consume trees and peat © NPS Climate Change Response/Flickr

Figure 2 Peatland after peat fire, Brunei Badas © H. Joosten

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. 3. MODIS Collection 61 NRT Hotspot / Active Fire Detections MCD14DL distributed from NASA FIRMS. Available on-line https://earthdata.nasa.gov/firms. doi: 10.5067/FIRMS/MODIS/MCD14DL.NRT.0061 4. Glückler, R., Herzschuh, U., Kruse, S., Andreev, A., Vyse, et al. (2021) Wildfire history of the boreal forest of south-western Yakutia (Siberia) over the last two millennia documented by a lake-sediment charcoal record. Biogeosciences, 18, 4185–4209, https://doi.org/10.5194/bg-18-4185-2021. 5. Vertitа, Y., Cochrane, M.A. (2020) Fire frequency and related land-use and land-cover changes in Indonesia's peatlands. Remote Sensing 12(1): 5. 6. Joosten, H. (2023) Report regarding the activities in Indonesia (supporting KLHK and PROPEAT). Duene e.V., Greifswald. 46 p