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Carbon emissions from fires in permafrost peatlands

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Increases in arctic and boreal fires can switch these biomes from a long-term carbon (C) sink to a source through direct fire emissions and longer-term emissions from soil respiration. Landscapes of intermediate drainage tend to experience the highest C combustion, dominated by soil C emissions, because of relatively thick and periodically dry organic soils. These landscapes may also induce a climate warming feedback through combustion and post-fire respiration of legacy C – soil C that had escaped burning in the previous fire – including from permafrost thaw and degradation. Data shortages from fires in tundra ecosystems and Eurasian boreal forests limit our understanding of C emissions from arctic-boreal fires. Interactions between fire, topography, vegetation, soil and permafrost need to be considered when estimating climate feedbacks of arctic-boreal fires.