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The impact of peatland restoration on local climate – restoration of a cool humid island

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Land use, land use change and forestry (LULUCF) have been directly altering climate and it has been proposed that such changes could mitigate anthropogenic climate warming brought about by increases in greenhouse gas emissions to the atmosphere. Changes due to LULUCF alter the Bowen ratio, surface roughness and albedo and so directly change air temperatures. Previous studies have focused on changes in the area of forestry and have used space-for-time substitutions to assess the impact of LULUCF. This study considered 18-years of daytime land surface temperature over an area of actual land use change in comparison to its surrounding landscape and considered the restoration of a lowland peat bog: satellite land surface temperature data across 49, one km2 grid squares with 20 on peatland and 29 on surrounding agricultural land on mineral soils from 2000 to 2017. The peatland squares were, until 2004, dug for horticultural peat and after 2004 were restored with revegetation of bare soil and restoration of natural water tables. Over the eighteen years, the average annual daytime land surface temperature (LST) significantly decreased for 6 grid squares, 5 of which were on the restored peatland where LST decreased by 2 K. In 2000, before restoration, the peatland was 0.7 K warmer than the surrounding agricultural land on mineral soils but by 2016 was 0.5 K cooler. This study has shown that anthropogenic land use change could cool a landscape and that functioning peatlands could act as cool, humid islands within a landscape.