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Present and future carbon-sequestration potential of tropical rainforests

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Multiple international initiatives have been introduced to mitigate climate change by reforesting previously cleared areas and restoring degraded forests (e.g. UN-REDD). However, the capacity of forests to grow and store carbon under projected climate change remains uncertain. Here we use a machine-learning approach to determine the present and future potential biomass and carbon-sequestration potential of tropical rainforests. Our results indicate a current carbon-sequestration potential of 69.0 Pg C. We estimate that 64% of the carbon-sequestration potential corresponds to reforestation in regions that have been previously cleared, and 36% correspond to the restoration of degraded forests. Our results indicate that reforestation potential decreases to 33.0 Pg C and 24.1 Pg C when using climate change projections under RCP4.5 and RCP8.5 respectively. This decrease is due to reduced carbon-sequestration potential from previously disturbed regions and a risk of tropical rainforests die-back due to projected warmer and drier conditions.