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Global maps of current and future nitrogen mineralization

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Soil nitrogen is a prominent determinant of plant growth, with nitrogen (N) availability being a key driver of terrestrial carbon sequestration. The local availability of soil N is thus crucial to our understanding of broad-scale trends in soil fertility, productivity, and carbon dynamics. Here, we provide global, high-resolution maps of current and future (2050) potential net nitrogen mineralization (N-min), revealing global patterns in soil N availability. Highest mineralization rates are found in warm and moist tropical regions, leading to a strong latitudinal gradient in N-min. We observed a positive correlation of N-min rates with human population density and net primary productivity. Projected climate conditions for 2050 suggest that N availability will further decrease in areas of low N availability and increase in areas of high N availability, thereby intensifying current global trends. These results shed light on the core processes governing productivity at a global scale, providing an opportunity to improve the accuracy of plant biomass and climate models.