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Editorial: The effects of climate change and anthropogenic activities on patterns, structures and functions of terrestrial ecosystems

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Editorial on the Research Topic:
The effects of climate change and anthropogenic activities on patterns, structures and functions of terrestrial ecosystems

Climate change and anthropogenic activities are two profound forces influencing terrestrial ecosystems. The extent, velocity, and interplay of their effects offer a rich tapestry for scientific exploration, as the myriad of interactions and feedbacks are both nuanced and wide-reaching. This Research Topic, comprising 17 meticulous studies, delves deep into the multifaceted impacts of these forces on various ecological parameters, offering insights, patterns, and predictions of potential futures.

In Eurasian grasslands, where precipitation and productivity share a complex relationship, the pioneering work by Zhang et al. elucidates how these dynamics can be instrumental in identifying ecosystem transitions. Extending this analysis to a global scale, Chen et al. evaluates the determinants of photosynthetic capacity in grasslands, shedding light on the intertwined nature of ecosystems and their climatic contexts.

The role of human intervention, often regarded as a primary perturbing force, is sometimes positive. Liu et al. provides evidence of how, under the ever-evolving climate change scenario, anthropogenic activities have bolstered ecosystem productivity between 1983 and 2018.

Urban sprawl and land use changes, while central to human needs, reverberate through ecological processes. The study by Tao et al. focused on the Nanjing metropolitan circle, dynamically simulates these impacts on carbon storage under various development trajectories. Meanwhile, Cheng et al., Zhao et al., Su et al., and Chen et al. deliver comprehensive assessments of China's forest carbon distribution, extreme temperatures

in the Qilian Mountains, the rich biodiversity of the evergreen-deciduous karst forests, and the merits of the National Key Ecological Function Areas, respectively.

Drought—a significant concern in the era of climate change—is examined through its impacts on microbial genes in alpine peatland (Yan et al.) and on critical enzyme genes in Scutellaria baicalensis (Li et al.). The role of rainfall and its influence on temperate forest ecosystem services is adeptly tackled in Liang et al., reiterating the significance of water as an ecological driver.

The systematic review by Liu et al., which collates insights from multiple ecological restoration studies in China, underscores the importance of policy-driven ecological initiatives. It serves as a precursor to Lv et al. and Tang et al., focusing on carbon sequestration and the vulnerabilities in the karst regions, offering a roadmap for sustainable restoration.

The technological integration of modern research techniques finds its representation in this Research Topic too. The study on maize by Peng et al. combines an optimized model to unravel the connections between photosynthesis, evapotranspiration, and dry matter distribution. Furthermore, the use of a hybrid machine learning model (He et al.) showcases the potential of modern computational tools in mapping seagrass habitats.

In conclusion, this Research Topic paints a vivid and comprehensive portrait of the myriad ways in which climate change and anthropogenic activities shape, mold, and sometimes challenge terrestrial ecosystems. It is our hope that these contributions not only enhance understanding but also guide future actions and policy decisions, ensuring a balanced coexistence of human aspirations and ecological imperatives.

Author contributions

CJ: Writing – original draft, Writing – review & editing.

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Conflict of interest

The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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