

# SPATIAL AND TEMPORAL PATTERNS OF CO<sub>2</sub>, CH<sub>4</sub> AND N<sub>2</sub>O FLUXES IN THE TERRESTRIAL ECOSYSTEMS OF CHINA SINCE 1980

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## ABSTRACT

The magnitude and spatial pattern of the emissions of CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O from China's terrestrial ecosystems are poorly understood. In this study, we have used a coupled biogeochemistry model in conjunction with remote-sensing and field data to quantify spatial and temporal patterns of CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O fluxes in the terrestrial ecosystems of China since 1980. We have documented the patterns of land-use change across China from 1980 to present and quantified the consequences of land transformations on productivity in natural and managed ecosystems. We also examine how the fluxes of CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O have changed as a result of multiple stresses and interactions among those stresses including land-use change, climate variability, atmospheric composition (carbon dioxide and tropospheric ozone), precipitation chemistry (nitrogen composition), and fire frequency through using factorial simulation experiments with the coupled biogeochemistry model. The estimates of CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O emissions from the terrestrial ecosystems of China are evaluated through comparisons with the results of field studies within China.