

Toward advanced inventory of regional and urban greenhouse gas emissions for carbon accounting

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Emissions of greenhouse gases distribute highly heterogeneously over land surface, including natural sources and sinks and anthropogenic sources. They have also different temporal variations, making it difficult to resolve observed atmospheric signals into specific sources. Advancing the mapping of land surface greenhouse gas sources and sinks is effective to improve credibility of not only bottom-up but also top-down estimates. In this study, we make an attempt to conduct regional-scale evaluation of greenhouse gases using several anthropogenic emission inventories and a process-based model of natural sources and sinks. We compare different inventory data to clarify the uncertainty in regional budget, putting the particular focus on Asian region and countries. The process-based model estimates greenhouse gas budget of forests, other natural lands, and croplands, taking account of atmospheric composition and deposition and fertilizer input. Having high spatial and temporal resolution would be a key feature of the new mapping, and so we try to use new land data for CMIP6. Finally, we discuss how the new emission mapping methodology and regional accounting are likely to make contributions to IPCC and UNFCCC.

Keywords: greenhouse gas emission inventory, carbon cycle, uncertainty