



Introducing Satellite Data Based Biosphere Model BEAMS to Improve Regional Transport Model AIST-MM for Estimating Carbon Dioxide Emission from Mega-city Tokyo

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Together with modelling system improvements, satellite carbon dioxide (CO₂) observation developments such as GOSAT (Greenhouse gases Observing SATellite) and GOSAT-2 offer new possibilities of finer CO₂ emission estimations via top-down approach, particularly, in mega-cities such as Tokyo, where the largest anthropogenic carbon source occurs. In summer, forests west and north of Tokyo Metropolis in the Kantō plain cause significant CO₂ fluxes (photosynthesis uptake + respiration release). These land-atmosphere CO₂ exchanges, however, have yet to be realistically simulated in the regional transport model AIST-MM (National Institute of Advanced Industrial Science and Technology-Mesoscale Model)^[1,2]. This study plans to improve regional CO₂ concentration simulations by integrating BEAMS (Biosphere model integrating Eco-physiological And Mechanistic approaches using Satellite data)^[3,4] photosynthesis and respiration components, MODIS and GCOM-C (Global Change Observation Mission-Climate) satellite data to our transport model and then introduce GOSAT data to the inversion analysis for emission inventory update. We expect the optimized model to better simulate both seasonal and diurnal CO₂ variations in Greater Tokyo, which have been observed from ground CO₂ monitoring data^[5].

References

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