Yamada, K., Y. Niwa, Y. Terao, Y. Tohjima, K. Tsuboi, K. Ishijima, and S. Murayama, 2024: Estimation of $CO_2$ fluxes from Tokyo using a global model and tower observation. *J. Meteor. Soc. Japan*, **103**, http://doi.org/10.2151/jmsj.2025-004.

**Plain Language Summary:** Quantifying emissions from cities is important for reduction of carbon dioxide ($CO_2$). In this study, using the continuous observation data obtained at an altitude of around 250 m above the ground, we estimated net $CO_2$ fluxes from the megacity area of Tokyo, Japan, for two years in combination with a global high-resolution model simulation.

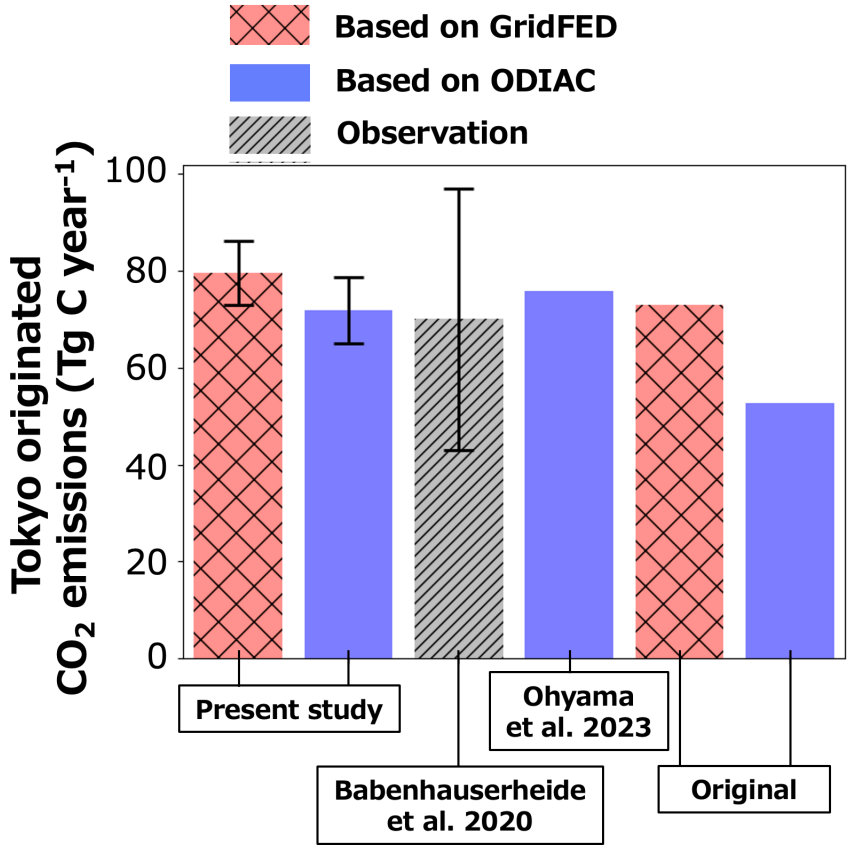


Fig. 12 Comparison of $CO_2$ emissions from the Tokyo area calculated in this study with the results of Babenhauserheide et al. (2020) and Ohyama et al. (2023). The regions used in the previous studies are different in a strict sense, but similar enough to that in our study.

- Variations of $CO_2$ concentrations in Tokyo were largely driven by fluxes in the southwest region, including the bay area where huge power plants are located.
- Simulated $CO_2$ concentration sometimes overestimated by the insufficiency of flux, but the flux could be smoothed by removing low-wind-speed data.
- This study shows that the annual net $CO_2$ emission from Tokyo is 79.5 ± 6.6 Tg-C year$^{-1}$.