

# Estimation of carbon emissions due to car usage in Susono

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## Background

In order to transform its former factory site of Higashi-Fuji in Susono, *Toyota* launched the *Toyota Woven City* project, which goal is to expand the mobility in the region and form a well-being development environment. Joint with *Toyota*, the present study aims to estimate the carbon emissions due to car usage in Susono, as part of a larger environmental analysis in the region.

## Methodology

The carbon emissions for each household in Susono were estimated by multiplying individual traveled distance in car by an emission factor depending on the vehicle category.

- The emissions factors have been converted from the French organism *ADEME*'s effective emissions factors pondered by the ratio of average kilometric fuel consumption in Japan and France.
- The vehicle category distribution amongst the Susono population has been deduced from the ratio of yearly traveled distances by car by the daily traveled distance in Chubu for each vehicle category, obtained from *MLIT*.
- The individual mobility behaviour came from the Pseudo People Flow Dataset<sup>1</sup>.

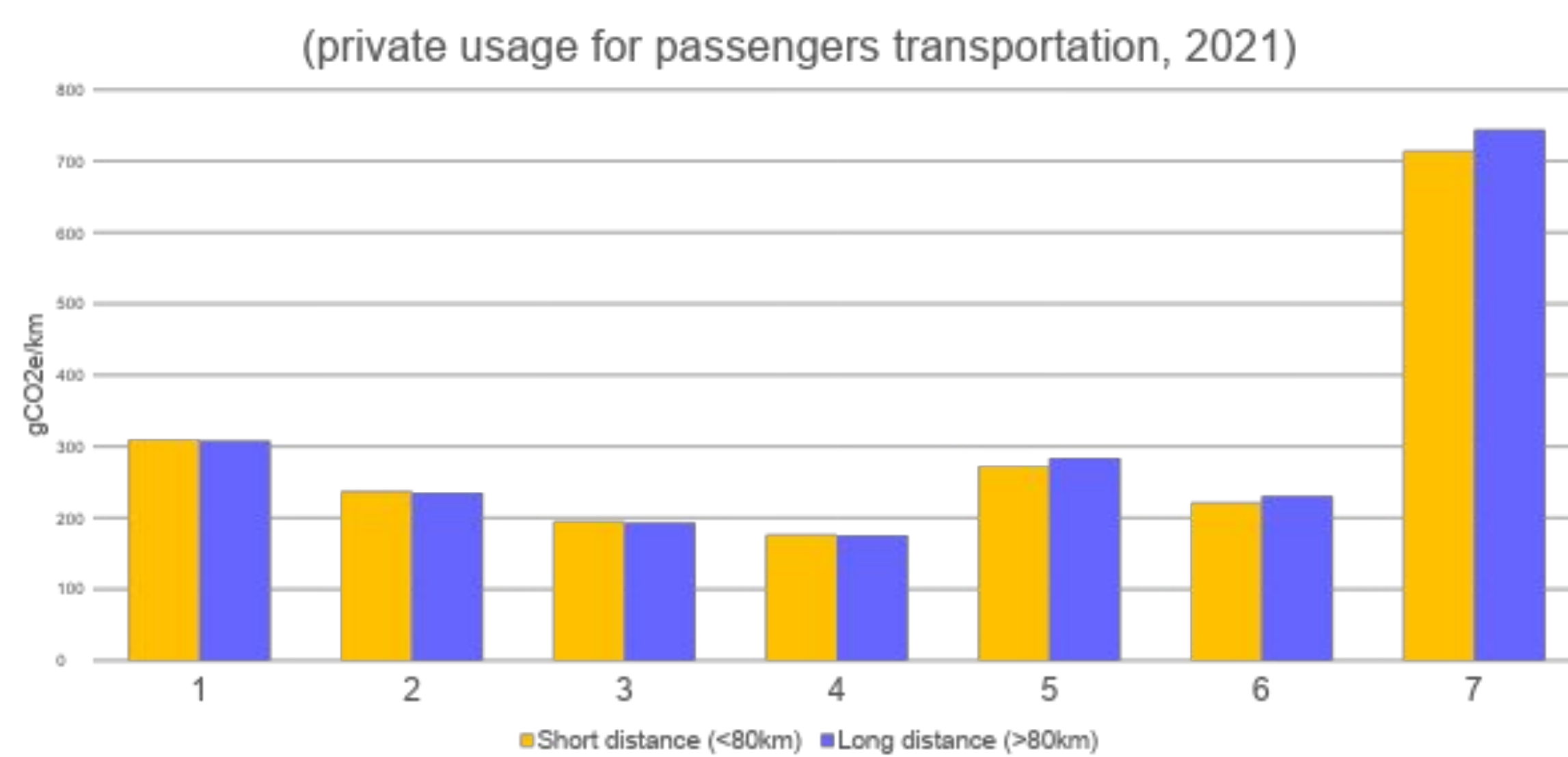


Fig. 1. Estimated emission factors per vehicle type in Japan

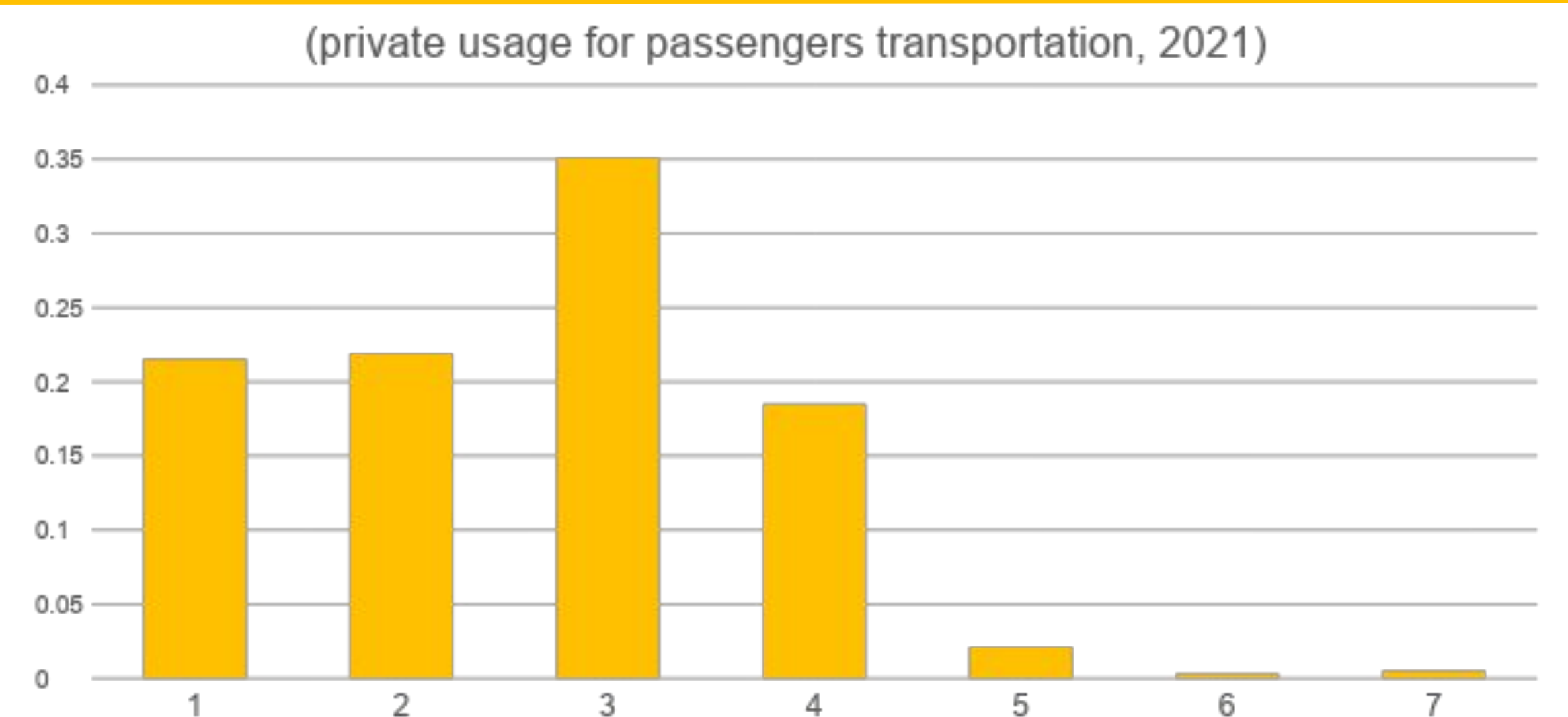


Fig. 2. Estimated car ownership distribution in Chubu

The estimation of carbon emissions on the road network was conducted with the same methodology considering the traffic volume of adjacent cities to Susono, partly corrected on main axis thanks to the *MLIT* traffic census.

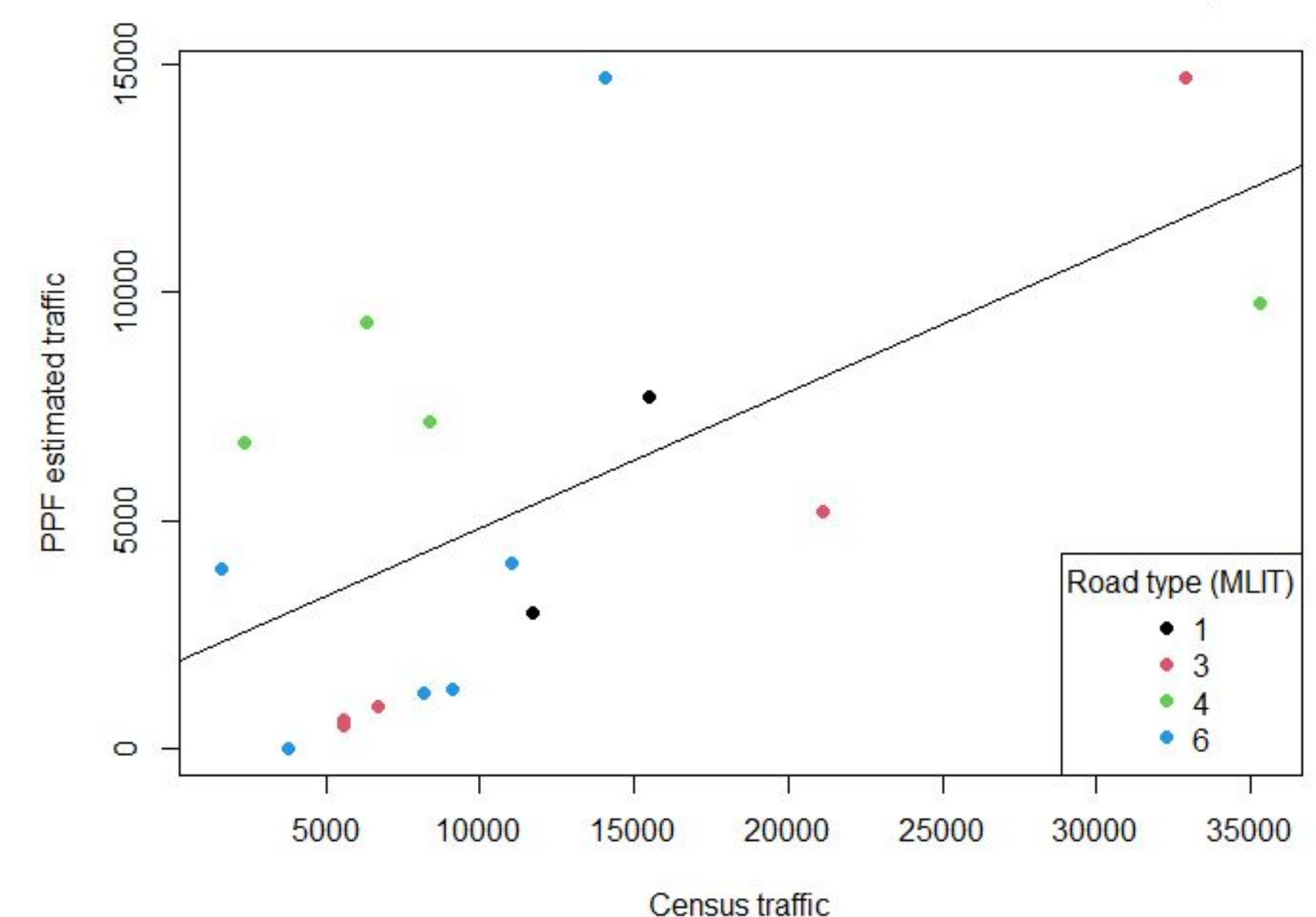


Fig. 3. Comparison of MLIT census and PPF traffic volumes on census road sections (7:00-9:00)

## Results

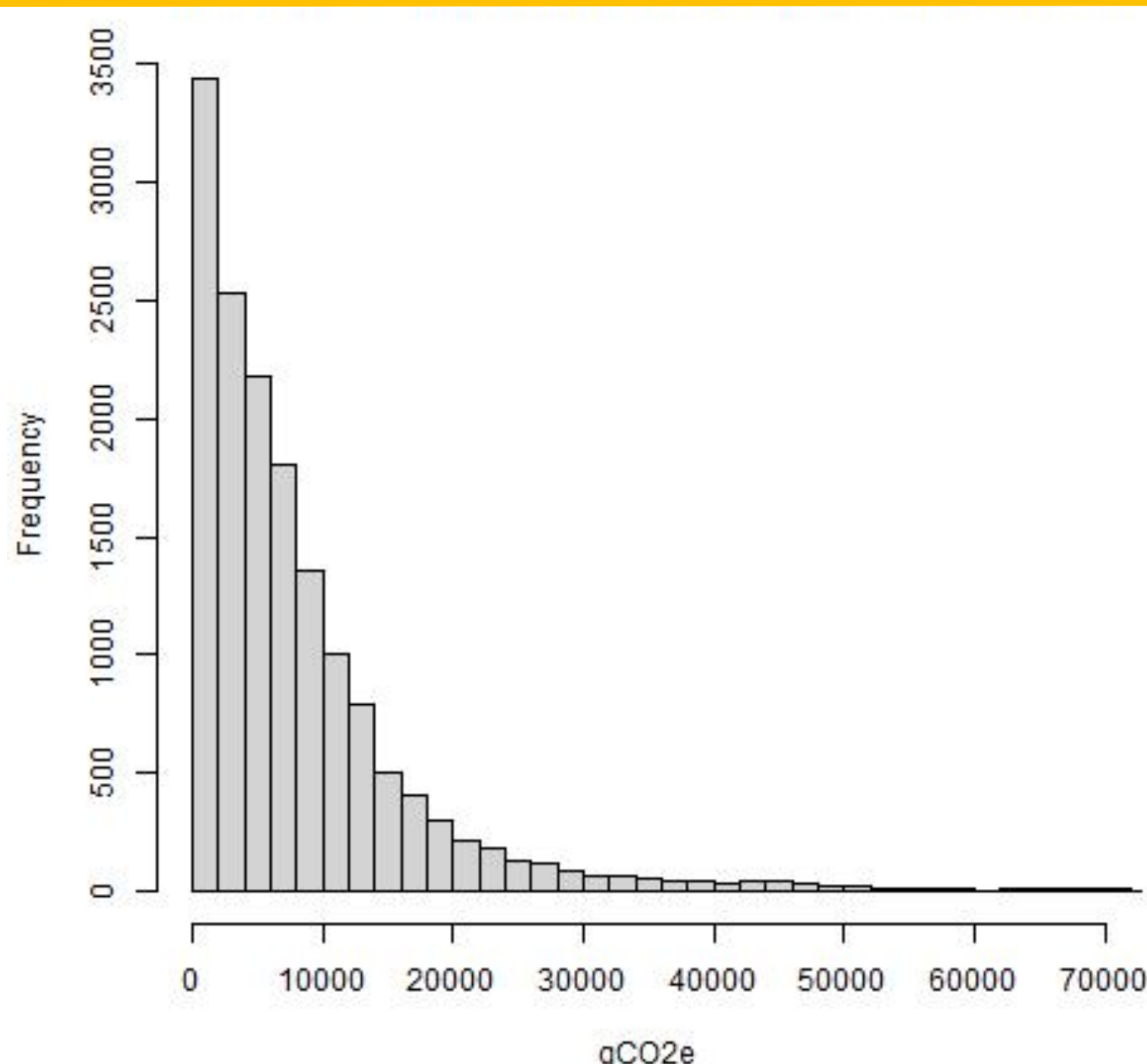


Fig. 4. Daily CO<sub>2</sub> emissions per household

The average emission factor in Japan is estimated to 230gCO<sub>2</sub>/km against 190gCO<sub>2</sub>/km in France, although the theoretical emission factors announced by car manufacturers are lower. It comes from the effective fuel consumption that is much higher in Japan probably due to waist in traffic congestion. According to this study, a Susono resident yearly emits 1.2t of CO<sub>2</sub> (3.1t per household) due to car usage.

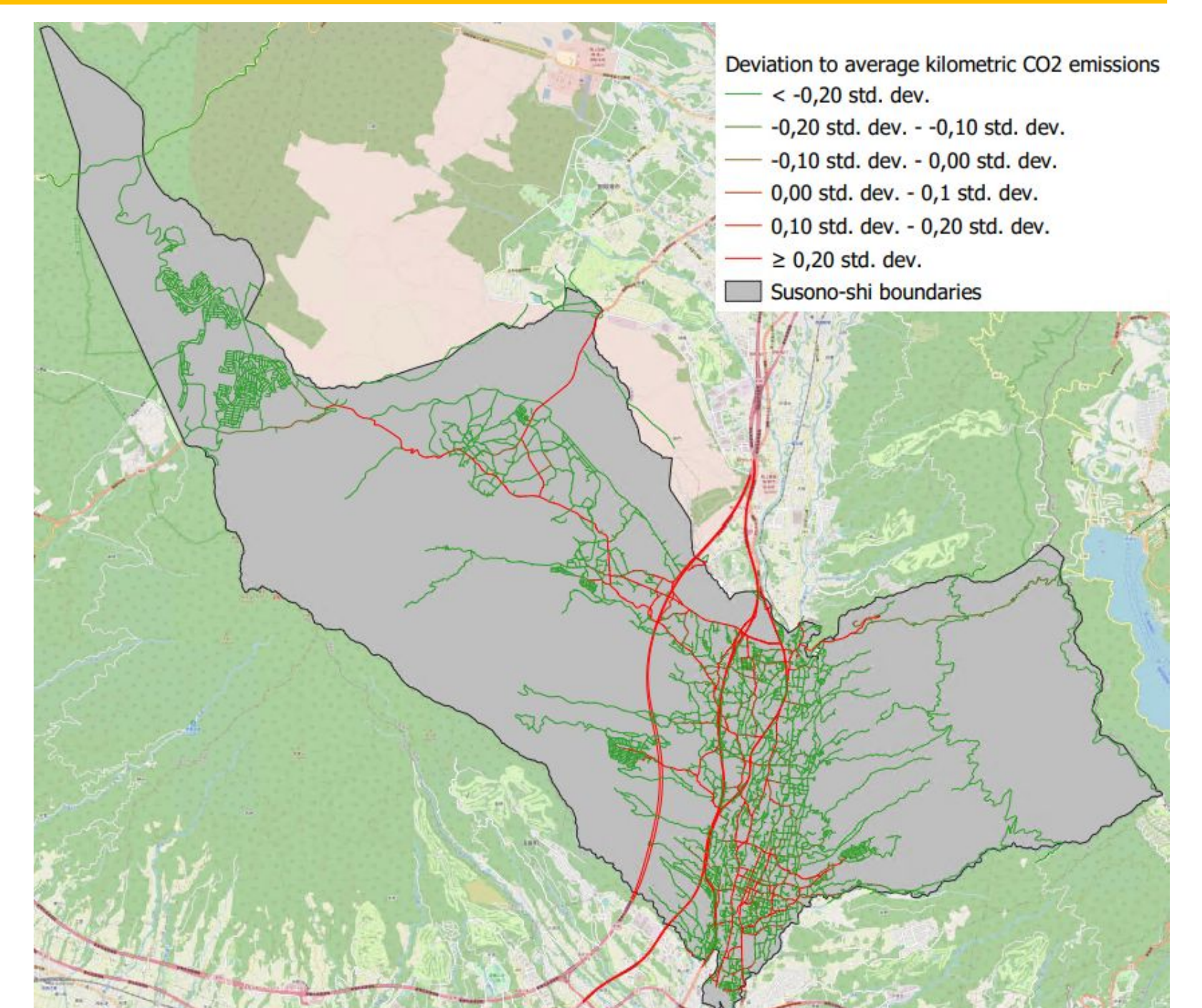


Fig. 5. Most pollutant roads in Susono

<sup>1</sup> Pseudo People Flow: <https://pflow.csis.u-tokyo.ac.jp/data-service/pseudo-pflow/>