

Introduction

- Passenger vehicles account for 13% of all CO₂
- Electrical vehicles do not emit CO₂, but:
 - 393 g of CO₂ per kWh in US, 306 g in EU, 560 g in China
- Steady speed: reduce energy consumption, reduce CO₂



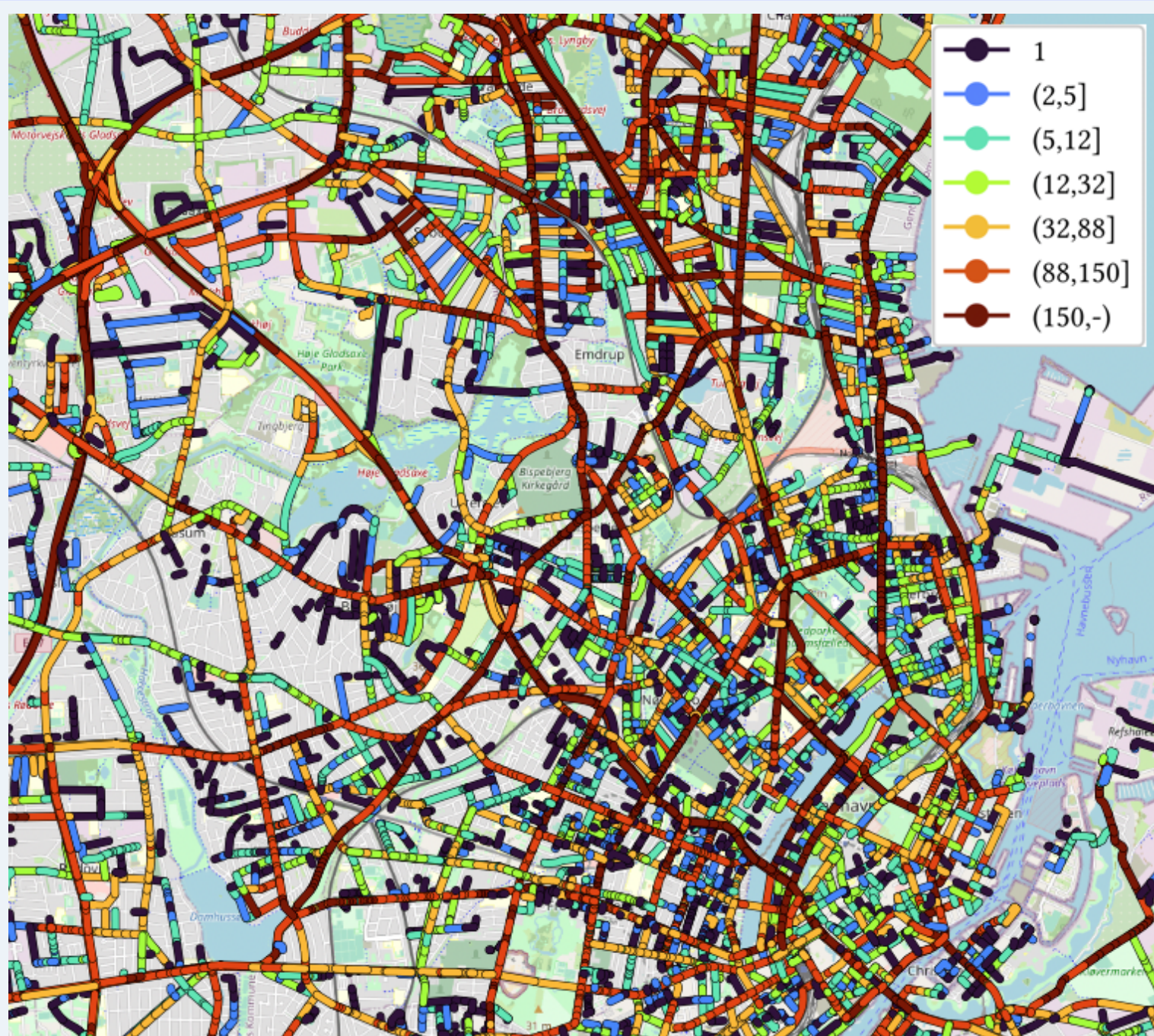
GPS and OBD Data

- High-frequency GPS (1 Hz)
- Speed and power from On-Board Diagnostics

Id	Latitude	Longitude	Timestamp	Speed (km/h)	Power (W)
1	57.028217	9.958145	2012-01-27 07:39:08	33	5060
2	57.028353	9.958017	2012-01-27 07:39:09	29	-1480
3	57.028488	9.957891	2012-01-27 07:39:10	23	-360
4	57.028623	9.957762	2012-01-27 07:39:11	17	2430



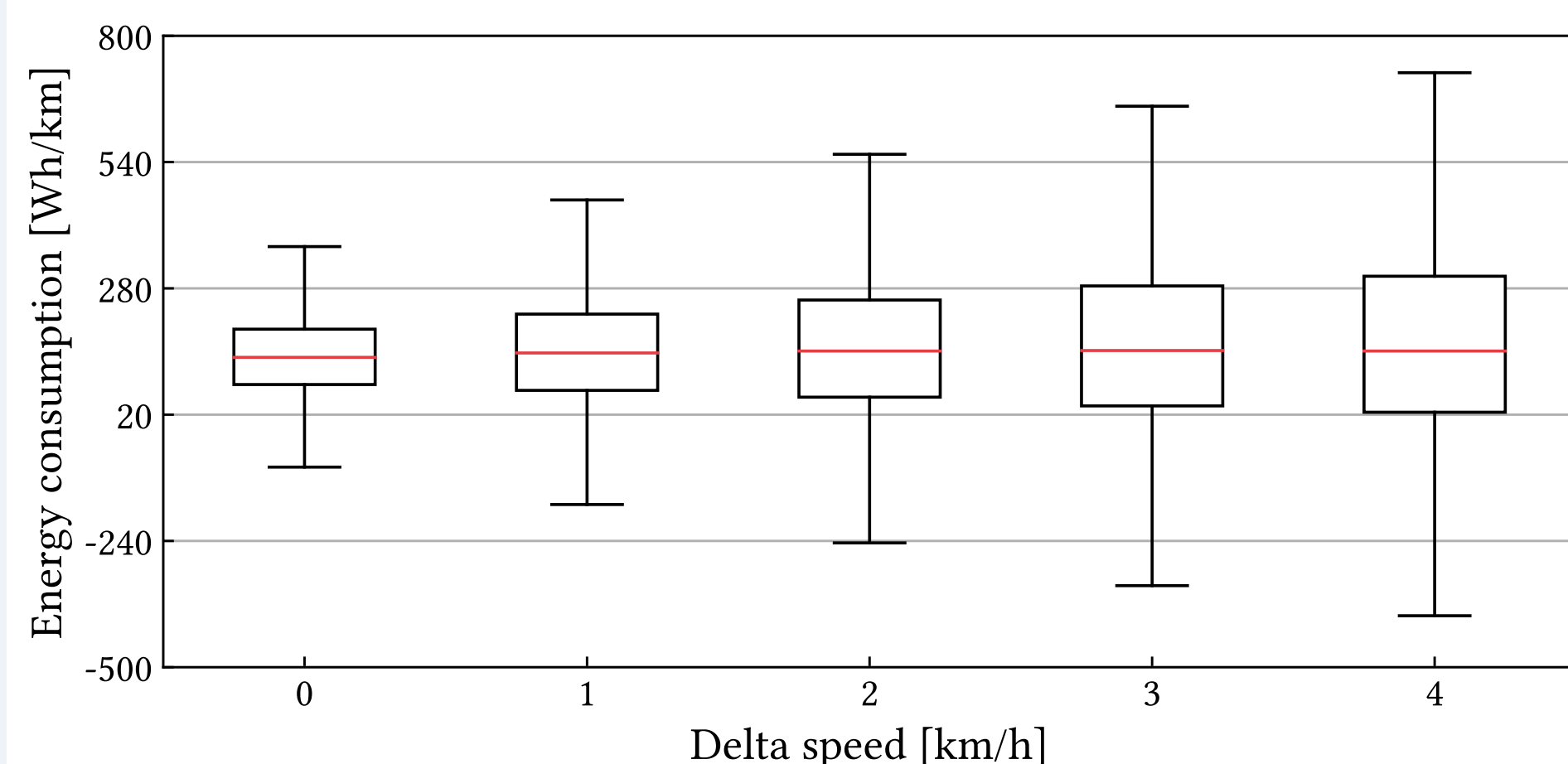
Trajectory Data



- 75.178.775 GPS+ points
- 7.579.386 subtrajectories (272.289 trajectories)

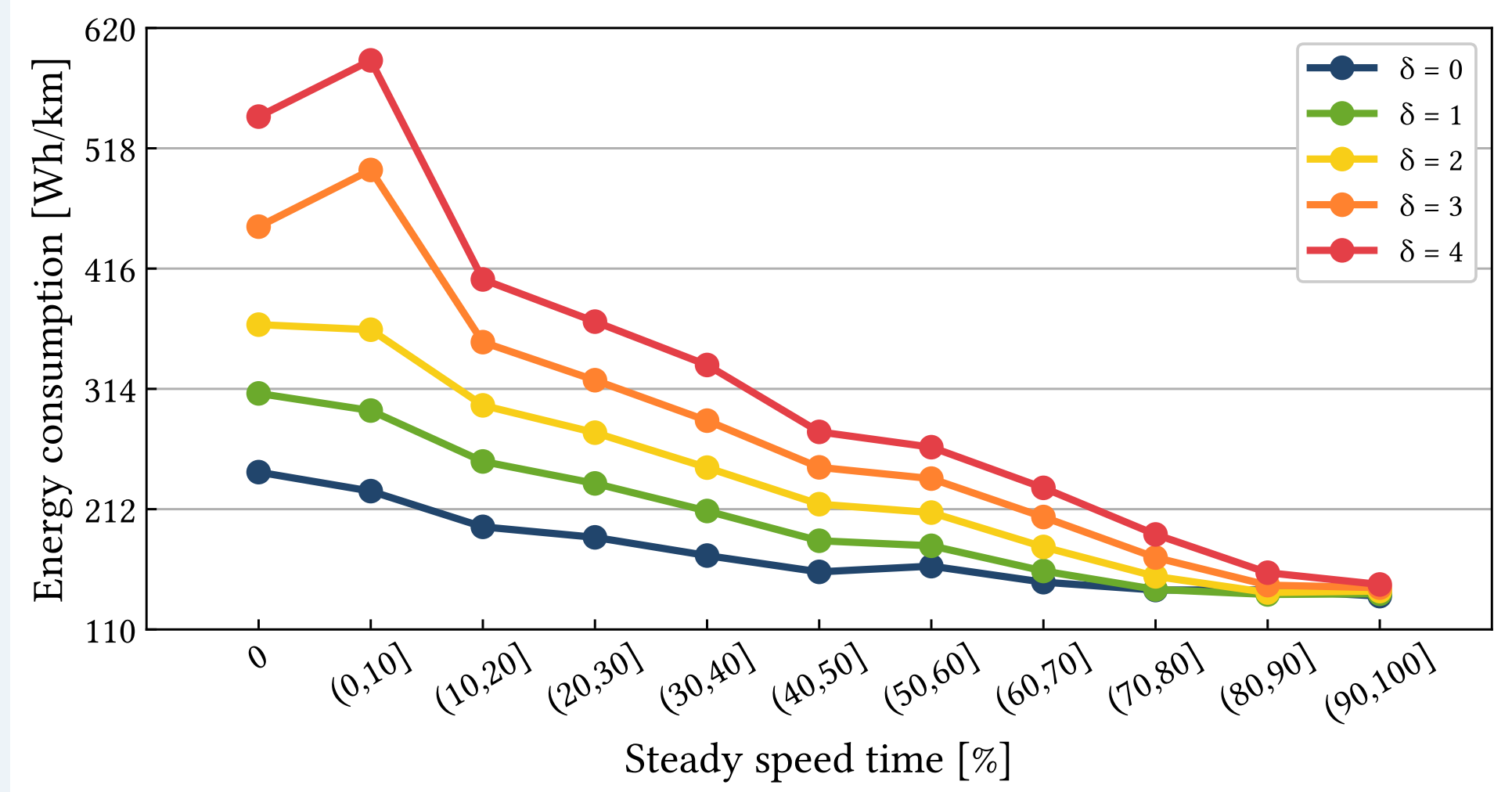


Steady Speed Period



- Similar mean, from 138 to 151 Wh/km
- Great increase in variance, from 366 to 724 Wh/km

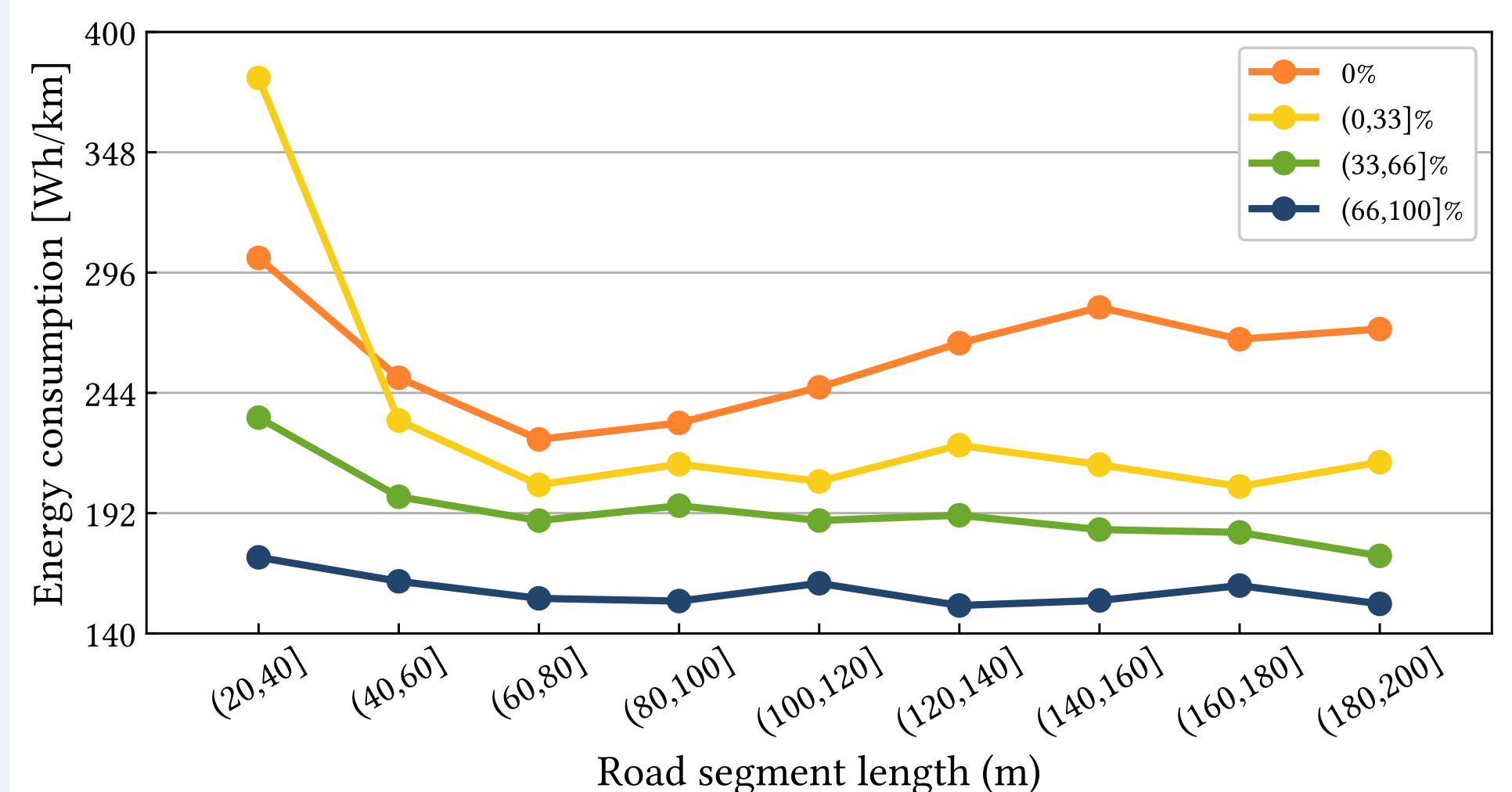
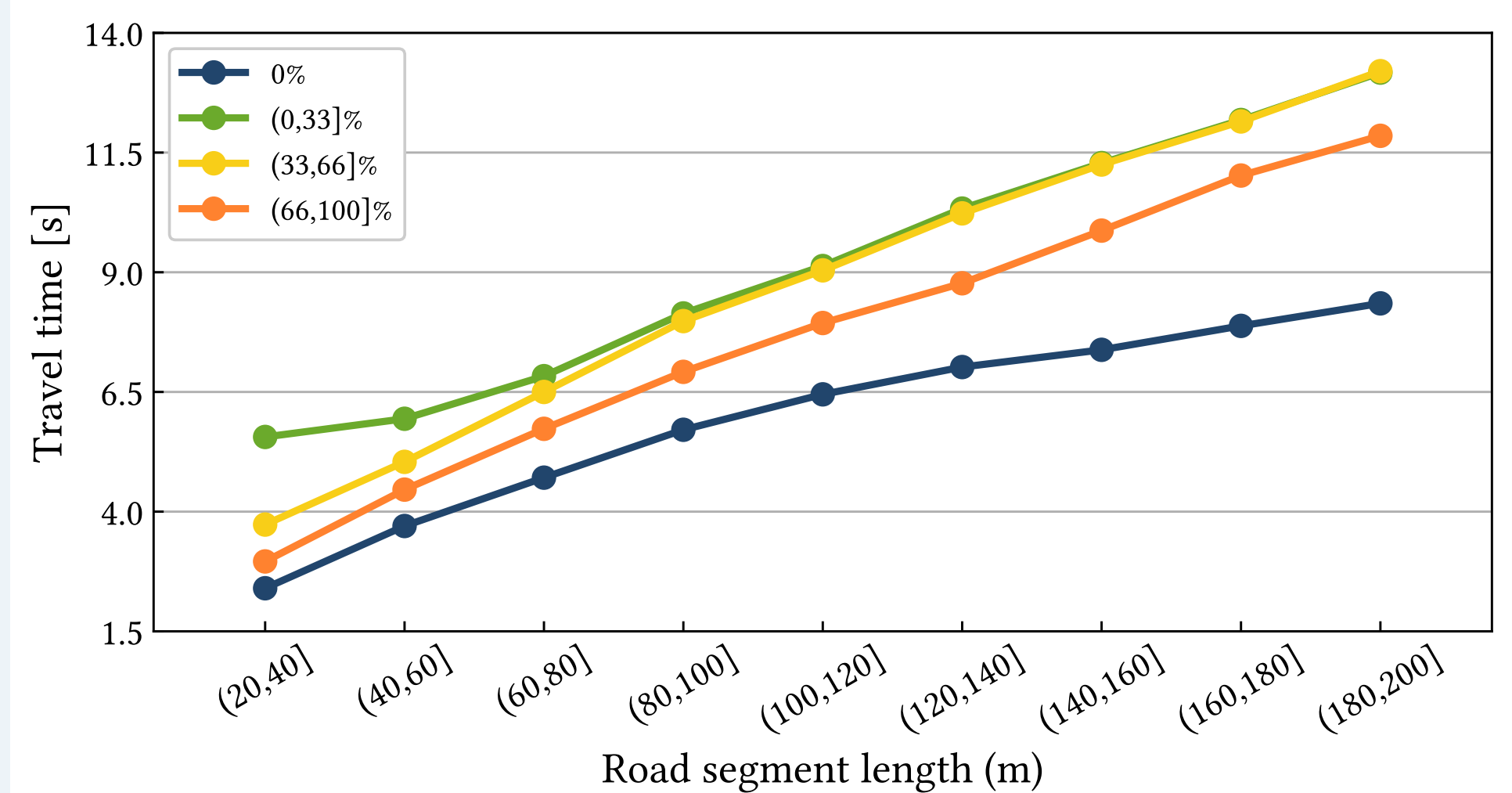
Percentage of Steady Speed



- Only 10-20% of steady speed is enough to reduce consumption by 29%
- Same behaviour across all values of delta speed



Travel Time and Consumption



- No steady speed to 66-100% increases travel time by 22%
- No steady speed to 66-100% reduces consumption by 37%
- 62% of all road segments have 200m or less



Summary

- The more fluctuations in speed, the worst the consumption
- Just a bit of steady speed is enough to save some energy
- Reduce consumption by up to 42% while increasing travel time by 10%
- Road segments of up to 200m are ideal for steady speed
- No fancy equipment, no new vehicle, energy can be saved right now