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Assessing the weather conditions for urban cyclists by spatially dense measurements

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Convincing commuters to use a bike for their daily trips is a timely contribution to reach sustainable development goals. In public discussions, bad weather is frequently raised as argument limiting the usability of cycling on an everyday basis. Looking at objective meteorological observations, how often does a typical commuter in an urban environment experiences bad weather while cycling? And can smart cyclists being informed by nowcasting and day-ahead forecasts effectively reduce the number of bad weather rides?

To answer these two key questions of this study, we analyze a huge ensemble of randomly drawn routes and assess the meteorological comfort of each ride by a threshold-based traffic light scheme. We chose temperature, wind, and precipitation as meteorological parameters indicating bad weather for cyclist. Observations are derived both from classical weather stations and from experimental novel urban observation systems: We explore the potential of a high-resolution X-band precipitation radar and of the dense station network (103 stations) during the FESST@HH campaign, which are both available at our study region, the city of Hamburg in northern Germany.

Most frequently we observe discomfort caused by temperature with a probability of 33%. Wind and precipitation discomfort occur only at 6% and 7% of the rides. Being slightly flexible in terms of riding times and being informed by a perfect nowcasting forecast is a very effective approach to reduce the risk to experience rain by a factor of two. Day ahead forecasts by operational ensemble systems provides an almost perfect guidance concerning temperature but the limited predictability of precipitation and wind renders these forecasts only useful for riders with a high risk awareness and small sensitivity to false alarms. In conclusions, this presentation indicates that weather is not severely limiting biking commuters and highlights the potential of guidance from weather observations and forecasts to reduce the risk experiencing bad weather during a ride.