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Title: Modelling of air quality affected by traffic emission considering meteorological situations

Abstract: Since the enactment of the Swiss Environmental Protection Act and its air pollution regulation in 1985, the cantons (states) are obliged to monitor the air quality in their area. Soon it was clear that the relationship between the emitted pollutants (emissions) and the measured pollutant concentrations at a specific location is very complex. In addition, there are neither emission data nor meteorological data of high resolution in time and space which are needed to describe the pollutant concentration quantitatively on an hourly basis at a specific site.

In the analysis presented in this talk, we succeeded in quantifying hourly averaged pollutant concentrations based on traffic emission and weather conditions over a full year. The model works for sites which are located immediately adjacent to a busy highway in a rural environment in Switzerland. Only on days with inversions of a few hours duration, the daily concentration profile is represented inadequately.

In this presentation, I will show how we proceeded in building an adequate model. The challenge was to equally satisfy physical as well as statistical considerations. An important statistical tool was the generalised additive model (GAM). The final model can be easily linearized and hence the inference can be based on a robust fitting technique since the errors do not really follow a Gaussian distribution.