Grant Agreement No. 2007105

Aphekom

Improving Knowledge and Communication for Decision Making on Air Pollution and Health in Europe

Profiling SO_2 Air Pollution Patterns in 5 EU Aphekom Cities

Henschel S [1], Goodman P [1], Atkinson R [2], Zeka A [3], Analitis A [4], Le Tertre A[5], Chanel O [6], Katsouyanni K [4], Medina S [5]*on behalf of the Aphekom collaborative network

[1] DIT Dublin, [2] SGUL London, [3] Brunel University London, [4] NKUA Athens, [5] InVS Paris; (6) CNRS-GREQAM-IDEP Marseille

Background and Aims

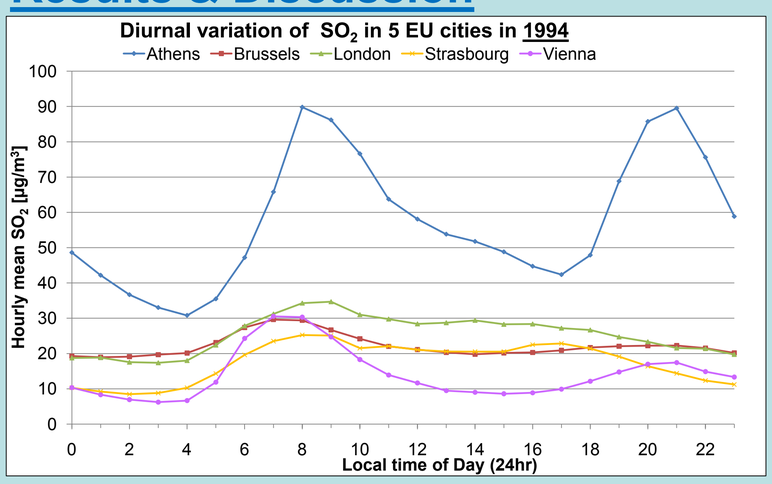
We demonstrate how an knowledge of hourly SO_2 patterns over time can provide an understanding of city specific emissions including source appointment. Such studies can provide useful information to policy makers and stakeholders to develop and set more effective local policies.

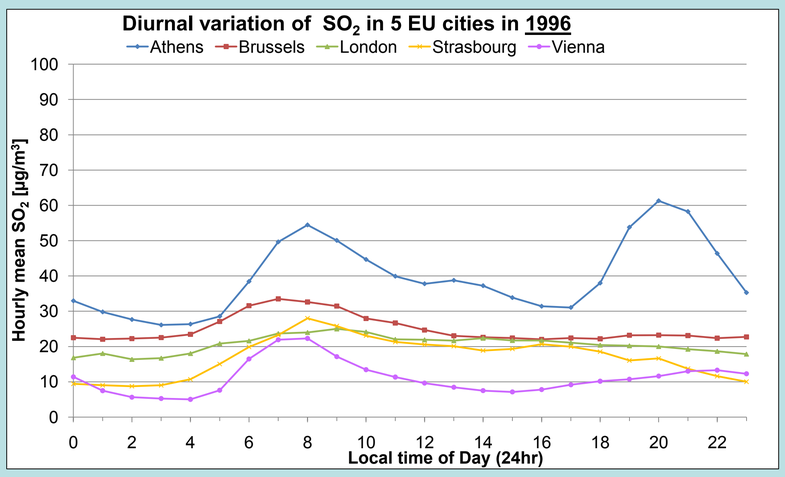
A detailed analysis of hourly SO_2 data obtained from a number of Aphekom centres was performed with the aim to provide a better understanding of the local patterns and potential sources of SO_2 and changes overtime in 5 EU cities.

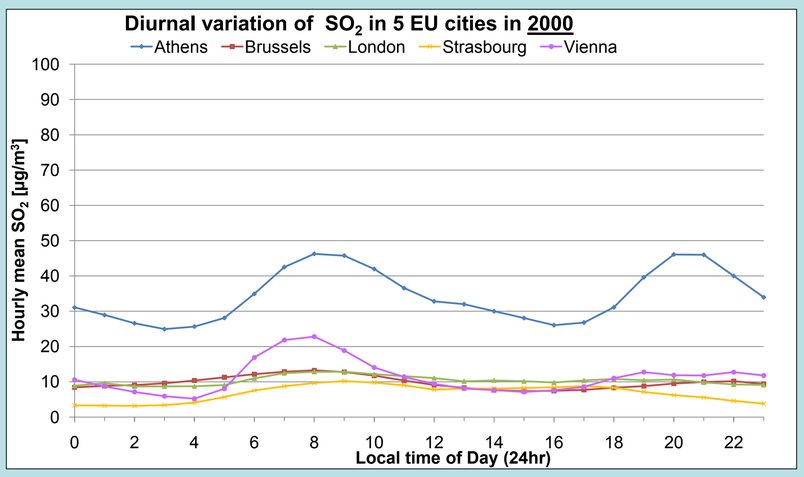
Methods

Individual cities diurnal (24hr) SO_2 profiles were generated using hourly SO_2 measurements from city centre or traffic monitoring sites by year, season and weekday for each year with data available from 1990 onwards. For the purpose of this poster we selected 5 of the participating European cities with suitable data namely: Athens, Brussels, London, Strasbourg and Vienna showing 24-hr plots for 3 selected years for illustration purposes.

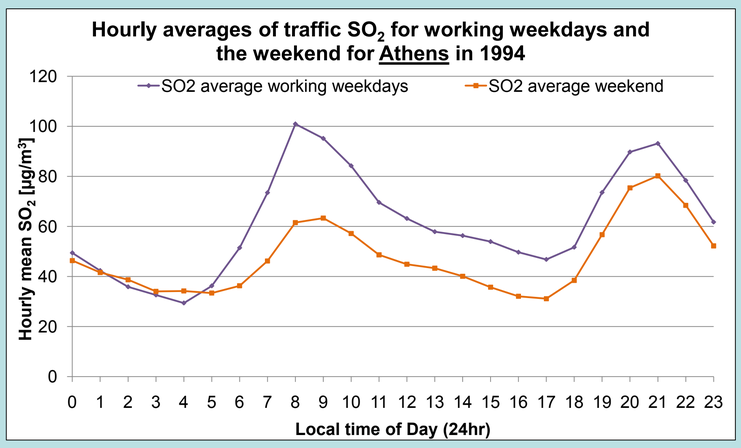
Results & Discussion

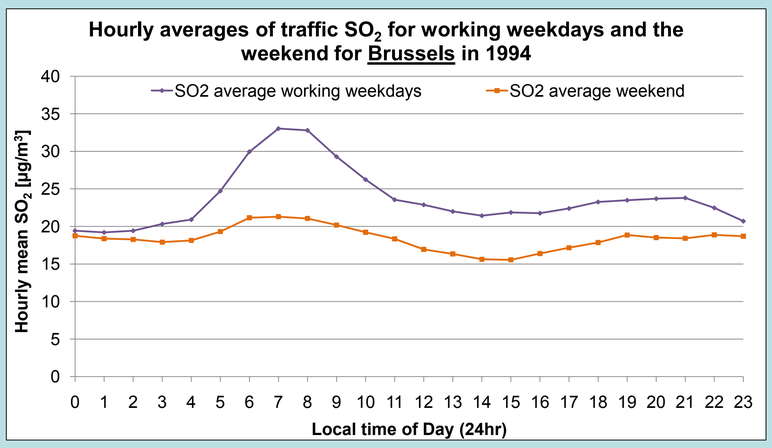






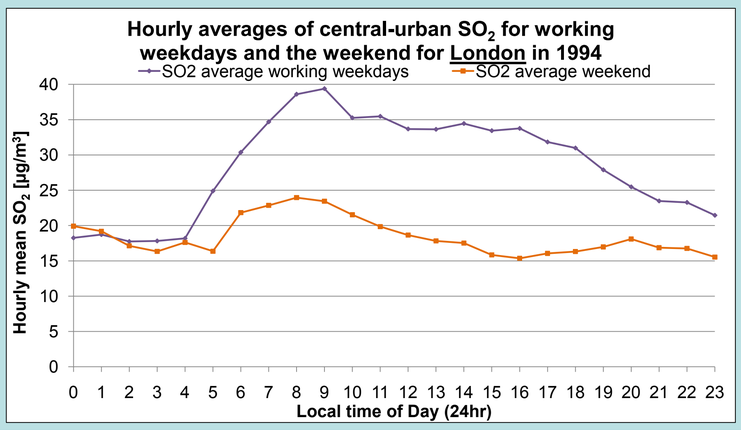
- General decreasing trend in hourly SO_2 levels overtime in all cities
- Pollution loads not uniform throughout the day in each city
- Observation of SO_2 peaks in the morning and evening → peak times coincide roughly with morning and evening traffic rush hours → suggests rush hours strongly reflected in the diurnal profiles
- Naturally likely to be other combustion sources contributing to observed levels, e.g. industries or port activity
- Traffic and domestic space heating related emissions strongest driving force of diurnal variation
- Remarkable reductions in SO_2 levels overtime clearly showing the flattening of the rush hour peaks (especially the morning ones) in all cities except Vienna.

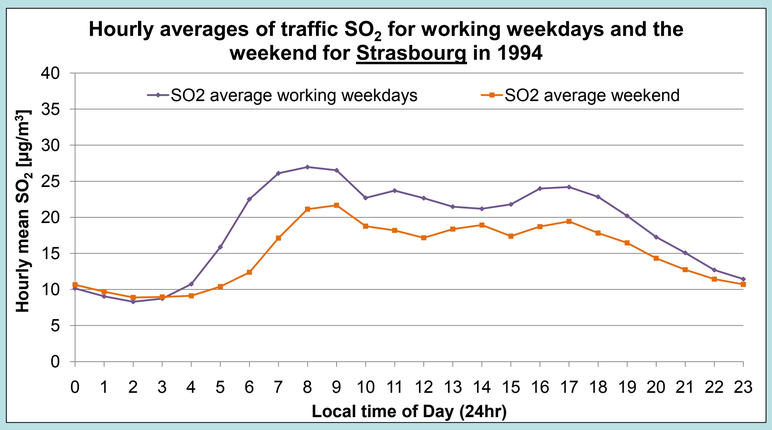


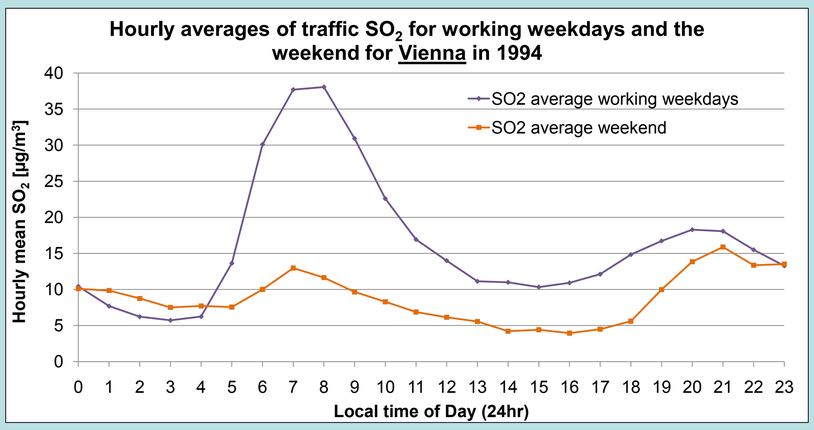


- Another common feature : So called "*weekend effect*" = lower SO_2 levels at the weekend compared to working weekdays (especially during daytime) → reflecting a lower traffic volume and industry related emissions
- Hourly winter SO_2 levels by average about 53% (17%) higher than summer levels in 1994 and 2001

→ suggests higher emissions due to space heating and periods of inversion in winter







Conclusions

- Knowledge of hourly pollution patterns useful in understanding city specific emission issues
- Useful tool to compare 5 EU cities of 5 different countries:

➢ Pollution loads in selected location within individual city not uniform throughout day

➢ helpful to identify city specific characteristics in diurnal SO_2 variation

➢Overall road traffic and heating appeared to be most important sources of SO_2 emissions → widely reflected in diurnal profiles

➢ Finding of decrease over time and strong weekend effects

Acknowledgments

The huge amount of work behind the Aphekom project is the fruit of the generous and constructive input from all the members of the Aphekom network. We wish to give our special thanks and appreciation to all of them.

Special thanks to Xavier Querol for his useful comments and suggestions!

Contact & Project Information

patrick.goodman@dit.ie, susannhenschel@gmx.de

Aphekom tackles air pollution in Europe. WHO Newsletter No. 42, Dec. 2008, p. 14-15, Berlin, Germany.

Aphekom General Brochure http://aphekom.org/c/document_library/get_file?uuid=5532fafa-921f-4ab1-9ed9-c0148f7da36a&groupId=10347

More on **www.aphekom.org**