Chemical composition of PM in a residential area of Beijing, China


1 Institute of Meteorology and Climate Research (IMK-IFU), Karlsruhe Institute of Technology (KIT), 82467 Garmisch-Partenkirchen, Germany
2 Institute of Geography and Geocology (IGG), Karlsruhe Institute of Technology (KIT), 76128 Karlsruhe, Germany
3 Institute of Mineralogy and Geochemistry (IMG), Karlsruhe Institute of Technology (KIT), 76128 Karlsruhe, Germany
4 Joint Mass Spectrometry Centre, Comprehensive Molecular Analytics, Helmholtz Zentrum München, 85764 Neuherberg, Germany
5 Department of Resources and Earth Sciences, China University of Mining and Technology (CUMTB), 100083 Beijing, P. R. China
6 School of Earth Sciences and Resources, China University of Geosciences (CUGB), 100083, Beijing, P. R. China
7 Institute of Atmospheric Physics (IAP), Chinese Academy of Sciences (CAS), 100029, Beijing, P. R. China

OBJECTIVES
Emission reduction measures were performed to improve air quality during the Olympic Summer Games in 2008: cut down mainly coarse particles. Question: PM still a problem?

Objectives: Chemical composition of PM, source identification and special case studies during haze and dust events.

METHODOLOGY
Particulate concentrations: Daily PM filter sampling on quartz fibre filters with 2 High-Volume Samplers DHA80 (Digital) by KIT/IMK-IFU from 2010.06.21 on for one year with CUMTB at the entrance of CUGB in 20 m distance to Mini-Volume Sampler (weekly PM2.5 samples) of KIT/IMG.

Meteorological data from IAP and ZBAA (http://weather.uwyo.edu/upperair/sounding.html).

Particle composition: Main and trace elements analysed by PEDXRF (Polarized energy dispersive X-ray fluorescence) from KIT/IMG.

RESULTS
PM mass concentration during different weather conditions:
- haze days: highest PM mass concentration, followed by dust days.
- Dust days: most coarse particles. Haze days influenced by anthropogenic activities - highest amount during fine mode.

Comparison of PM mass concentration during different weather conditions:
- haze days: highest PM mass concentration, followed by dust days.
- Dust days: most coarse particles.

Sulfur, Zinc and Lead which refer to anthropogenic influences - highest amount during haze days.
- Fe, Ti, Ca, Mn, Ba which refer to geogenic sources - highest amount during dust days.

Sulfur and Zinc highest amount during dust event on 2011.04.13 - influenced by re-suspended dust.

CONCLUSIONS
Sources of PM: soil and re-suspended dust (geogenic sources), fossil fuel combustion, waste incineration, and brake wear.

Haze days: highest PM mass concentration from anthropogenic activities, highest sulfur amount.

Dust events: sources different, mainly desert dust, highest Fe, Ti, Ca, Mn, Ba amount.

REFERENCES
