Košetice Observatory – The Czech Background Aerosol Supersite

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The Košetice observatory (49°35´ N, 15°05´E, 534 m a.s.l.) is operated by the Czech Hydrometeorological Institute (CHMI) and was established in 1988 as a station specialized in air quality monitoring at the background scale. The observatory is involved in GAW/WMO (Global Atmosphere Watch), EMEP/ECE (Co-operative Programme for Monitoring and Evaluation of Long-range Transmission of Air Pollutants in Europe) and ICP-IM (International Co-operative Programme on Integrated Monitoring).

The monitoring program includes meteorology, solar radiation, air chemistry, precipitation chemistry, hydrology, surface water chemistry and soil analysis. More detailed information is available in (Váňa *et a*l. 2007, 2009).

The basic measurements of atmospheric aerosols were implemented within the National Imission Network (operated by CHMI) since the start of the observatory. At the beginning, mass concentrations of total suspended particles (TSP) were monitored. In 1996, monitoring of PM_{10} concentrations started according to the European legislation. The recent studies have concluded that fine particles ($PM_{2.5}$) are more hazardous in terms of mortality on cardiopulmonary diseases and lung cancer (Pope et al., 2002). Measurement of $PM_{2.5}$ started at Košetice Observatory in 2004.

Thanks to its well selected location and long-term homogeneous data series, Košetice Observatory has been included into several European projects. In regards to atmospheric aerosols, the first of them was EUSAAR (European Supersites for Atmospheric Aerosol Research), an EU-funded I3 (Integrated Infrastructures Initiatives) project carried out in the FP6 framework of the specific research and technological development programme "Structuring the European Research Area - Support for Research Infrastructures" in the period 2006-2011. The EUSAAR aerosol activities are continuing within more widely composed EU FP7 project ACTRIS (Aerosols, Clouds, and Trace Gases Research Infrastructure Network).

Advanced aerosol measurements have been carried out in close co-operation with the Institute of Chemical Process Fundamentals (ICPF). Continuous sampling of dry particle number size distributions using a Scanning Mobility Particle Sizer (SMPS, TROPOS) started in 2008 with 5 min time resolution covering particle size range from 9 to 900 nm (Asmi et al., 2011). One year series of aerosol hygroscopicity data had been collected between 2008-2009 using a Humidity Tandem Differential Mobility Analyzer (HTDMA, ICPF) with one hour time resolution. $PM_{2,5}$ OC/EC measurement has been implemented since 2009 with 6 days sampling frequency on 2 quartz-fiber filters (Putaud et al., 2010). Since October 2011 (within ACTRIS), a carbon honeycomb denuder developed within EUSAAR had been installed upstream the filters. The OC/EC content in the samples has been determined by thermal-optical analysis at CHMI Central Laboratories in Prague-Libuš using the OC/EC Sunset Lab Dual Analyzer. Charring correction has been done by laser transmission monitoring.

Special attention to the climatological effects of atmospheric aerosols is devoted in The CzechGlobe project operated by Global Change Research Centre AS CR at the co-located station Košetice (ACTRIS) – Křešín u Pacova (ICOS). The measurements of optical properties of the atmospheric aerosol started in 2012 as the first of this type in the Czech Republic. The aerosol scattering coefficients at three wavelengths have been determined by an integrating nephelometer (TSI 3563). The aerosol absorption coefficients at seven wavelengths have been gathered using an aethalometer (AE-31, Magee). All parameters have been determined on dry aerosol particles, the measurement methods closely follow ACTRIS recommendations, and the results will be used for the extension of the Czech participation within ACTRIS.

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Asmi A., Wiedensohler A., Laj P. et al. (2011). *Atmos. Chem. Phys.* **11**(11), 5505-5538.

Pope, CA; Burnett, RT; Thun, MJ; et al. (2002), *JAMA,* **287** (9), 1132-1141. DOI: 10.1001/jama.287.9.1132

Putaud J-P., Van Dingenen R., Alastuey A. et al. (2010) *Atmos. Environ.* **44**(10), 1308-1320.

Váňa M. et al. (2007, 2009) Kosetice Observatory – 20 years. Pt. 1 + 2, CHMI, Praha.

Váňa, M. et al. (2012) *P226 (SS01S1PO1) at EAC 2012*, Granada