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Air Quality in Different Types of Archives

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Aerosol particles are one of the major pollutants in outdoor and indoor air. They may negatively influence health, but also have negative effects on ecosystems and cultural heritage. Particulate matter (PM) can be harmful for works of art by causing soiling and chemical damage, depending on particle size and chemical composition (Hatchfield, 2005).

The study includes indoor/outdoor monitoring of the air quality in four archives in the Czech Republic, which representing different outdoor environments: Zlatá Koruna (rural), Třeboň (small city with seasonal tourism), Teplice (industrial area), and Prague (large city with traffic). The aim of this study is to investigate concentrations and sources of airborne PM and gaseous pollutants in the indoor environment of the archives, and to establish the relationship between the indoor and outdoor environment. In 2012 the measurements were performed at Třeboň and Zlatá Koruna during 4 intensive campaigns in different seasons of the year.

The results indicated outdoor air as the most probable source of particles in the indoor environment of both archives. Average values for the indoor/outdoor ratios of the particle number concentration had a maximum between particle diameters of 0.1–1 μm (Fig. 1), which indicates a maximum penetration factor and low indoor deposition velocity of these particles. The penetration at Třeboň was higher probably due to simple windows with gaps, compared to double glassed windows at Zlatá Koruna.

These results were confirmed by measurements of the ventilation rate, which was at Třeboň in average three times higher than at Zlatá Koruna (Fig. 2). The ventilation rate was lower in summer than in winter at both archives, probably due to lower temperature difference between indoor and outdoor environment.

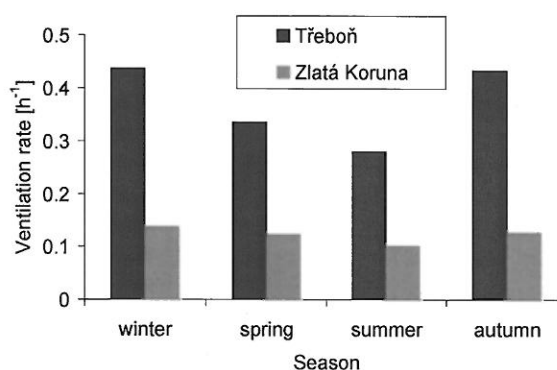


Figure 2. Ventilation rates measured at Třeboň and Zlatá Koruna in different seasons of the year.

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Hatchfield, P. B. (2005) *Pollutants in the Museum Environment*. Archetype Publications, London.

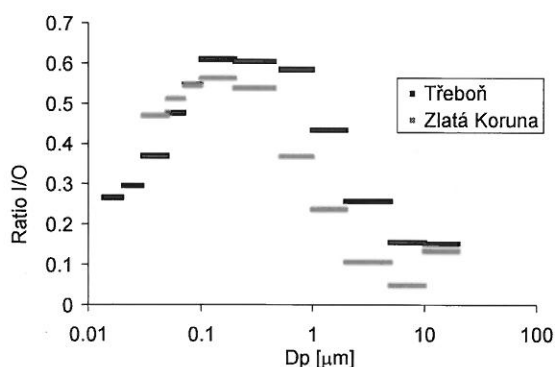


Figure 1. Indoor/outdoor ratios of particle number concentrations versus particle size at Třeboň and Zlatá Koruna during the winter campaign.