

Organic and inorganic pollutants in the magazines of the Lower Saxony State Museum, Hanover, Germany

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Abstract

Indoor pollution in cultural institutions such as museums, libraries and archives is of particular importance. On the one hand it is essential to provide a healthy indoor climate for museum staff and visitors, on the other hand cultural assets have to be protected against deterioration. Building materials, preservatives and other products are possible sources for a number of hazardous compounds. In many cases conservators handle cultural artifacts where the type of preservation is unknown. Dealing with this complex subject matter, the Fraunhofer Wilhelm-Klauditz-Institute (WKI), Braunschweig, is realizing an interdisciplinary research project in cooperation with the University of Applied Sciences Braunschweig/Wolfenbüttel since January 2004. The Lower Saxony State Museum in Hanover as a project partner allows due to its many departments (prehistory, natural history, ethnology, state gallery) representative examinations of magazines, exhibition rooms and display cases. The project is financially supported by the Deutsche Bundesstiftung Umwelt (DBU).

In the first part of this project measurements of indoor pollutants in magazines of prehistory, natural history and ethnology have been accomplished. Concentrations of volatile organic compounds (VOCs), formaldehyde and organic acids (formic acid, acetic acid) in ambient air were determined by active sampling and chemical analysis. Semi volatile organic compounds (SVOCs) and selected elements were examined by sampling and analyzing settled dust. The climatic conditions (temperature and relative humidity) were recorded as well. The results, conclusions and outlook of the following course of the project will be presented in the poster.

Most of the VOCs detected in ambient air are associated with packaging and building products used for furnishing magazines and for building exhibition cases. Furthermore they are associated with products previously used for preservation and restoration. Wooden shelves and drawers were identified as sources of terpenes and other VOCs. Compounds like lindane and 1,4-dichlorobenzene are still used as preservatives against insects and fungi. In settled dust, increased concentrations of lead, arsenic and chlorine were found. This result also indicates the application of certain preservatives. The spectrum of detected air pollutants reflects the different application of chemicals and building products in the particular departments. The results will be evaluated with possible effects on human health. The conceivable influences on the stability of exhibits have to be identified in the following course of the project in whose context measurements will be carried out in exhibition rooms, storage cases and on building materials to identify special emission sources.