DEPOSITION MONITORINGIN OF URBAN FORESTS

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BACKGROUND

Deposition monitoring is used for the determination of deposited pollutants, precipitation quality and quantity and its dynamic. Results are used for calculating critical loads, determination of fluxes and canopy exchange rate. The most interesting pollutant compounds are nitrate and sulphate ("acid rain"). With that purpose several types of water samples are collected: ***bulk deposition*** (open-air precipitation), ***throughfall deposition*** (below stand precipitation), ***stemflow*** (water, collected on the stem of broad leaves species, especially beech - *Fagus sylvatica*) and ***soil solution*** (run-off water).

INSTALLATION

For performing proper and satisfying sampling field equipment is necessary. The catching funnel (gutter) should be high enough to prevent contamination of the soil and proper design not to underestimate or overestimate the precipitation amount. The collecting bottles should be kept in cool and dark. After every sampling period the samples are delivered to the laboratory for further analysis. Deposition sampling should be performed in open area (bulk) - close to the urban forests edge and in urban forest stands (throughfall and stemflow). During winter special collectors are installed (photo on the right side, first and second from the top).

ANALYSIS DEPLOYED

Usually are deposition samples with low ionic strength . On unfiltered samples measurements of pH value, electroconductivity (EC) and alkalinity are performed. Further analysis are : ion chromatography for anions (Cl^-, NO_2^-, NO_3^-, PO_4^{3-} and SO_4^{2-}), cations (Na^+, NH_4^+, K^+, Mn^{2+}, Ca^{2+} and Mg^{2+}), combustion and NDIR determination for DOC measurements, peroxodisulphate digestion and UV determination on UV-Vis spectrometer for total nitrogen determination.

Reference: http://www.icp-forests.org/pdf/FINAL_Depo.p*df*

OZONE MONITORING

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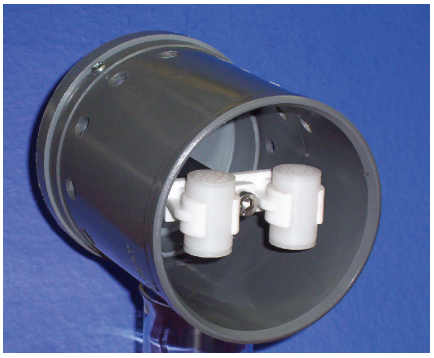
BACKGROUND

Air pollutants of interest are: ozone (O_3), nitrogen dioxide (NO_2), sulphur dioxide (SO_2) and ammonia (NH3).

Effects of ozone on human health are adverse and they appear as incidence of asthma, decreased lung function growth, rarely as lung cancer or even mortality. The effects of ozone on forest trees and shrubs are even more apparent and provable. Therefore the ambient air quality monitoring is important for predicting effects to the plants and have awareness of in what atmosphere the people spend their time.

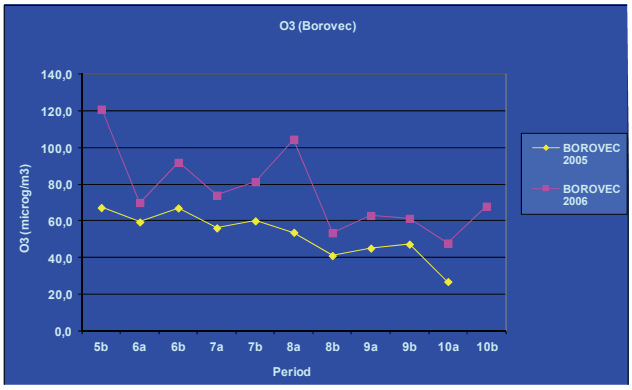
INSTALLATION

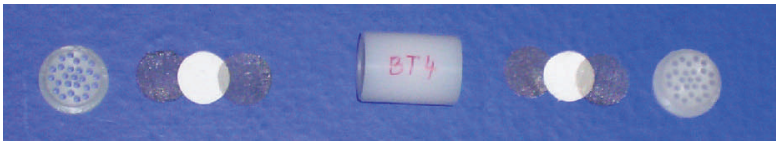
Passive dosimeters consist of holder, precipitation shield and passive dosimeter. The latter is assembled with housing, active filter and perforated cap (see photo at the bottom). Active filters are soaked with different reagent solutions for ozone, ammonia and NO_x/SO_2 respectively. After every sampling period, usually two weeks, the dosimeters are replaced with the new ones and brought to the laboratory for further analysis. Similar procedure is applied for passive measurements for NO_x, SO_2 an NH_3.



ANALYSIS DEPLOYED

In the laboratory the dosimeters are disassembled in the controlled environment. Filters are water-extracted. The solution is analysed by anion chromatography for nitrate amount in case of ozone and NO_x determination. For determination of SO_2 sulphate anion is determined. Ammonia is on the filter transformed to ammonium which is detected by cation chromatography.





Reference: http://www.icp-forests.org/pdf/FINAL_AAQ.pdf