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Development of a new radial passive sampling device for atmospheric NO_x determination

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Abstract

In this paper we used Na₂CO₃-impregnated silica as reactive substrate for the determination of atmospheric NO_x (NO +NO₂) by using a passive sampling device, with radial symmetry, which is unprecedented. We conducted laboratory and field tests at an urban setting, with co-located passive samplers and continuous measurements of NO_x by a chemiluminescence detector, used as reference. The performance of the carbonate-based sorbent for the NO_x sampler was evaluated in two different time frames (autumn 2016 and winter 2017), characterised by different environmental conditions. The comparison of the NO_x concentration levels measured by passive sampling, using Na₂CO₃ as NO_x sorbent, showed a close relationship with those obtained by the chemiluminescence analyzer. Validation experiments in the laboratory and in the field are reported together with the calculation of the diffusion-sampling rate of the samplers.

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