

CONTINUOUS MERCURY MONITORING OF AMBIENT AIR

INTRODUCTION

The mercury concentration in ambient air in non-polluted areas varies in a range of 1–3 ng/m³.

The multifunctional mercury spectrometer **RA-915⁺** of proprietary LUMEX Ltd. design is based on the Zeeman atomic absorption spectrometry using high frequency modulated light polarization (ZAAS-HFM).

The portable spectrometer is available for continuous mercury determination in air and for rapid analysis of solid and liquid samples.

The **RA-915⁺** mercury analyzer has been widely used for continuous monitoring of the mercury concentration in ambient air.



MONITORING TECHNIQUE

The RA-915⁺ analyzer provides highly selective continuous determination of the background mercury concentration in ambient air with appropriate detection limit (**DL**), which depends on averaging time (**t_{av}**) as

$$DL(t_{av}) = \frac{DL_1}{\sqrt{t_{av}}},$$

where **DL₁** is the detection limit determined for the averaging time of 1 second.

For example, the averaging time of 30 s. provides the **real detection limit of 0.3 ng/m³**.

The mercury monitoring data are collected by a built-in data logger or a PC.

The mean values for any time interval (1 min, 1 hour, 1 day, 1 month, etc.) can be calculated from the acquired data.

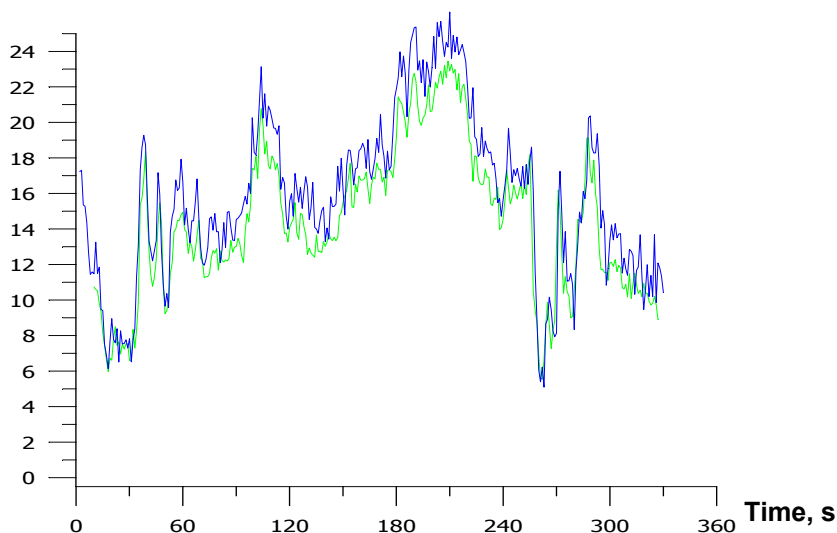
The analyzer is used for a long-term mercury monitoring in the ambient air in stand-alone mode to study short-term and seasonal mercury variations and to reveal possible local and regional sources of the mercury emission into the atmosphere.

Averaging time, T_{av}, s	Detection limit, DL, ng/m³
1	1.6
5	0.8
15	0.4
30	0.3
60	0.24
120	0.22
240	0.21

EXAMPLES OF CONTINUOUS MERCURY AUTOMOBILE SURVEY

1. Concurrent measurements using 2 analyzers RA-915+ near a battery plant *St. Petersburg, Russia, 07 June 2001*

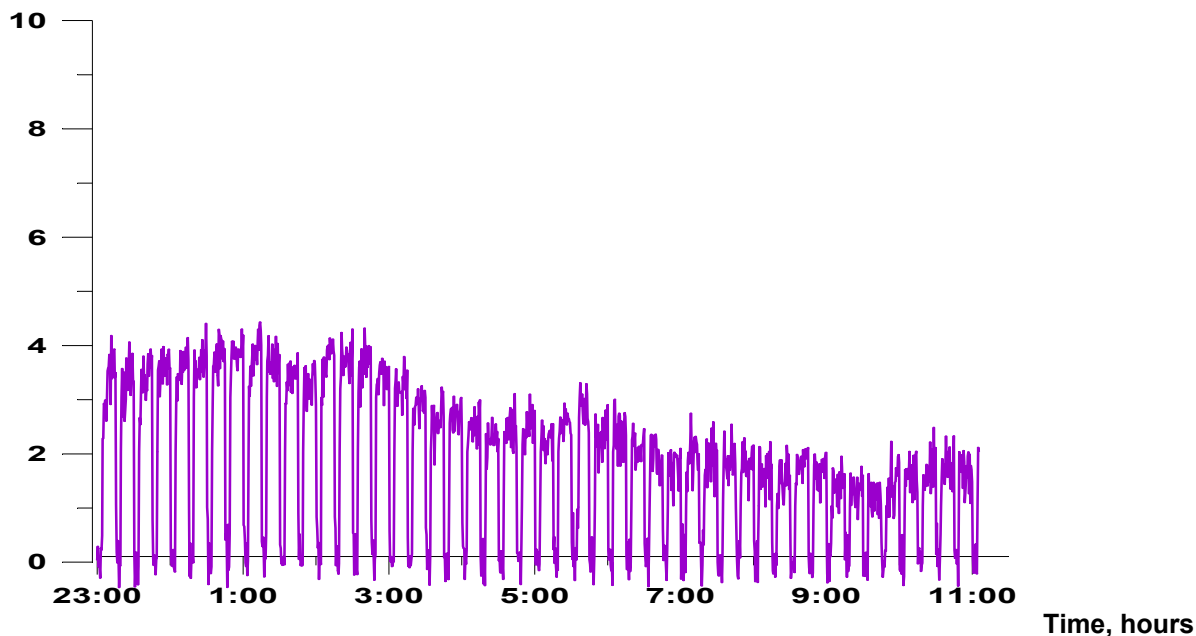
C Hg, ng/m³



DL = 1.6 ng/m³, T_{av} = 1 s.

2. Monitoring chart of the mercury concentration in ambient air *Minamata, Japan, 22–23 February 2003* (Original file with zero control data)

C Hg, ng/m³



DL = 0.3 ng/m³, T_{av} = 30 s.

The contents on this paper are subject to change without notice.