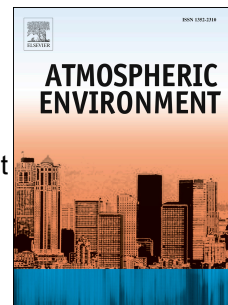


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Assessment of air quality microsensors versus reference methods: The EuNetAir joint exercise

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1 Assessment of Air Quality Microsensors Versus Reference Methods: the EuNetAir 2 Joint Exercise

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21 Abstract

22 The 1st EuNetAir Air Quality Joint Intercomparison Exercise organized in Aveiro (Portugal)
23 from 13th - 27th October 2014, focused on the evaluation and assessment of environmental gas,
24 particulate matter (PM) and meteorological microsensors, versus standard air quality reference
25 methods through an experimental urban air quality monitoring campaign. The IDAD-Institute of
26 Environment and Development Air Quality Mobile Laboratory was placed at an urban traffic
27 location in the city centre of Aveiro to conduct continuous measurements with standard
28 equipment and reference analysers for CO, NO_x, O₃, SO₂, PM10, PM2.5, temperature, humidity,
29 wind speed and direction, solar radiation and precipitation.

30 The comparison of the sensor data generated by different microsensor-systems installed
31 side-by-side with reference analysers, contributes to the assessment of the performance and the
32 accuracy of microsensor-systems in a real-world context, and supports their calibration and
33 further development.

34 The overall performance of the sensors in terms of their statistical metrics and measurement
35 profile indicates significant differences in the results depending on the platform and on the
36 sensors considered. In terms of pollutants, some promising results were observed for O₃ (r²:
37 0.12-0.77), CO (r²: 0.53-0.87), and NO₂ (r²: 0.02-0.89). For PM (r²: 0.07-0.36) and SO₂ (r²:
38 0.09-0.20) the results show a poor performance with low correlation coefficients between the
39 reference and microsensor measurements. These field observations under specific
40 environmental conditions suggest that the relevant microsensor platforms, if supported by the
41 proper post processing and data modelling tools, have enormous potential for new strategies in
42 air quality control.

43
44 Keywords: Air quality monitoring; Reference methods; Microsensors; Experimental campaign;
45 Intercomparison
46

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