

## ***Interactive comment on “Measurements of CO<sub>2</sub>, its stable isotopes, O<sub>2</sub>/N<sub>2</sub>, and <sup>222</sup>Rn at Bern, Switzerland” by P. Sturm et al.***

**Anonymous Referee #2**

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The paper presents a preliminary series of results concerning the use of a multi-tracer approach to constrain CO<sub>2</sub> variability in an urban airshed. In this work well known(<sup>222</sup>Rn, major gas stable isotopes) as well newer(Ar/N<sub>2</sub>, O<sub>2</sub>/N<sub>2</sub>, delta29N<sub>2</sub> and delta34O<sub>2</sub>) atmospheric tracers are reported in agreement with recent literature suggesting how this approach can be considered a promising tool in solving carbon dioxide source/sink apportionment. The paper is half-way between a technical report, describing developments and improvements in the apparatus used, in order to fulfil the demanding requirements for a correct isotopic analysis of gases in air , and an interpretative paper devoted to the analysis of the data collected; this seems to reflect the present stage of the research progress. One of the most interesting aspects of this

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paper is the use of an on-line apparatus for gas sampling and analysis which overcomes the risks of artefacts associated with the use of flasks for air sampling. This solution is supposed to greatly reduce the connected risk of misleading interpretation of the results. As concerns the data presented they show great potential, though they are (possibly) not exploited at best: this is the consequence of large gaps in the data series of tracers as compared with CO<sub>2</sub>'s (see fig. 6 and fig. 11), partly limiting the confidence in data analysis results. This should be explained in the text while the mentioned figures, which do not add substantial information to the paper if not the temporal data consistency, are redundant and might be eliminated. As a last comment, it is a shame that <sup>222</sup>Rn/CO<sub>2</sub> correlation is so limited. Though the new tracers are very appealing <sup>222</sup>Rn can still be very effective in supporting atmospheric studies (see GAW report n. 155 on atmospheric radiotracers published in 2004) therefore it deserves a more careful attention.

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