**Atmospheric
Measurement
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Discussions**

Interactive comment on "A new CF-IRMS system for the quantification of the stable isotopes of carbon monoxide from ice cores and small air samples" *by* Z. Wang and J. E. Mak

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The paper presents a method for the determination of the concentration and isotope ratios of carbon monoxide in ice cores. Although the basic principle of the method is based on published procedures, the application to CO in ice cores is new and the paper contains results from a number of tests providing insight into the potentials and limitations of the methodology. Therefore the paper deserves publication in Atmospheric Measurement Techniques. Nevertheless, there are several issues which need to be addressed before the paper should be published. i) The paper presents results of a variety of blank tests, however it is not always clear which process contributes to the

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blank and to which extent the blanks indeed can be ascribed to specific parts of the procedure. The results in Table 3 strongly suggest linear dependence between the magnitude of the blank and sample volume and/or sample collection time. Is there any information which would allow separating the two possible influences? ii) The impact of blank size on the results depends on sample volume, difference in isotope ratios between blank and sample and potentially a range of other factors. I could not find a clear explanation of how the measurements were corrected for blank values (if they were) or how the results may be biased by the blank values and how the blanks will impact the reproducibility of the results. It is also somewhat confusing that the blank values for tests are typically given as pmol CO, whereas the results of sample analysis are given as ppb. This makes it very difficult for the reader to form an own opinion about the possible bias and uncertainty resulting from blanks. iii) The light dependence of blank values was determined using artificial ice samples. This may not be truly representative since light induced formation of CO will depend on the composition of the ice. This needs to be discussed briefly. iv) There are some statements in the text and discussion which may be better suited for the conclusions, need to be supported by evidence, or simply may be deleted: - Line 19-23, page 2693: "Use of a Teflon beaker was also investigated. . ...However permeability limits. . ." It is not clear what the consequences of the permeability were and what was tested. - Bottom of page 2693: "Clearly an old fashioned Toepler pump. . ..." This is a somewhat farfetched conclusion since no tests using a Toepler pump are presented or cited which would support this statement. - Chapter 2.2 starts with a statement that sounds more a like a conclusion than an explanation of what was done. v) The paper contains many grammatical errors and poorly phrased sentences. They are too many to list here. I strongly suggest that the language and grammar is checked thoroughly be a native English speaker.

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