

Interactive comment on “ μ Dirac: an autonomous instrument for halocarbon measurements” by B. Gostlow et al.

Anonymous Referee #2

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The paper by Gostlow et al., describes a novel, lightweight reasonably portable gas chromatograph-electron capture detector for the determination of a range of halocarbon compounds that are important for the point of ozone depletion. The instrument is designed to be deployed on a range of challenging platforms from balloon to aircraft and ground based locations.

General Comments: The paper focuses a great deal of attention on the technical aspects of the instrument, describing the inlet manifold, sampling system, columns technology, helium supply, detection systems etc. It then goes on to describe in great technical detail how the μ -Dirac system needs to be modified for use on different sampling platforms. This description takes up pages 2126-2138, whereas the instrument description, discussion, result and summary only take up pages 2139-2145. My point

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being that the main area of interest to the reader, how the instrument performs is not given a great deal of attention. I would suggest re-balancing this to provide a greater discussion of the results presented and major reduction in unnecessary information presented in the instrument description.

Specific comments: 3.1 Calibration : No indication is given about how old the NOAA-ESRL standard is, what type of cylinder is used (stainless steel, Acuflex, Luxfur) what NOAA calibration scale it is on (NOAA -2003, 2005 etc?), or how the standard is assessed for sample drift. Many volatile halocarbons are unstable in sample canisters, the degree of stability, relates to the type of material the cylinder is constructed from, the pressure in the cylinder the water content of the cylinder etc.).

P 2139 Line 23 What is considered a blank chromatogram, sampling of the carrier gas, sampling of a sample tested to contain no halocarbons of interest?

3.2 Accuracy and precision: P 2141 Line 20 Since the μ -Dirac system is designed to operate in possibly less stable conditions aboard balloons and aircraft, and the focus of this paper is to present measurements from such platforms, I think it is important to provide accuracy and precision data to reflect these platforms.

3.4 Comparison with UEA GC-MS instrument I am unsure why this section is here. Discussion of the same campaign is repeated in section 4.4. The samples are referenced to a NOAA-ESRL (2003) scale, I assume this is the scale that should have been cited in the Calibration section? It is puzzling that the author makes no attempt to ascertain the cause of the 20-30% difference between the NCI-GCMS and μ -Dirac. The magnitude of this difference is quite substantial and might suggest sample losses or non-linearities with either instrument.

P 2142 Line 20 It appears that there are offsets with CHCl_3 as well, what is the magnitude of this offset? Does this also occur with the rest of the halocarbons?

4.1 Attempted MIR long duration balloon flight. I do not see any reason to include this

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section as part of the results – there are no results to report. It is quite disappointing that the μ -Dirac was described in the introduction as being “originally designed for use on a Montgolfier Infra Rouge (MIR) long duration balloon”, a great deal of time is spend detailing the instrumental requirements for MIR balloon deployment (section 2.2), but no results are presented in the paper. I would either suggest removing reference to the MIR in this version of the paper or waiting to publish until results have been acquired.

P2144 line 13-14 The values of C2Cl4 might be described to be similar to values found at Mace Head during background conditions at this time of year. However, the values for CHCl3 are around 50% higher than baseline values found at Mace Head. Why only compare these two compounds and not the rest of the halocarbons?

4.4 Operation in Malaysian Borneo P2144 Lines 25/26 and P2145 Lines 1-3 I assume that the μ -Dirac and the UEA GC-MS were again using the same calibration std? If so, why is there good agreement between the two set of data when it is known that co-elution on the μ -Dirac chromatogram is causing a 10-30% overestimation in the marine atmosphere. Secondly, why are the μ -Dirac results reported to be 20-30% lower than the UEA GC-MS for the same campaign, in section 3.4, P 2124 Line 15?

Interactive comment on Atmos. Meas. Tech. Discuss., 2, 2123, 2009.