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Interactive comment on "Ambient formaldehyde measurements made at a remote marine boundary layer site during the NAMBLEX campaign – a comparison of data from chromatographic and modified Hantzsch techniques" *by* T. J. Still et al.

Anonymous Referee #1

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The reader of the paper is unfortunately left at the end without improved knowledge of the formaldehyde levels present in Mace Head. What is left is an experimental verification of a diurnal variation as predicted by the model. For model comparisons it would be important to know on which average value these variations have to be added. Although model results are presented (with diurnal variations) these model data cannot be used to give more insight into the 'true' experimental values.

The authors are presenting two different data sets that are not compatible and than try

to justify one or the other measurement set with model calculations. There are arguments for each of the two techniques used from comparisons with other data measured at the site but these comparisons are probably subject to similar uncertainties. The quality of the comparison data (acetaldehyde / formaldehyde ratios) is not stated in the paper. If, as the authors claim, it is difficult to measure formaldehyde I would expect the same arguments for acetaldehyde as well. As recent intercomparisons (C.Hak, ACP, 2005) show several different HCHO techniques can be used to yield comparable results.

The paper relies strongly on the quality of the experimental data that is, according to the authors, not well defined due to unknown experimental problems. Instruments seem to agree in the laboratory but to disagree in the field. This disagreement indicates that either the varying temperatures of analyzed gases or instruments or water vapour contents in the field maybe responsible. Also critical are long inlet lines especially in maritime environments. Sea salt layers in the inlet lines or sea salt in the zeroing valves can significantly change the transmission. There is no information in the paper whether and how the inlet lines are kept clean or are checked for transmission during the campaign. Sampling artifacts have to be considered and discussed and may lead finally to a better data set, if the appropriate information is available several years after the campaign.

Special comments Calibrations have been performed with dilution of permeation gas with UHP nitrogen. This ‘absolutely dry’ dilution gas may change the sensitivity and zero background of the wet chemical instrument. Whetther the GC system is affected I don’t know.

The sampling lines of both instruments were placed at different altitudes. In case of deposition losses the lower inlet line UoL would see always lower concentrations.

The stripping coil of the Hantzsch technique working at room temperature seems to be rather short for a complete absorption. Incomplete sampling can in principle be cali-

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brated but only when the sampling temperature is kept constant or at least known. The commercial unit used by Weller (2000) thus works with constant low temperature (10 degree C). Cardenas et al, (2000) as reference give a detection limit for the technique of 85ś49 ppt. How is the detection limit of the instrument for the Mace Head experiment. Is it the same instrument used in the Cardenas (2000) measurements? This number can be derived directly from the span and zero readings from the campaign.

Modelling section 4.3., page 12550 Planetary boundary layer height and deposition velocities are stated as uncertain. Where are the 800 m taken from. What would be the variability to be expected.

Figures Fig. 8a shows two days experimental data but it seems to be only one day model data. Fig. 8b indicates that there is a diurnal (24h) variation in the model as well. (see also Junkermann and Stockwell, JGR, vol. 104, 8039-8046, 1999, for data and model comparison on formaldehyde in the South Atlantic Ocean.

Table 1 The paper of Cardenas also contains TDL and DOAS measurements at Mace Head

References A new paper on formaldehyde intercomparisons was published recently (not yet available in July 2005). Hak, C., I.Pundt, S.Trick, C.Kern, U.Platt, J.Dommen, C.Ordóñez, A.S.H.Prévôt, W. Junkermann, C.Astorga-Lloréns, B.R.Larsen, J.Mellqvist, A.Strandberg, Y.Yu, B.Galle, J.Kleffmann, J.C.Lörzer, G.O.Braathen and R.Volkamer, Intercomparison of four different in-situ techniques for ambient formaldehyde measurements in urban air, Atmos. Chem. Phys., 5, 2881-2900, 2005.

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