Supplementary Information

Table S1 Ventilation conditions in the studied classroom during the field campaign. ON is when the ventilation was working, OFF is when it was stopped. ON/W is when the ventilation worked and windows were opened, and OFF/W is when it was shut down with opened windows. Black font is for working ventilation, green is when it is not working and red is to indicate the windows opening.

Date\Hour	05:10	08:10	09:45	10:10	11:45	13:30	15:10	15:20	16:15	17:10	17:15	17:20	18:10	18:57	20:10
25/02/2015	OFF	ON	OFF	ON	ON	ON	OFF	ON	ON	ON	ON	OFF	OFF	OFF	OFF
26/02/2015	OFF	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON
27/02/2015	OFF	ON	ON	ON	ON	ON	ON	ON	ON/W	ON/W	ON/W	ON/W	ON	ON	OFF
28/02/2015	OFF	ON	ON	ON	ON	ON	ON	ON	ON/W	ON/W	ON/W	ON	ON	ON	ON
01/03/2015	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF/W	OFF/W	OFF
02/03/2015	OFF	ON	OFF	ON	OFF	ON	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF
03/03/2015	OFF	ON	OFF	ON	OFF	ON	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF
04/03/2015	OFF	ON	OFF	ON	OFF	ON	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF

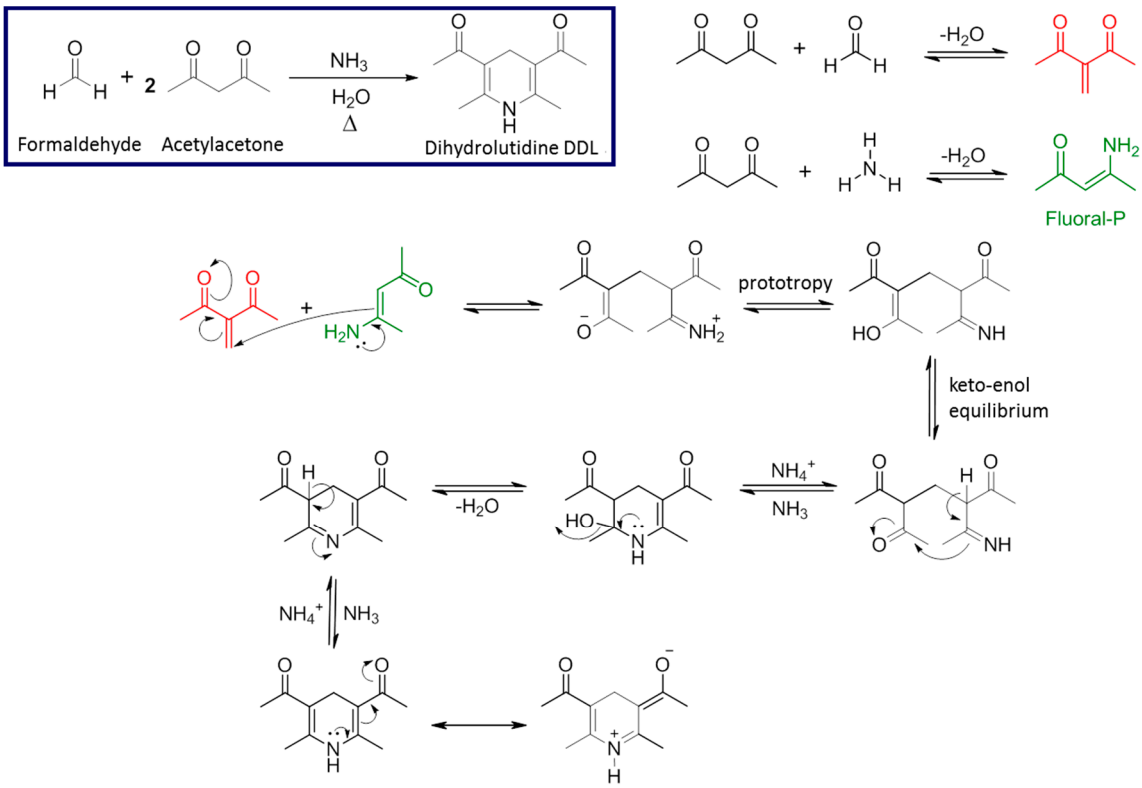

Figure S1: Balance chemical reaction for the reaction between formaldehyde and acetylacetone, producing dihydrolutidine (DDL).

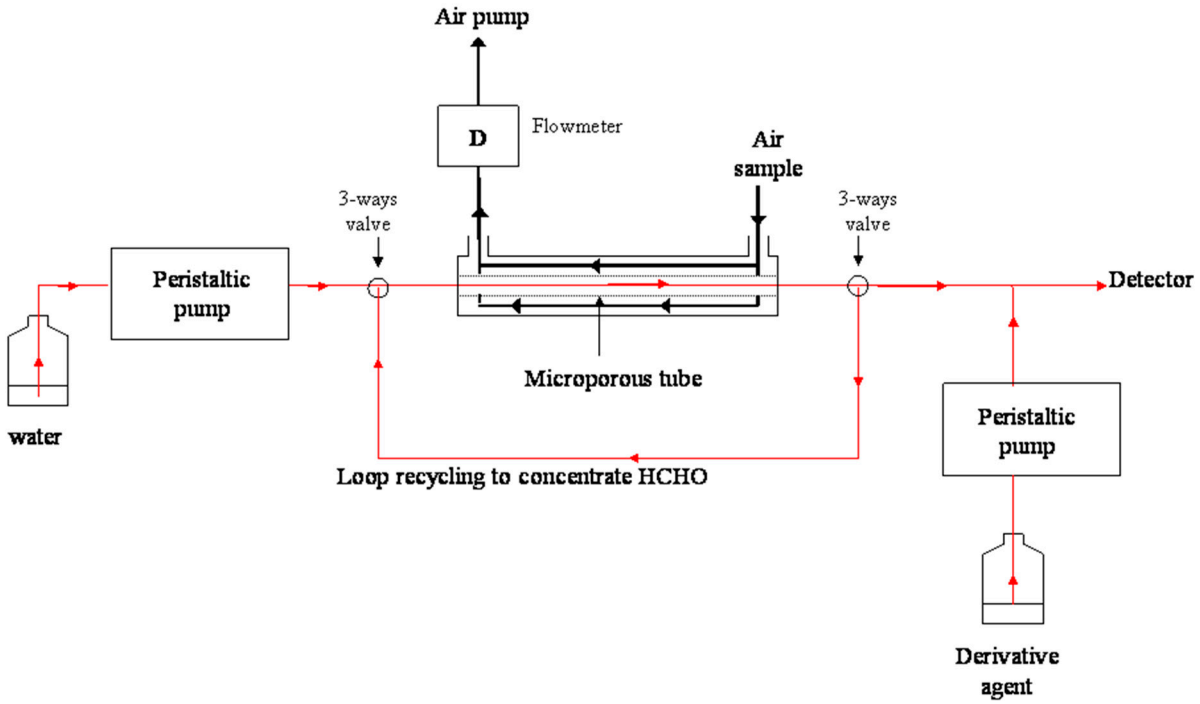

Figure S2: Schematic diagram of the formaldehyde uptake used for the first generation of formaldehyde analyser.

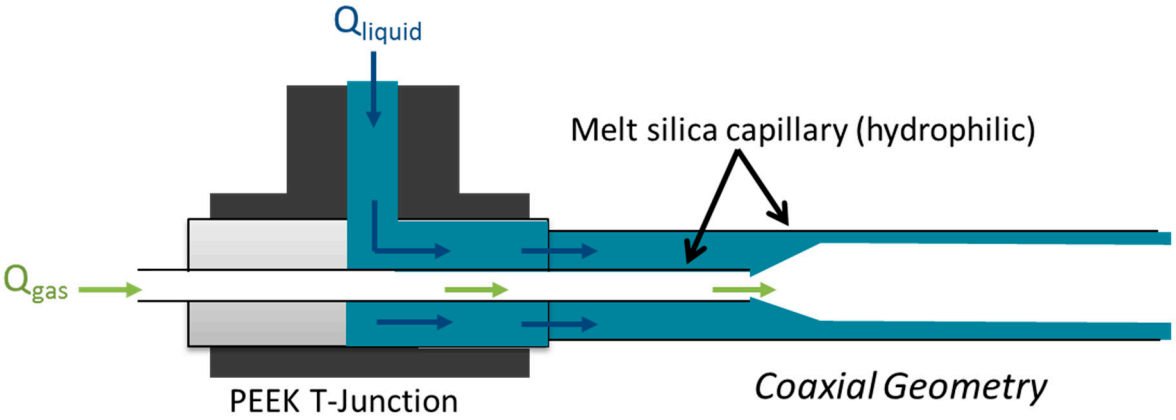

Figure S3: Scheme of the microfluidic cell, to obtain an annular flow.

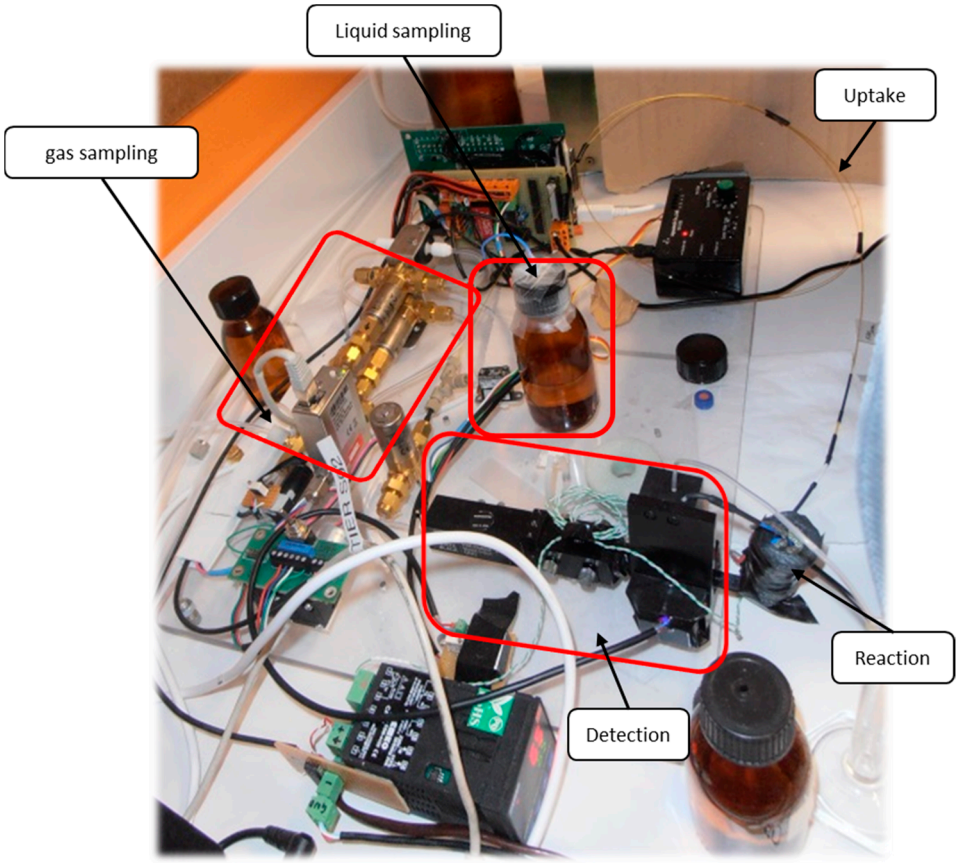

Figure S4: Picture of the formaldehyde micro-analyser prototype, during the field MERMAID campaign.

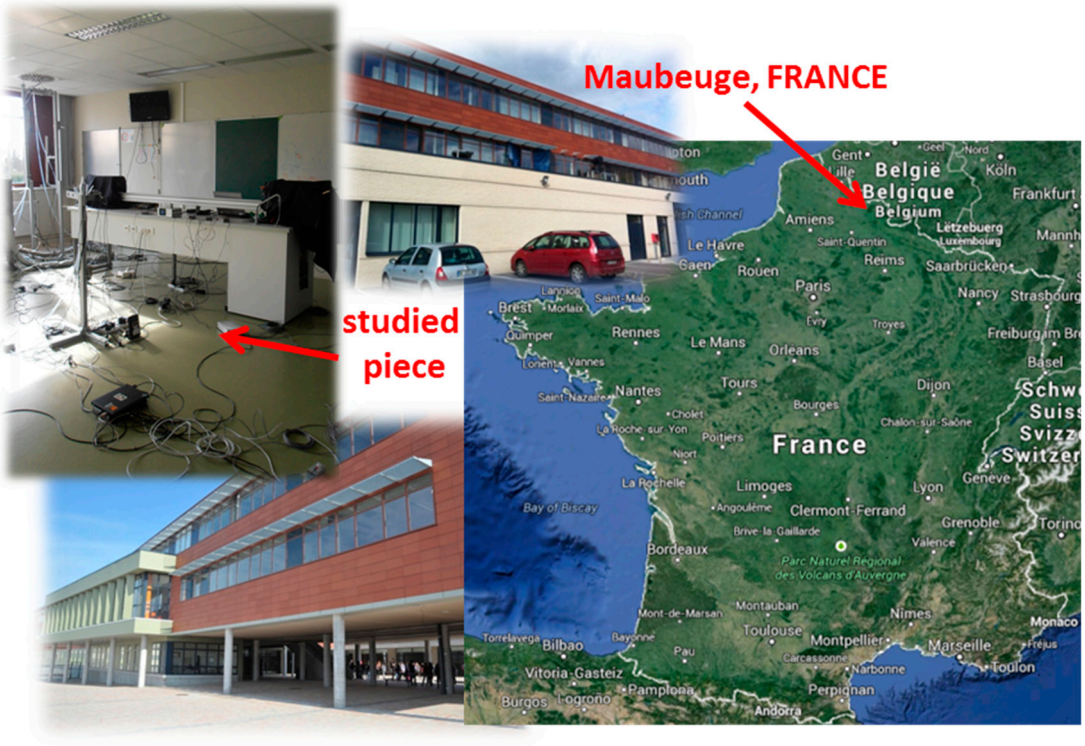

Figure S5: Picture of the VHEP College Vauban in Maubeuge (North, France).

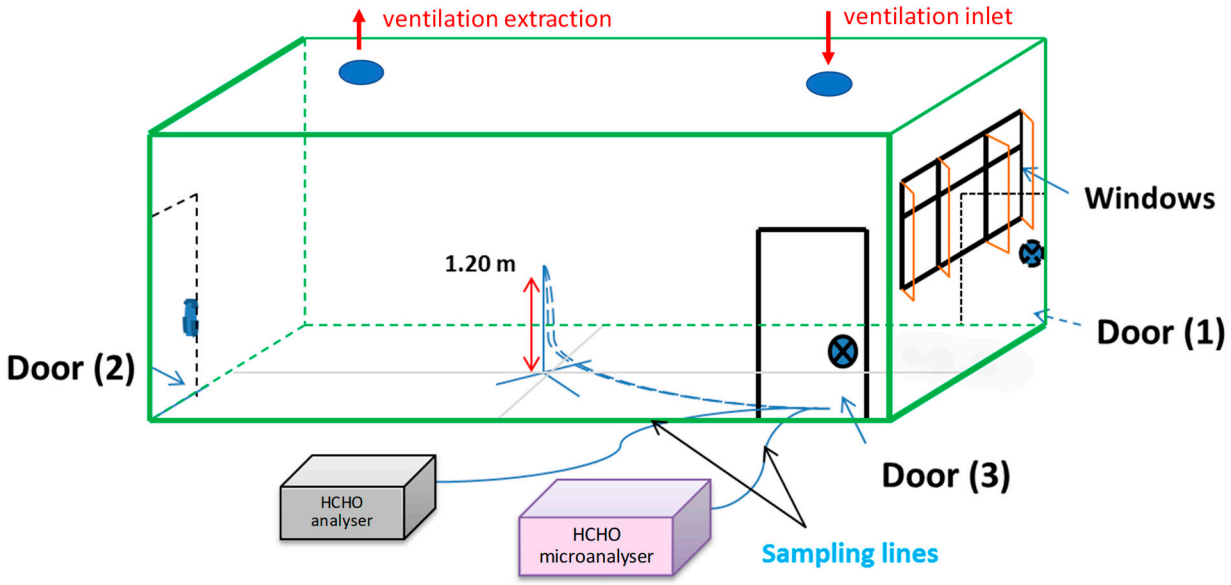

Figure S6: Schematic diagram of the chosen room investigated in this work. Instruments were installed in an adjacent room. Sampling was carried out using ¼" Teflon tubes via door 3. All sampling lines were placed at the same point in the studied room at 1.20 m above the ground.

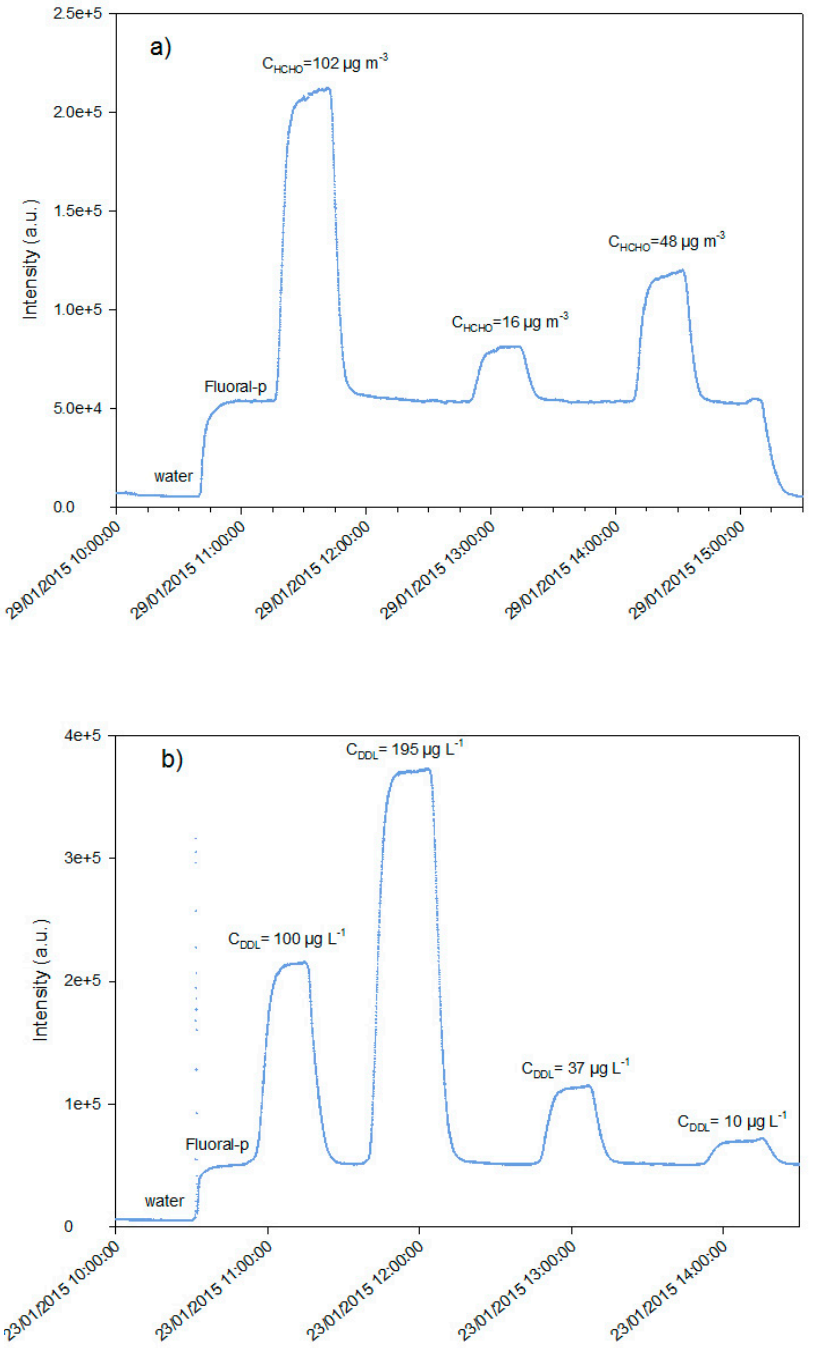

Figure S7: Raw signal obtained with the formaldehyde micro-analyser for a) gaseous formaldehyde concentration in the range 16-102 µg m^{-3} and b) liquid formaldehyde concentration in the range 20-397 µg L^{-1} corresponding to 10-195 µg L^{-1} for the detection product, using pure air (to replace gaseous formaldehyde) to obtain an annular flow, with gas and liquid flow rate of 20 mL min^{-1} and 17 µL min^{-1} respectively.

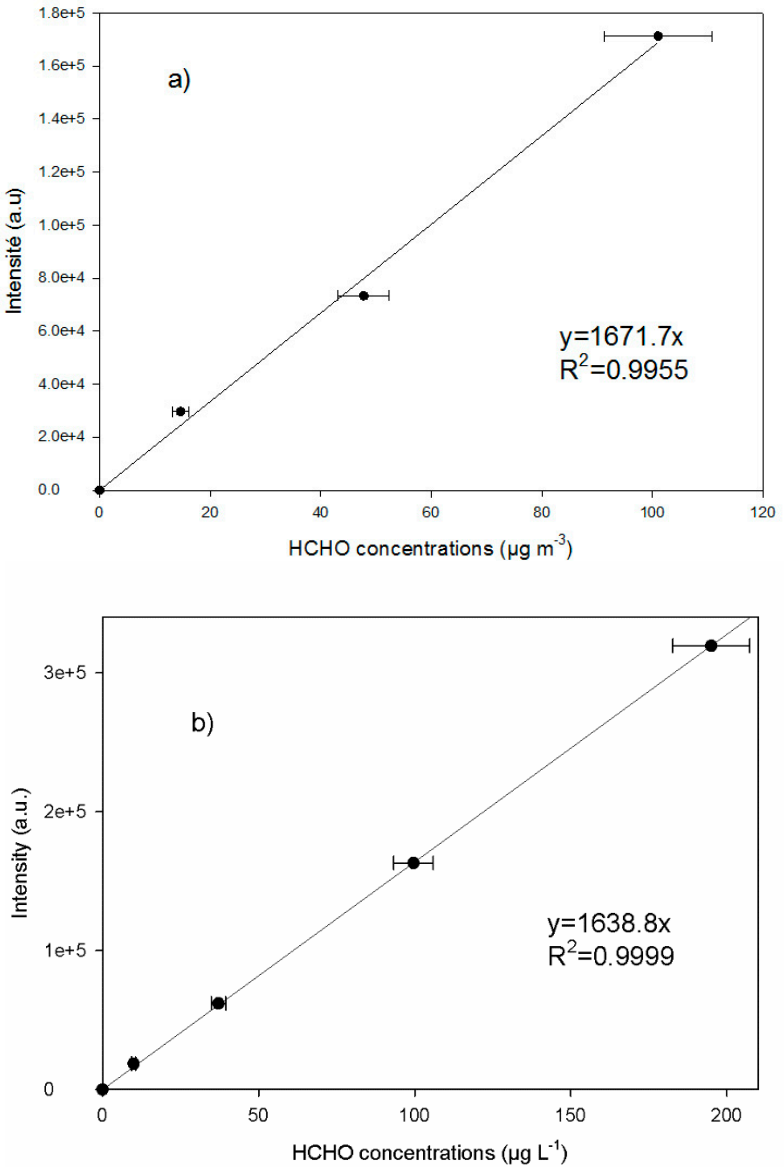

Figure S8: Calibration curves obtained with the formaldehyde micro-analyser with gas and liquid flow of 20 mL min^{-1} and 17 µL min^{-1} respectively for a) gaseous formaldehyde concentrations in the range 14-105 µg m^{-3}; horizontal bars represent the uncertainties of gaseous formaldehyde concentrations which are determined using the uncertainties of DNPH gaseous sampling volumes and HPLC/UV analyses (cartridges desorption, dilution and error on the calibration curve) and b) liquid formaldehyde concentrations in the range 10-195 µg L^{-1} using pure air (to replace gaseous formaldehyde) to obtain an annular flow; horizontal bars represent the uncertainties of liquid formaldehyde concentrations which are calculated using the mass uncertainties related to solutions preparation.

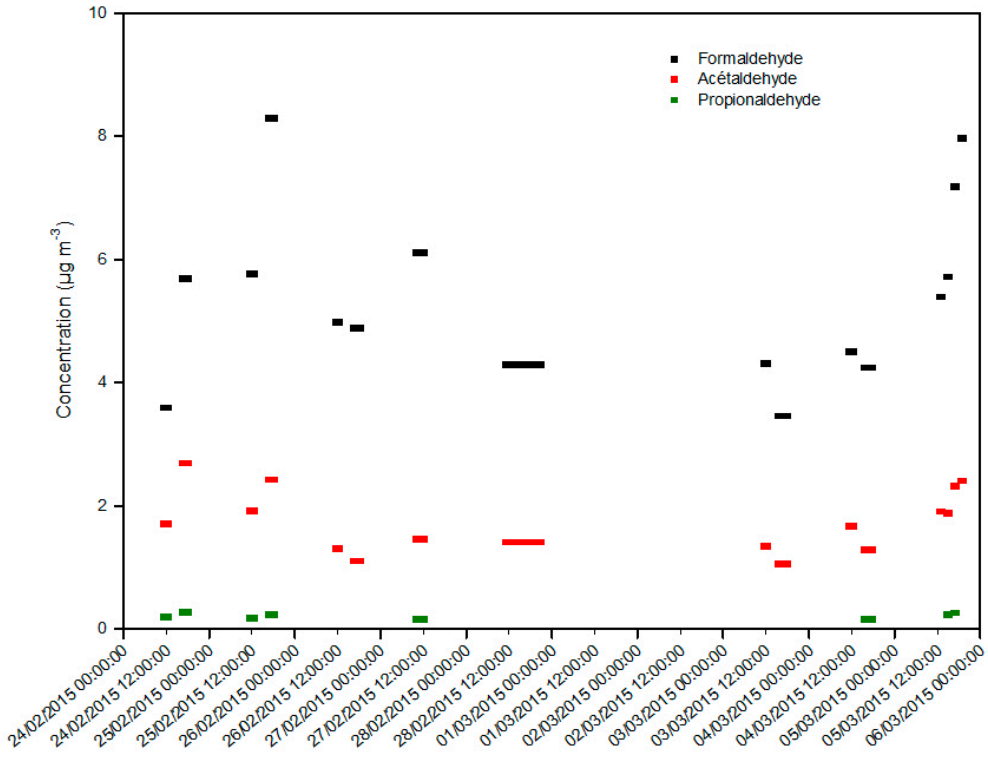

Figure S9: Variation of gaseous aldehydes concentrations measured at the ventilation inlet, for 11 days, using the reference ISO 16000-3 method.