level quantization on the collected statistics when the concentration is low — a point not mentioned in this paper.

(iv) p.22. When $2\alpha=0.05$ and $N=34$ the half-width of the confidence interval on the mean is only equal to 0.035, as stated in the paper, when $S=0.1$. Reference to the RMS concentration profiles in Figs. 23, 24 and 25 show that this is generally the case, but the implied condition on S should have been made explicit. It would not be possible on the argument used in the paper, to fix $N=34$ unless it were already known that $S=0.1$. Ayrault et al. must have had prior knowledge. On the other hand, the plot of S_{MAX} in Fig. 22 shows that $S_{MAX}>0.2$! Some explanation is called for.

(v) p. 24. The first sentence should read:
... defined by the ratio $I=\bar{C}S$ ...
for the sake of consistency.

I should very much like to know what Ayrault et al. have to say about the points I have raised.

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Authors' reply

Dear Editor,

We send you some responses to the comments of John Davies.

(i) With the indirect calibration procedure, the numerical results are considered as references. Our first mean image M1 is compared with the corresponding numerical results. The grey-level values, associated with the numerical concentration values provide the calibration curve C1. The aim of the indirect method is to obtain a linear relation between the concentration and the grey-level values. After four iterations, the relation is linear (Balint, Ph.D. Thesis, Ecole Centrale de Lyon, 1982). Unfortunately, each iteration corresponds to a loss of information. This is the main reason we have defined a threshold and considered only two iterations.

(ii) In our case, given the small number of samples, the skewness and the flatness pictures looked very mottled. The accuracy of these statistical moments is too low. A spatial smoothing, which is an image enhancement, cannot increase the accuracy of these results but only the visual perception of the pictures.

(iii) The skewness and flatness factors are classical in turbulence studies. Of course, we can also compute other factors and the standardised quantile excess function.

(iv) Concerning the heavy gas dispersion, the order of magnitude of the variability is unity (Chatwin, J. Hazardous Materials, 6 (1982) 213–230). For the evaluation of the confidence intervals, we took a value corresponding to about 10% of the initial concentration, the standard deviation being equal to 0.1. With this estimation, we define the number of samples, this was only an estimation. Figures 20, 23 to 25 represent concentration profiles for three different X values, whereas Fig. 22 presents the maximum of the standard deviation inside the pictures, for different times, i.e. for all X values. The upper values of S_{MAX} are not surprising and mainly situated inside the counter-rotating vortices.

(v) The variability $I = S/\bar{C}$ is defined by analogy with the turbulence intensity, for example $I = u'/\bar{U}$ (see also Chatwin).

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Editors' note

The Editors of this journal welcome discussions on the papers published in the journal. Discussions may be published as Letters to the Editor.