

## ***Interactive comment on “Intermittent heat instabilities in an air plume” by J.-L. Le Mouél et al.***

### **Anonymous Referee #2**

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The manuscript present an interesting experimental investigation of thermal plumes in a controlled environment. The most peculiar novelty of this work is the location of the experiment, which is in a naturally thermally stable room of an abandoned underground quarry. The authors performed a quite exhaustive series of measurements to characterize the properties of the thermal plumes generated by one source. The description of the experiment is quite clear and concise, and the results drawn by the authors are described in terms of temporal intermittency and its relationship with the instabilities arising in their set-up. The article is interesting and deserve publication, although a more thoughtful interpretation of the results in terms of physics of the system could be beneficial.

I have a few minor comments, which will be listed below.

\* lines 26-29 and 41-45: this sentence is repeated, please remove the second one.

C1

\* line 89: there is an extra space in the title II.2: "C alibration"

\* page 5: the authors should probably describe the stability of the source in terms of temperature variation, and presence of possible periodicity, which could affect their results. This is perhaps a major point that should be described with care in the text, and possibly tested in the lab.

\* Table 1, the entry in the lower-right case is missing the unit of measure.

\* lines 122-123: this description perhaps belongs to previous section?

\* line 130: what is the set-up S? It only appears here and should be commented.

\* line 134: the experiments last for 24 hours. Did the authors test at least in one case what happens for longer measurements?

\* lines 145-147: the lists of experiments should be sorted in alpha-numerical order (in the present version, A7 comes before A6), unless there is a reason for this order, and in this case it should be clearly stated.

\* line 159: Do the authors have any explanation for the difference between probes 4, 5 and 6? Is it depending on the position? Why?

\* line 204: there are two periods at the end of the sentence: "..".

\* page 15, section III.4: could the authors comment about their findings in this configuration?

\* line 259: the authors show the cumulative distribution.

\* line 304: the parameter  $UL/\nu$  is the Reynolds number. The authors should acknowledge that and perhaps comment in terms of laminarity/turbulence of the flow, as resulting from their estimate  $10^4$ ?

\* line 317: What is the consequence of the satisfactory agreement between  $F$  and  $F_0$ ? Could the authors comment on that more explicitly in the text?

C2

\* lines 332-336: did the authors look at the log-log plot of the spectra' does it present a power-law? This could be an interesting information to add to the article, even to describe the turbulence properties of the system (and given the high Reynolds number, I suspect it should be a power-law)...

\* page 7: the authors speak about instabilities, but they do not really refer or describe what particular type of instability is relevant here. Could they please spend some words on this?

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Interactive comment on Nonlin. Processes Geophys. Discuss., doi:10.5194/npg-2016-23, 2016.