General comments:

This study mainly showed that the peak intensity of FTICRMS is not a proxy for abundance and concentration. However, this is somehow common sense and should be already known to most researchers. The experiments performed by the authors nicely proved that peak intensity should be used with caution, especially for quantification. Again it is already well known. The author claimed that there are plenty of misuse studies of peak intensity, if this is true, I would suggest the author organize a table of literature to illustrate how serious this issue is. The simulation model is great but I highly doubt its applicability considering so many speculation factors were introduced, including random error, etc. Besides, this model was to evaluate the matrix effect on peak intensity, and seems that it can only be used as an educational tool for people to understand the bias of FTRCRMS in the quantitative study. How people can use it for their own samples? For the model part, I suggest the author simplify the sentences as it is hard for me to understand them and, if necessary, list the mathematical equations used for calculation. Add text to clearly and concisely describe what this simulation model is, how it can be applied to environmental samples, and how people can make use of it. This is very important because the model is the only highlight I can see from the manuscript even though it is very hard for me to understand all. I suggest a major revision for this manuscript and the author should pay attention to the concise of writing since the authors aim at people who are new in this field. For specific comments see below please:

The introduction part mainly described the diversity studies (yes or no question), then all of a sudden in the last paragraph, raised the concern of “quantification” (how much question), What is your point here? Could the diversity part be removed and more focused on how people used the peak intensity data incorrectly to support the concern of the authors?

The study lacks a “Method” part, including information on compounds, standards, instruments, etc. Please provide.

Sections 3.1 and 3.2 should be improved, use a scatter plot for Fig.4 instead so that you can simplify the text and make it easy for readers.

It seems that the homogeneity of the sample sets is not taken into consideration. Real-world within peak comparison might be more complicated if the studied set contains very heterogeneous samples.

L75: There was only one paper cited, but later sentence uses “these studies”, add more papers please.

L113: “Using consistent sample concentrations” is impossible

L145-L146: Add text to describe what samples, what compounds, and what chemical standards.

L268-L269, list the publications that misuse peak intensities

L369: add literatures

L275-L276, why do you choose 100 and 1000 peaks? Where are these peaks from? From what kind of samples?

Figures: Be consistent, either use figure and Fig, do not mix the usage

Fig.4 Please change it to a scatter plot and give a correlation value (R2), this can help people understand the relationship between intensity and concentration. In fact, in lines 162-163, the author also suggested a calibration curve, why not do it for this study? What is relative intensity?

Fig. 8: How do you get the observed difference? How is the true difference calculated? The R2 in Figure 8C is questionable: although the value appears to be high, it's obvious that the independent variables are heteroscedastic.