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Interactive comment on "Dynamic Spectra of Small-Mass Meteors" *by* Emma R. Mirizio et al.

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The authors would like to thank the reviewer for their comments that will greatly improve the manuscript.

The luminous efficiency can vary based on meteor composition due to bright spectral lines from a particular element (Borovicka, 1994). This would change the generally accepted values of luminous efficiency for each case rather than the wide variety of values currently used.

We will clarify the meaning of "common" and add a reference: "Commonly observed bright spectral lines in sporadic meteors correspond to elements such as Mg, Fe, Ni, and Na as well as smaller abundances of Ca (Harvey, 1973)." Added additional Borovicka references.

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A statement of goals will be added: “The goal of this data collection and analysis is to find the composition and search for differential ablation for a sample of meteors using the observed spectra, as well as estimate the mass, velocity, and brightness of each meteor using optical data. In addition, this acted as a proof-of-concept study to push the limits of our imaging technology for observing the smallest meteors for which spectra could be resolved.”

The stellar calibration resulted in a good fit, and adding additional dimmer stars to the calculation did not improve the fit or values for determining the lower bound of mass. Due to the speed at which meteors travel over the detector, it is possible that the magnitudes are underestimated when determined from the more static stars (Rendtel, 1993). This reference suggested by the referee will be added.

In the results and conclusion sections, we will add a figure of the image of the spectra and greatly explain the calculations made. This sample was not found to be associated with any meteor shower, which resulted in defining the sample as consisting of sporadic meteors. For future work, adding radar measurements or triangulation would greatly improve the analysis. This would allow for estimates rather than lower limits on parameters such as velocity and mass. The additional figure should clarify the conclusions.

From the referee’s minor comments, we will clarify the language of “faint” and the resolution of the spectra. Also, additional references are included in the discussion of differential ablation. In terms of the error associated with the values in the table, due to the lack of triangulation, the velocity and mass will be limits rather than estimates. We will clarify this.

The additional references the referee listed will be further analyzed and included, such as the additional Borovicka papers, Trigo-Rodriguez papers, and Ceplecha papers.

The manuscript has been significantly reworked to better explain the process of taking the images and finding meteor composition.

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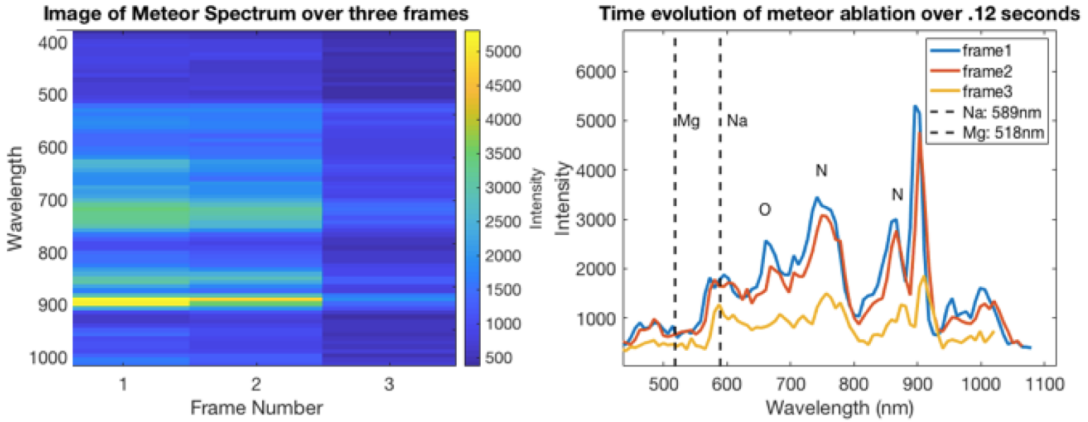

Fig. 1. Image of the spectrum of the same meteor as in Figures 4 and 5 visualized in with the intensity of spectral lines as brightness deceasing over time (left) and as line plots (right).

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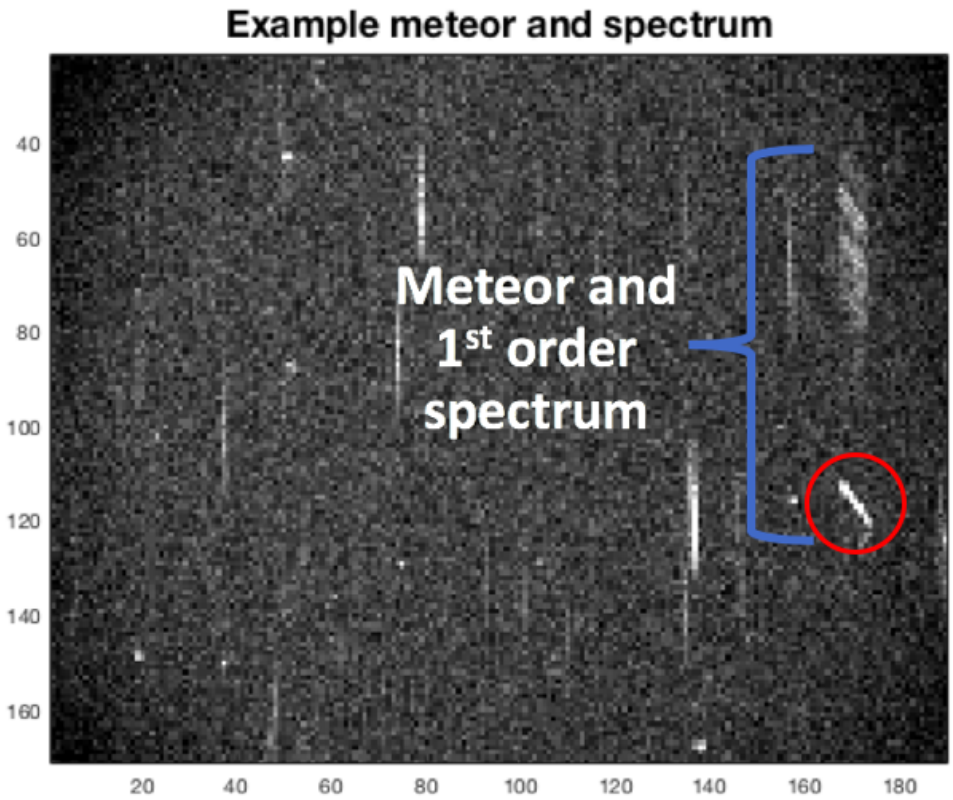

Fig. 2. An example raw image of a meteor and its spectra (left) that is uncalibrated and unflattened with the zeroth order image of the meteor circled in red.