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Interactive comment on "Mesospheric gravity wave activity estimated via airglow imagery, multistatic meteor radar, and SABER data taken during the SIMONe–2018 campaign" *by* Fabio Vargas et al.

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We appreciate the reviewer for taking the time to read and make suggestions for the present manuscript.

I understand the reviewer's concern about having written the manuscript in an abbreviate style. Maybe because we wanted to make it concise, we have failed while specifying important parts of the analysis and processing, which must be described precisely to permit the reproduction of the results.

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The incorporation of error bars in the spectral analysis could be found from our simulations of the error propagation into gravity wave parameters in our recent paper (Uncertainties in gravity wave parameters, momentum fluxes, and flux divergences estimated from multi-layer measurements of mesospheric nightglow layers, https://doi.org/10.1016/j.asr.2018.09.039.)

For the small scale analysis using the autodetection method, we have defined as a gravity wave event the output of the cross-spectrum of two time-difference images when the special peak is larger than 10% of the total energy of the spectrum. two time-difference images are generated from three light frames of the airglow (please take a look at fig 01 for Vargas et al 2009 attached here as supplement, https://angeo.copernicus.org/articles/27/2361/2009/). Thus, if a wave is detected in a given set, it is considered an independent wave detection. Now, if in the next set another wave detection is made, the only way to tell the two events to correspond to the same gravity wave is by comparing their wave parameters. Now, the momentum flux of a wave varies as it goes through the field of view. thus, considering the momentum flux average of all the waves detected during the campaign would be the same as clustering the corresponding wave events into a distinct wave, and then averaging the momentum flux for that specific one for the duration of the event over the airglow images where it shows up, and then averaging over all the distinct wave events, just would be more laborious. We have a clustering algorithm that does work for us, but still, we choose not to do it here.

Regarding the SABER data, we did not acknowledge the SABER team in the proper section, but we should have. We have not offered coauthorship to the SABER team indeed. We are not aware it is required to offer coauthorship and thought an acknowledgment would suffice.
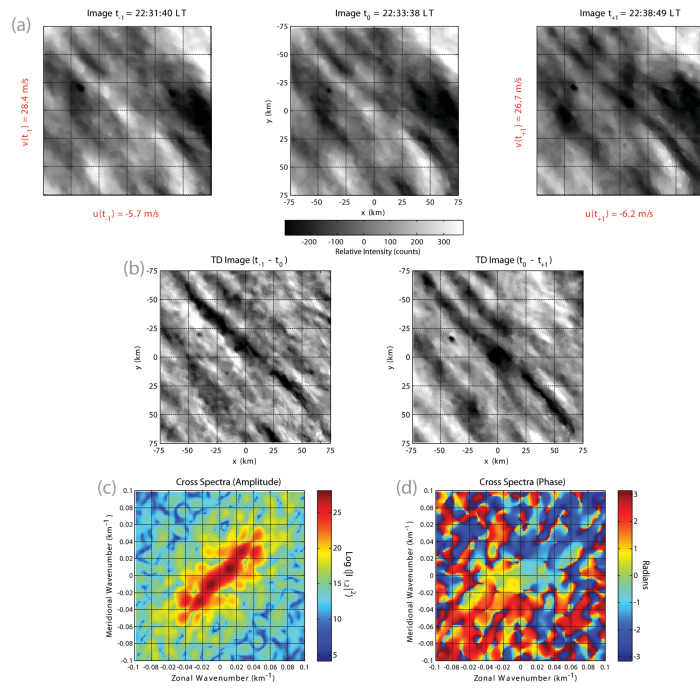
Fig. 1. Processing of a set of three airglow images in order to obtain the cross spectra. In **(a)** it is showed a set of sequential OH images presenting GW structures. **(b)** Time difference images obtained from the set of images. **(c)** Amplitude cross-spectra of the TD images, from where we estimate the wave amplitude, propagation direction and horizontal wavelength. **(d)** Phase cross-spectra of the TD images showed in (a).

Fig. 1.

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