

Authors' Response to Report #1

The authors would like to thank the reviewer for their time, dedicated attention to detail, and thorough review of the manuscript. Below are the reviewer's specific comments retyped in *black and the italicized* style with corresponding response indicated in **blue and bold**. Once again, the authors want to offer their sincere gratitude to the reviewer for their contribution to ensuring this paper's quality and relevancy.

- Authors Brandon C. White, Brian R. Elbing, and Imraan A. Faruque

Abstract = “Hasproviding” – one word?

This line has been revised as “GLINDA has been deployed with storm chasers beginning in May 2020 and has provided real-time automated monitoring of spectrum and peak detection.”

L48: Why is there a tilde over 1 Hz?

The line has been updated from “Bedard (2005) showed that ~1 Hz infrasound emissions followed the available radar observations associated with a tornado.” to “Bedard (2005) showed that infrasound emissions of ≈ 1 Hz followed the available radar observations associated with a tornado.”

P6L110: What are the deployment conditions during the measurements? Are there any potential acoustic interference from other equipment or environment noise (e.g. weather radar, truck engine, traffic or nearby industrial)?

The external deployment conditions vary spatially as the chasing vehicle moves during intercept, therefore noise from elements such as traffic, industrial, and/or natural sources may be represented differently across the time series data while intercepting. In the measurements presented for the Lakin tornado event, these external sources are expected to be of mitigated concern due to the geographic setting being a largely open field/farm area (reducing industrial noise and traffic).

As opposed to the spatially distributed sources, truck and other sensor noise is in constant relative position to the GLINDA system during all time of operation. While many sources of measurement noise (inverter 60 Hz signal, human speech, etc) are above the frequency band of interest, any signals which may be regularly seen in operation over 1-100 Hz can be considered in noise floor measurements. This is a driving motivator to the contents of Fig. 12 where measurements during the life of the tornado are compared to 1 hr before and after tornadogenesis. The apparent rise over tornado-infrasound frequencies is above the noise floor of all internal noise (represented by the blue, Pre-Event curve).

P7L137: What are the test conditions of the measurement shown in the spectrogram of Fig.5? The Figure should be introduced in more detail, such as meaning of F_{res} and T_{res} in the title.

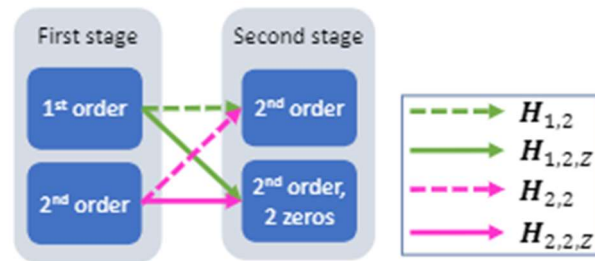
The paragraph has been revised to improve clarity. It now reads, “The primary visualizations of the data are a spectrogram displaying near real time frequency decompositions and a maps API displaying the location of the storm chasing unit via GPS. Figure 5 shows a demonstration of these visualization capabilities with simulated inputs. In the spectrogram, F_{res} and T_{res} represent the size of the frequency and time bins respectively.

L164: “fixed frequency domain resolution over the 0 to Nyquist frequency range.” I’m not sure I understand this sentence.

This statement has been revised as follows: “Traditionally the frequency decomposition of a time-domain signal is performed using a Fast Fourier transform (FFT) which returns a frequency domain representation of the data with linearly-spaced frequency points over the frequency band $f_{FFT} \in [0, f_s/2]$, where $f_s/2$ is commonly known as the Nyquist frequency.”

P9L183: Fig. 6 is missing(?). Only a caption appears.

Figure 6 has been appropriately compiled into the document and now appears above its appropriate caption. It is additionally included here for reference.



P10L196: The storm chaser “intercepted” the tornado before its generation. Is this sentence means the GLINDA system captured the characteristic infrasound of the tornado before its touchdown? If so, could the author provide the accurate time difference (instead of “shortly”) between acoustic interception and physical tornadic touchdown? This is very valuable data.

During the lead-up to tornadogenesis, the storm chasing vehicle was en route to the site of rotation. In general, the “intercept” or time window with chasers at the identified measurement proximity to the site of the tornado occurred approximately 2-5 minutes before the tornado touched down. The impacts of spatial rate of change on propagation of infrasonic signals and its measurement are not well known at this time and the subject of ongoing study which includes notable uncertainty. Once intercept of the tornado was established by the chasers, the vehicle remained largely stationary with panned video coverage resulting in expected reduced process noise.

This line has been revised as “The storm chasers, equipped with GLINDA, arrived to the intercepting location for the tornadic storm system approximately 2-5 minutes prior to tornadogenesis. The intercepting storm chasers were located approximately 4 km SSE of the tornado during tornadogenesis.”

P18L293: In conclusion, the term GLINDA has been already defined in previous P3L58, which is a different definition.

The conclusion has been updated to reference the full name of “Ground-based Local INfrasound Data Acquisition (GLINDA) system” as in earlier text.

P18L307: The “past observation” may need reference.

A reference to the earlier discussion of section 2 is included as “The spectral content shows an elevated signal during the tornado spanning 10 to 15 Hz, consistent with past observations of small tornadoes as described in section 2.”

Figure captions, figure caption, figure property, math equation, and abbreviation. Examples are listed below.

P3L72: Usually, there is no one-sentence paragraph for academic writing.

This introductory sentence has been expanded upon to further clarify the content of the following paragraphs in the section. The introduction now reads “In this section, system design goals are identified, and hardware components, computational platforms, and data handling for collection and retention prior to analysis are discussed. Additionally, calibration procedures over the specific range of frequencies of interests are presented for the unit.”

P5L94: Figure caption usually ends with a period.

A period has been added to end the caption.

P9L172: Reference of equation should be Eq. 2 or Eqn. 2.

This line now reads, “The CZT, defined in Eq. (2), ...”

P9L179: Equation 2 does not have a punctuation.

Equation 2 has been reviewed

6.P12L225: Space is needed between number and unit.

Corrected from “500Hz” to “500 Hz”

P15: Fig. 14 axis’s labels need revision.

Font size has been reduced to be more in line with manuscript font size as seen below

