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Interactive comment on "Sensing earth and environment dynamics by telecommunication fiber-optic sensors: An urban experiment in Pennsylvania USA" *by* Tieyuan Zhu et al.

Anonymous Referee #2

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The paper shows an application of DAS measurement to permanent 2D network using dark fibers located in Pennsylvania Univ. State campus. The paper does not show really new results using DAS recordings, but it demonstrates quite synthetically how to turn a campus optical fiber network into a seismic network, its design and its sensitivity. This paper can thus serves as a reference for people interested in doing the same kind of experiment. However, in order to do so, the authors should reinforce the signal processing part with more detailed explanations, some demonstrations need to be clarified and they need to present figures in a way they can be used for comparison. Details are below.

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Discussion paper

Questions/remarks: 1) On line 130 (and figure 3) you explain your process to go from strain rate to velocity. At first sight, this operation should only require a single spatial integration. Can you explain in detail why you have to go through one time integration followed by one time derivation in addition to the 1/k integration? Could the process being done directly in the spatial Fourier domain using a high-pass wavenumber filter plus 1/k integration?

2) Line 139 mentions many factors that may influence waveform discrepancies. The authors mention the gauge length effect; it seems to me that the length of integration (40*2=80m) compared to much larger wavelengths may also play a role?. It would be interesting to give more details and to show a more qualitative comparison (e.g. coherency), or to cite references that analyze this in detail. Nevertheless, it is good to see that the scaling factor is correct.

3) The lower frequency band specified on line 202 is a bit optimistic. According to figure 8, there is not much energy available below 0.02 Hz to bring such conclusion.

4) Figures 8 and 11 show power spectra with arbitrary unit. Please specify what is the reference for the dB scale you show.

5) What is the interest of figure 1b on lower right (fiber end)? Is it very small and we cannot deduce any information from it.

typos: - Is reference Martin et al, 2019, line 54, page 2 correct? This paper doesn't seem to deal with Stanford array - missing word at end of line 103

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