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EGU21-12443
https://doi.org/10.5194/egusphere-egu21-12443
EGU General Assembly 2021

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Pascal Edme, Patrick Paitz, David Sollberger, Tjeerd Kiers, Vincent Perron, Cedric Schmelzbach, Andreas Fichtner, and Johan O.A. Robertsson
ETH-Zurich, Earth Sciences, Zurich, Switzerland (pascal.edme@erdw.ethz.ch)

Distributed Acoustic Sensing (DAS) is becoming an established tool for seismological and geophysical applications. DAS is based on Rayleigh scattering of light pulses conveyed in fibre optic cables, enabling unprecedented strain rate measurements over kilometers with spatial resolution of less than a meter. The low cost, logistically easy deployment, and the broadband sensitivity make it a very attractive technology to investigate an increasing number of man-made or natural phenomena.

One key restriction however is that DAS collects axial strain rate instead of the vector of ground motion, resulting in a poor sensitivity to broadside events like (at the surface) vertically incident waves or surface waves impinging perpendicular to the cable. Helically wound cables partially mitigate the issue but still do not provide omni-directional response as the typical vertical component of seismometers or geophones.

The present study is about the potential of using unconventional DAS cable layouts to replace and/or complement traditional sensors. We investigate the possibility of estimating the divergence and the vertical rotational components of the wavefield from cables deployed in a square or circular shape. The impact of the size of the arrangement as well as that of the interrogation gauge length is discussed. Real data are shown and the results suggest that DAS has the potential to offer additional seismic component(s) useful for wave type identification and separation for example.