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Distributed Acoustic Sensing (DAS) be able to replace classical seismic instruments?

The geophysics' field is seeing rapid development of new technologies, including Distributed Acoustic Sensing (DAS). This innovative technique attracts scientists and researchers for its ability to monitor and analyze geological and structural changes with high spatial resolution over large distances. Unlike traditional methods based on the use of stationary instruments, DAS allows to make data acquisition using a distributed network of sensors, which opens up new horizons for studying complex geophysical phenomena. Traditional geophysical instruments, although they have proven themselves over many years, often have limitations related to their mobility, accuracy and cost. In the conditions of the modern world, where monitoring and safety requirements are becoming increasingly stringent, there is a need to develop new approaches that could provide greater efficiency and flexibility in conducting geophysical research. DAS, due to its scalability and adaptability, is one of such alternatives. However, DAS technology is not ideal and a natural question arises: will virtual geophysical instruments based on optical cables really be able to replace traditional geophysical instruments in fundamental research in the future? The presented work attempts to answer this question, considers the basic principles of DAS operation, its advantages and disadvantages, and compares virtual seismic sensors with classical seismometers.

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