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Urban DAS recording of a vibroseismic campaign with a 21km-long dark fibre in Potsdam, Germany

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The de-carbonization strategy of the city of Potsdam, Germany, incorporates the utilization of its geothermal potential. As a first step of developing a deep geothermal project for district heating, an urban seismic exploration campaign of the Stadtwerke Potsdam took place in December 2020 in the city centre of Potsdam. Since urban measurements are often difficult to setup and a low-footprint alternative is sought for, we supplemented the contractor-performed Vibroseis survey along three profiles by distributed acoustic sensing (DAS). In close cooperation with the municipal utilities, we interrogated a 21 km-long dark telecommunication fibre whose trajectory followed the seismic lines as close as possible. This was accompanied by a network of 15 three-component geophones for further control and research.

In this contribution we present the data set, the approach for geo-referencing the fibre, and first results regarding DAS recording capabilities of vibroseismic signals in an urban environment. Following the paradigm that the high density of telecommunication networks in urban areas may facilitate the exploration of the often insufficiently known local geology, we strive to further shed light on the possibilities of their employment for urban exploration. In this respect we aim at tackling the question of the accuracy of fibre localization, recording sensitivity and range of active stimulation.