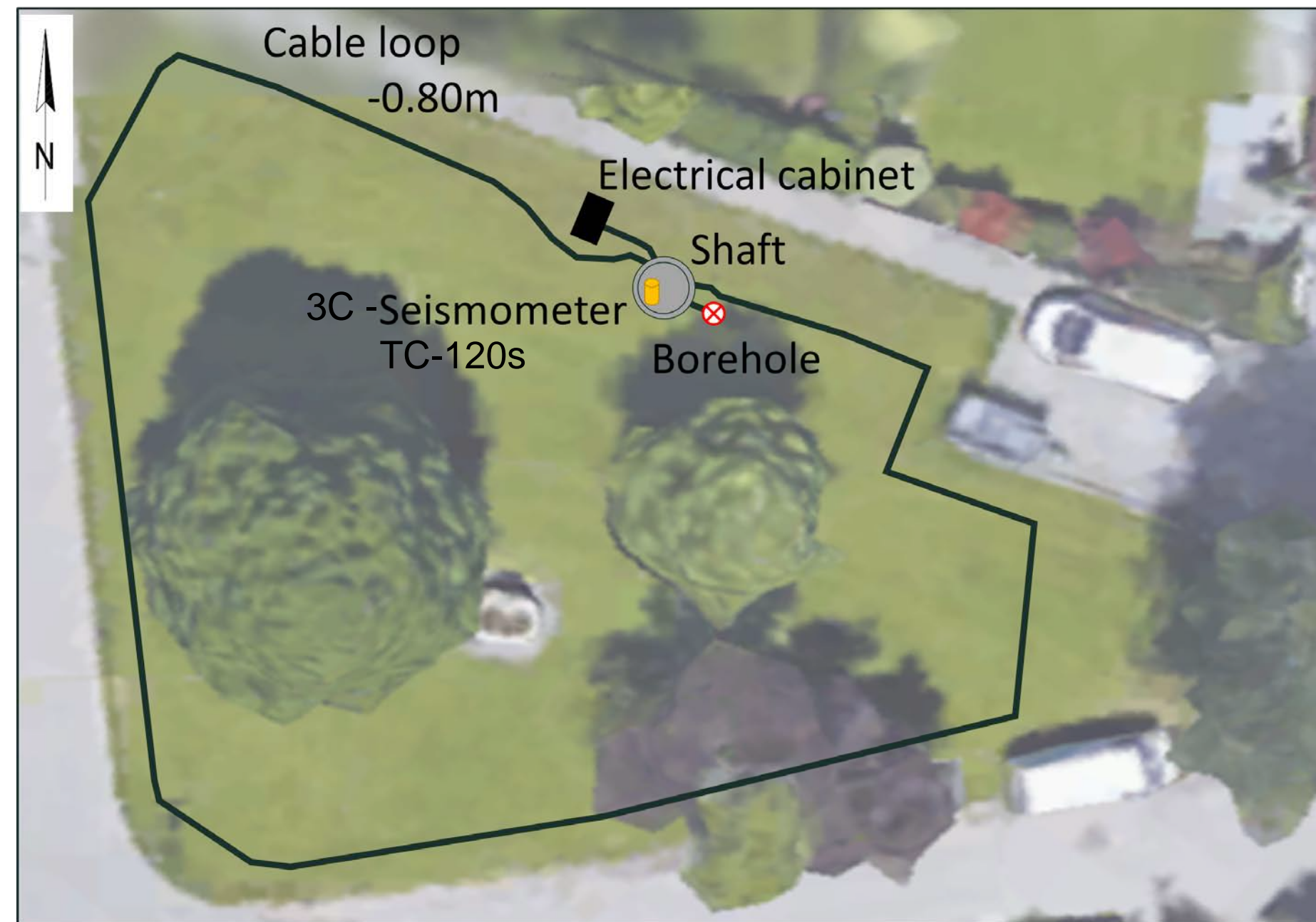
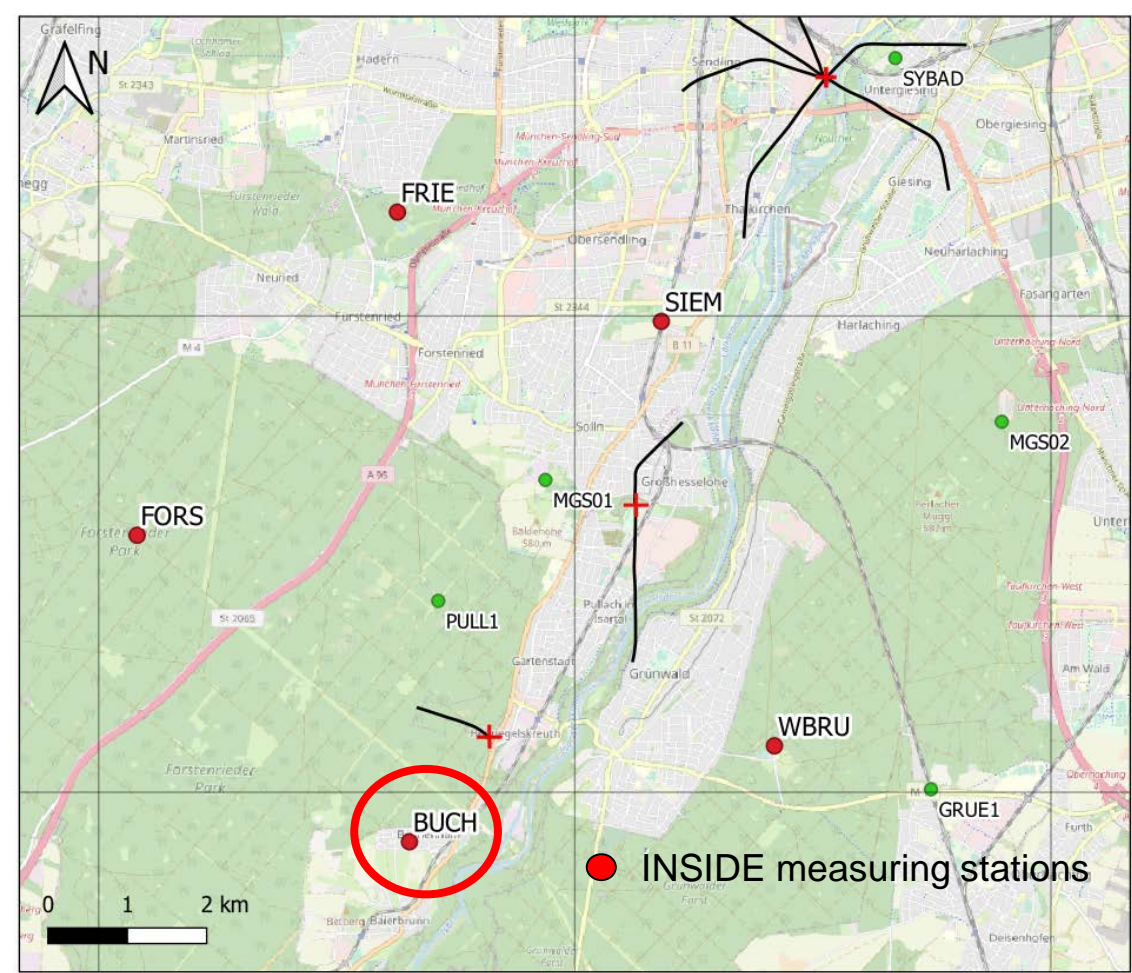


I. The measuring station: horizontal and vertical deployment of fibers



UPS (uninterruptable power supply)

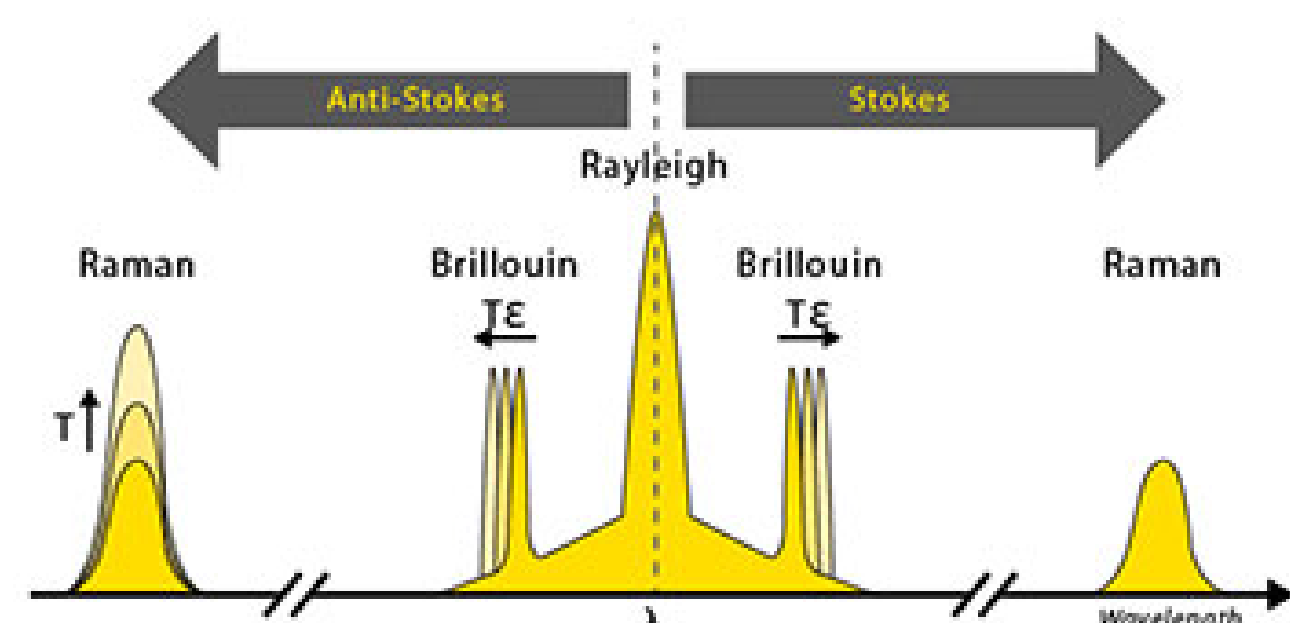
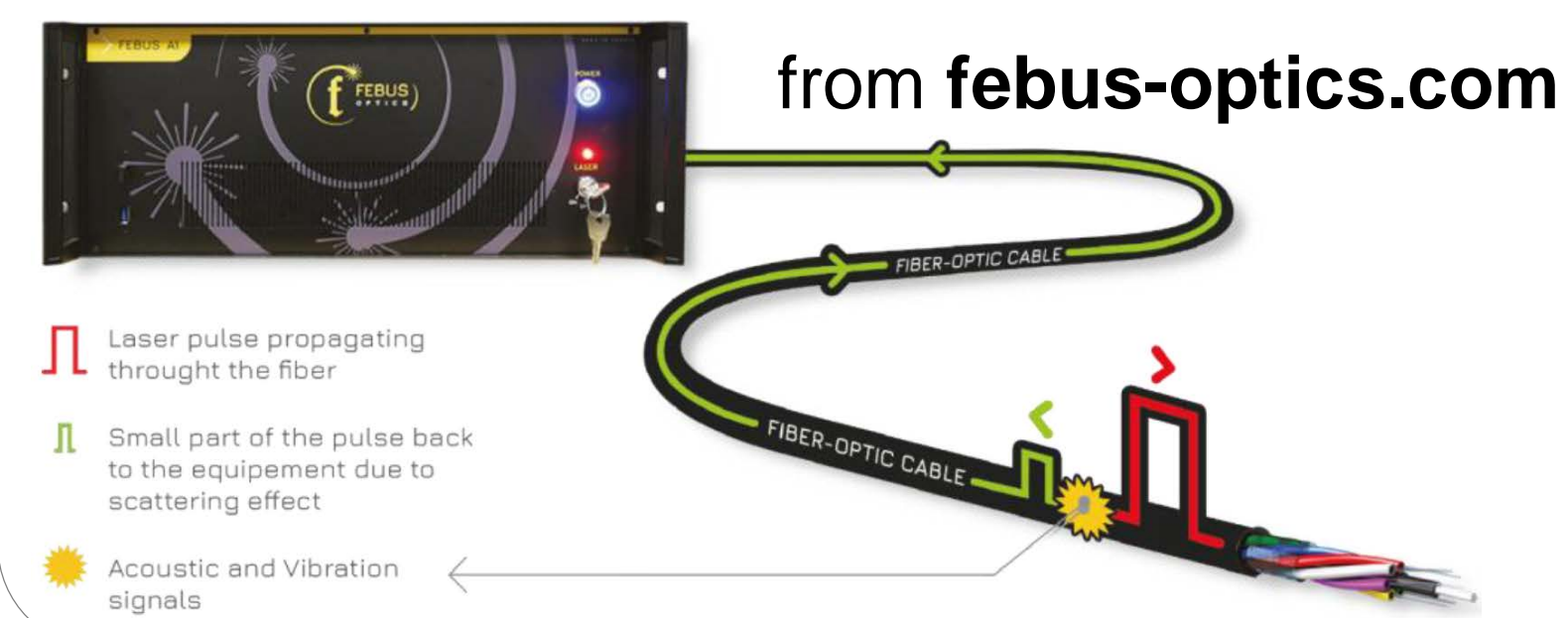
G1R (DTSS)

A1R (DAS)

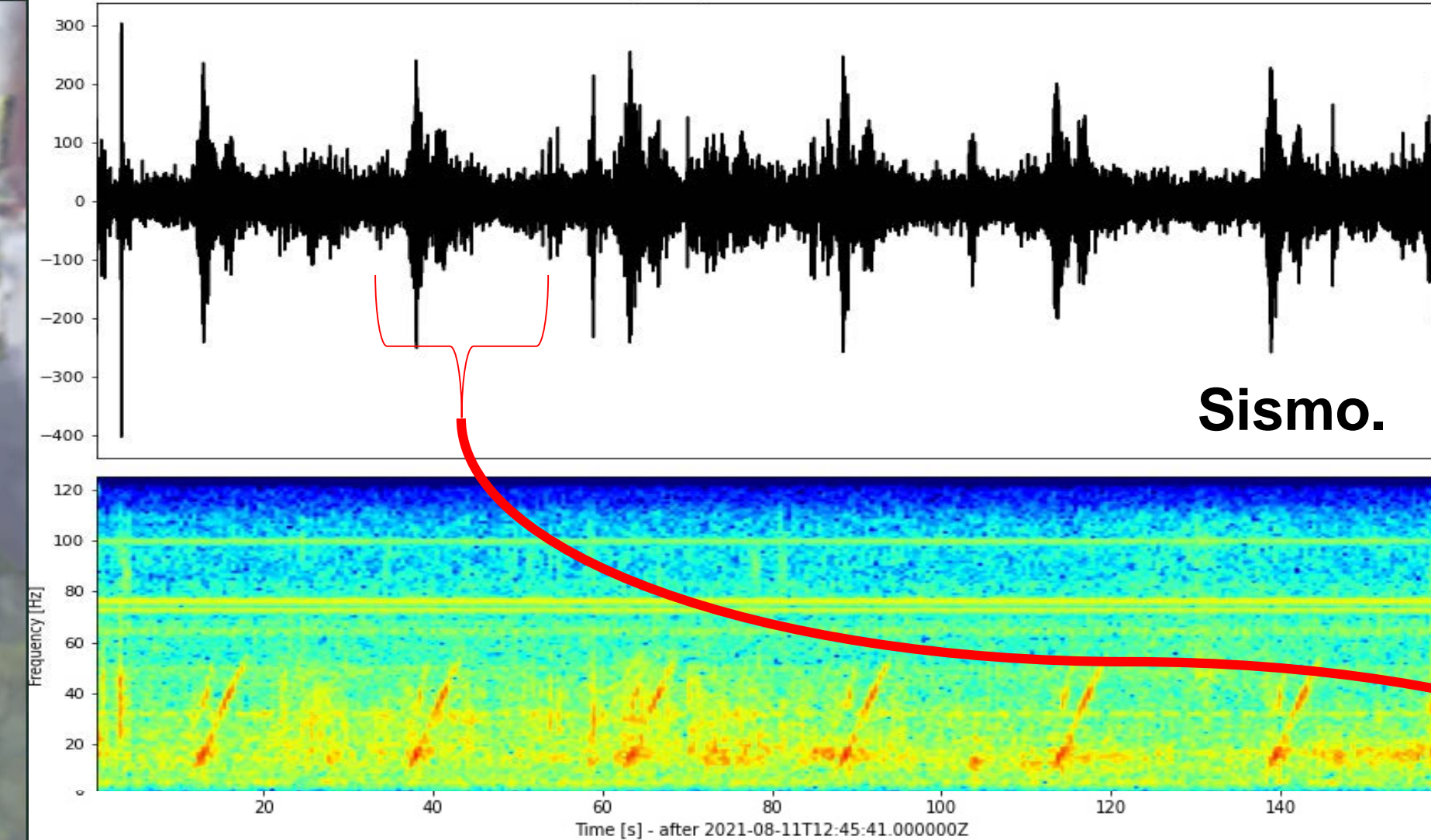
Data Recorder

II. Background: DFOS techniques, DAS and DTSS

DFOS: optical fiber is the sensing element ; measurements are based on scattering effects along the fiber and made using an optoelectronic device. **DAS:** dynamic measurement based on Rayleigh back-scattering, allowing to detect acoustic frequency strain signals over large distances. **DTSS:** static measurement based on spontaneous Brillouin scattering providing Temperature/Strain measurements



III. Recording of an active survey: vibro-trucks at less than 5km



<< Fig.1 Successive sweeps recorded by the BUCH TC120 seismometer

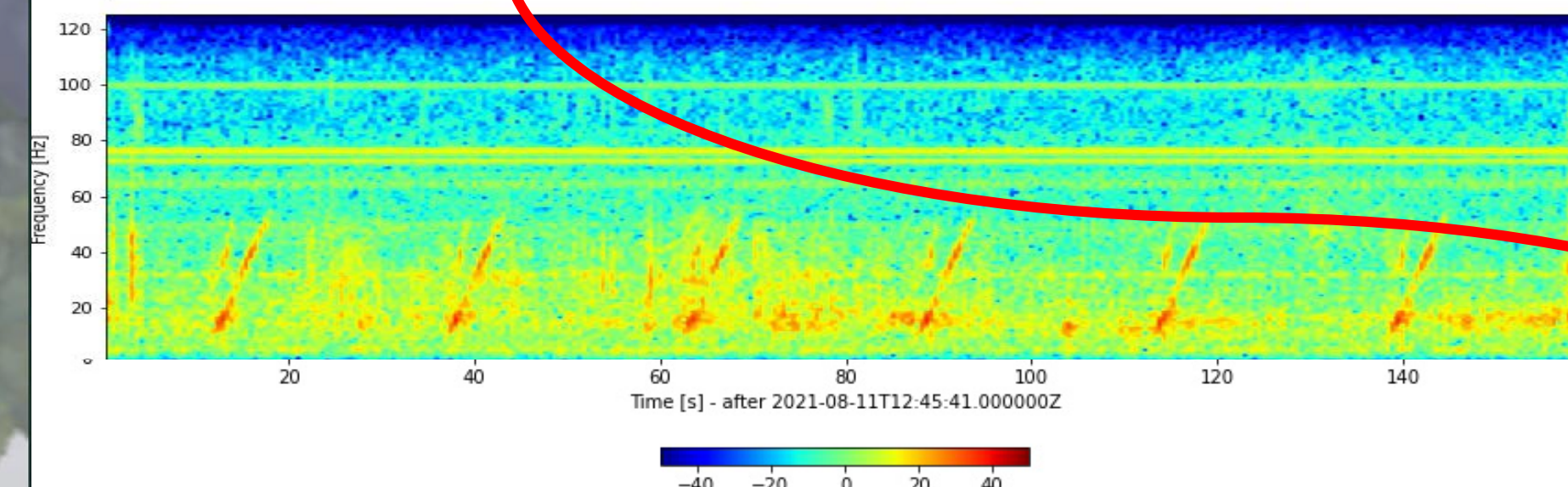


Fig. 3 >> Correlation function computed by correlation of single sweep (recorded by the TC120) and the 160s dataset of DAS data

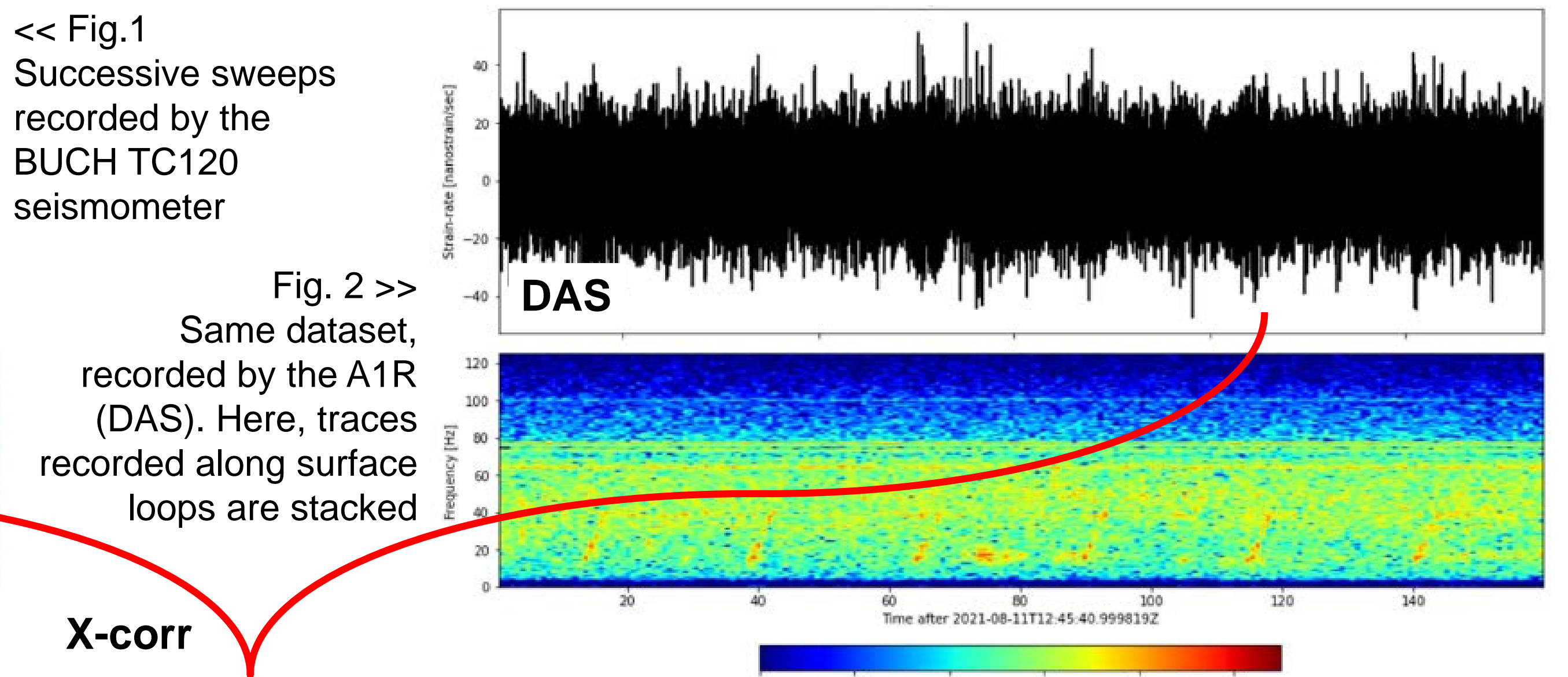


Fig. 2 >> Same dataset, recorded by the A1R (DAS). Here, traces recorded along surface loops are stacked

>> DAS measurements carry the signature of the sweeps (see spectrograms)

>> Cross correlation sequence highlights the comparable content of both measurements, and improves the signal to noise ratio

IV. Recording of regional and distant events: example of the M3.7 Udine event in October 2021

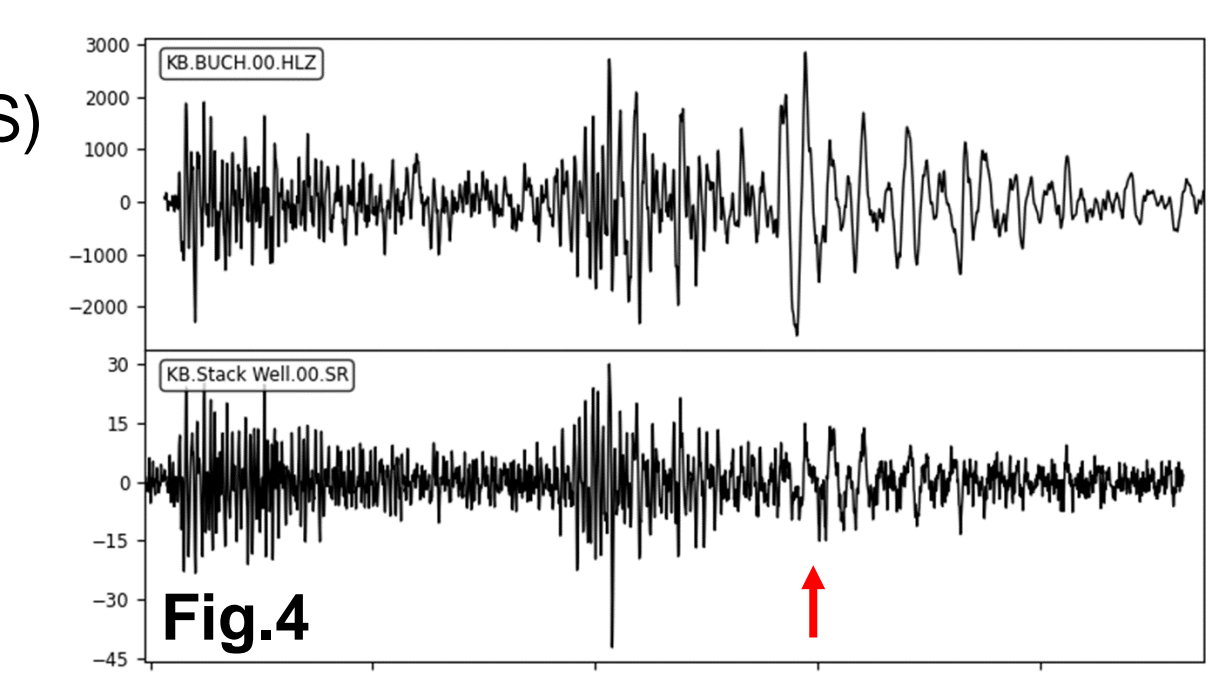


Fig.4

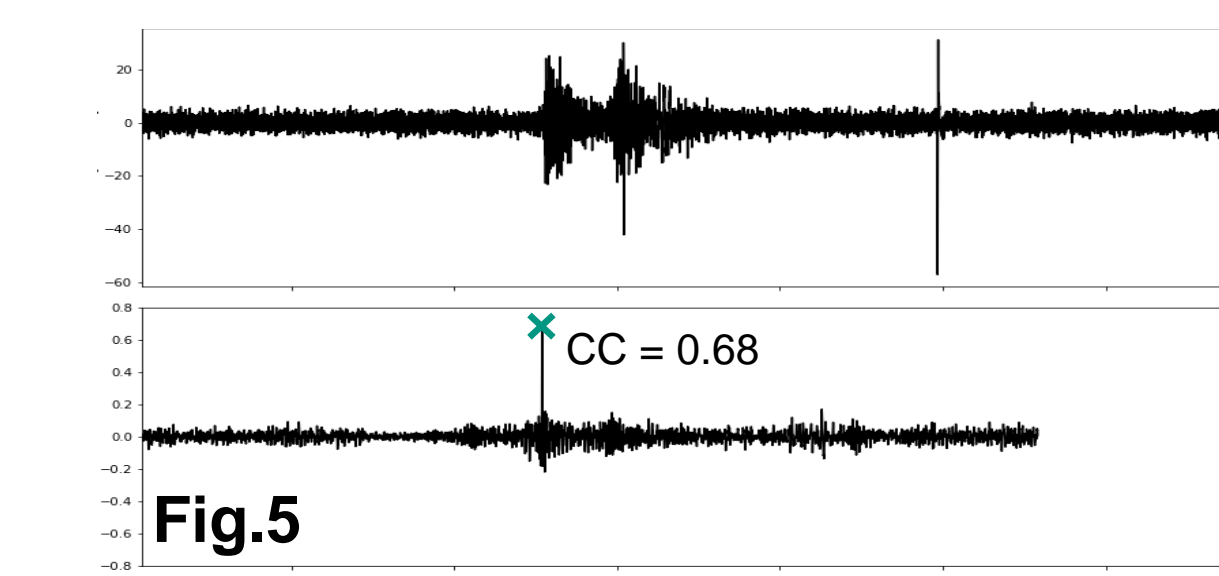


Fig.5

Fig.4: Comparison between signals recorded by the TC [m/s] and the A1R (DAS msts., [nε])
 Fig.5: DAS msts. (in large window) and cross-correlation sequence with TC signal of Fig.4
 Fig.6: Frequency representation of both signals displayed in Fig.4 with related power spectrums [m²s⁻²Hz⁻¹] and [nε.Hz⁻¹] respectively)

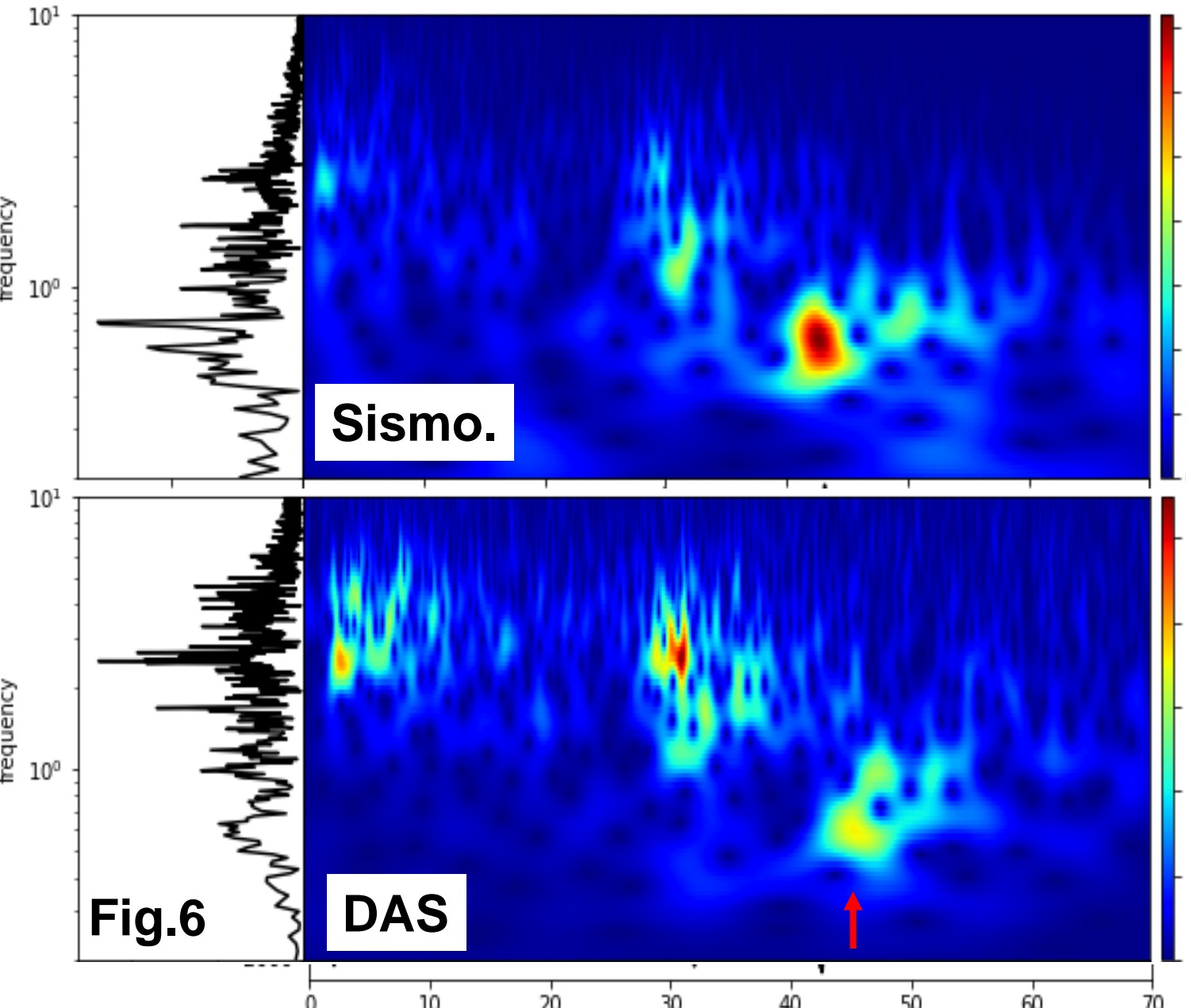
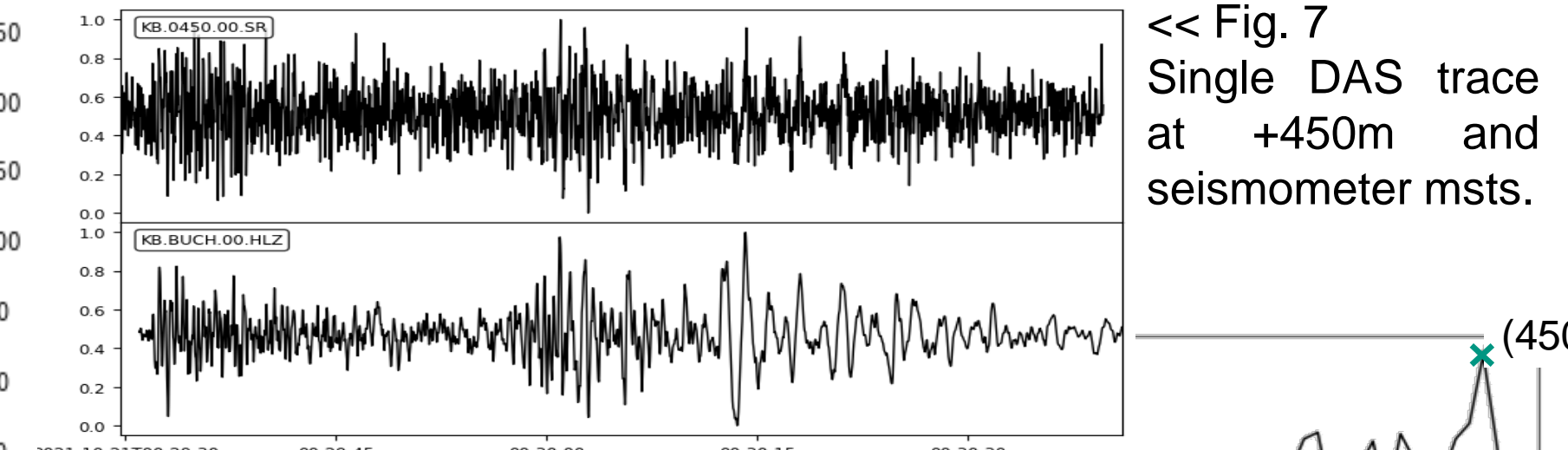


Fig.6



<< Fig. 7 Single DAS trace at +450m and seismometer msts.

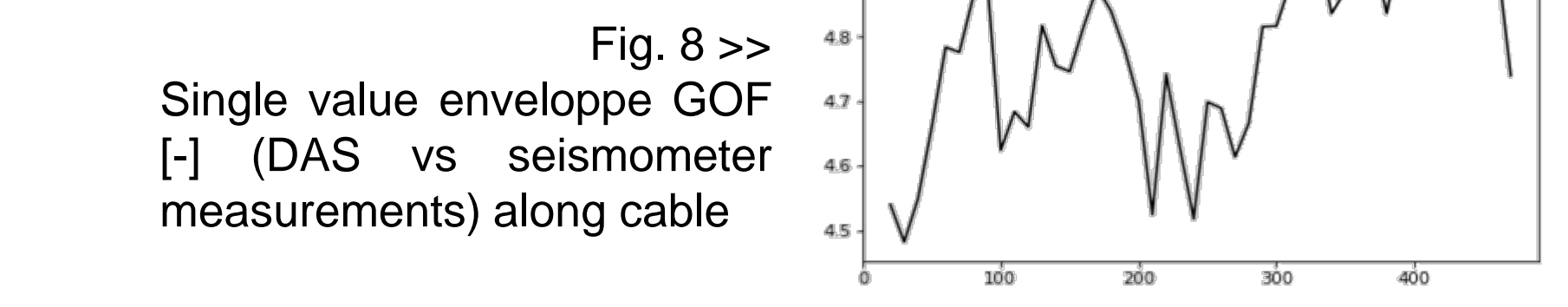


Fig. 8 >> Single value envelope GOF [-] (DAS vs seismometer measurements) along cable

- >> DAS msts. are noisier and less sensitive to lower freqs.
- >> Results on single traces variable along cable and less convincing than for stacked traces: loss of an advantage of the distributed msts.
- >> Recording of local (micro)seismicity: no available data yet ; recording of teleseismic events: limited sensitivity
- >> Improvement of data quality is foreseen (eg. removal of the common mode, denoising)