



DGMK Demo Dataset

Two example datasets consist of seismic data recorded during the seismic monitoring project in northern Germany by the Institute for Geophysics, University of Stuttgart, and funded by DGMK - German Society for Sustainable Energy Carriers, Mobility and Carbon Cycles e.V..

In the last decades, the region of northern Germany ceased from aseismic maps. According to the Federal Institute for Geosciences and Natural Resources - BGR (Bischoff et al., 2017), since 1977 in total 77 seismic events with local magnitudes (ML) between 0.5 and 4.5 have been observed in that area. Occurrence of most earthquakes in direct vicinity of natural gas fields could indicate that events are induced or triggered by gas exploration processes.

Beginning in 2014, several seismic small array and 3-c single stations have been installed in that area by the Institute for Geophysics, and delivered many years of continuous seismic data. For single stations one three-component seismometer (Nanometrics Trillium Compact, 20s – 3C = TC20-SV1) has been used while the mini-arrays have additionally three one-component short-period seismometers (Lennartz 1Hz MKII – 1C /LE-1DV MkII) as satellite stations. The detailed properties of the used seismometers are given in Table 1.

	TC20-SV1	LE-1DV MkII
Natural frequency	20 second	1 second
Upper frequency limit	100 Hz	100 Hz
Sensitivity	750 V/m/s	400 V/m/s
Output signal	max. ± 20 V	max. ± 7 V

Table 1. Detailed parameters of seismic sensors: 3C Nanometrics Trillium Compact, 20s and 1C Lennartz LE-1D/V lite MKII respectively.

The station distribution is mapped in Fig. 1, while the respective coordinates are listed in Table 2. Both given events occurred near station PLAT in some 5 km depth in the Söhlingen gas field.

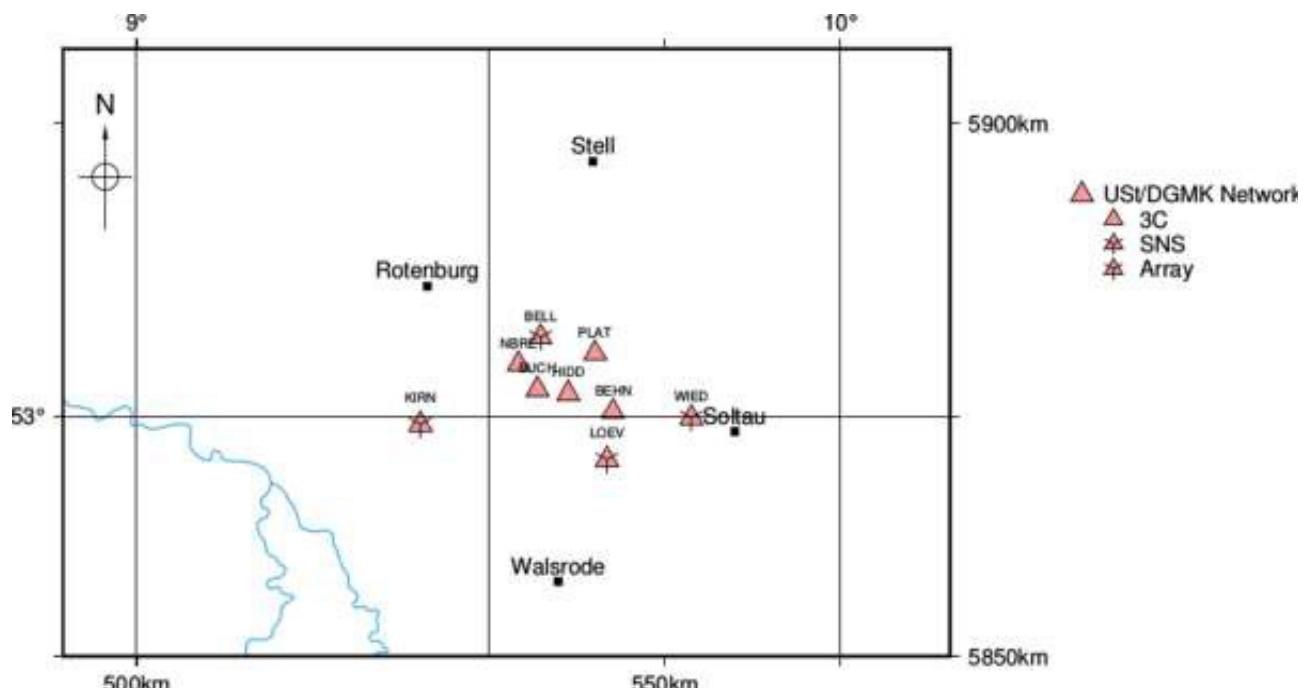


Figure 1. The DGMK monitoring research network. Visualised are all seismic stations which have been deployed: five 3-c single stations (**BEHN**, **BUCH**, **HIDD**, **NBRE**, **PLAT**) and four seismic mini-arrays (**BELL**, **WIED**, **KIRN**, **LOEV**). Note that the highlighted stations are used in this dataset.



Station	Location	Station type	Latitude	Longitude	Sensor type
LOEV	Löverschen	mini array	52.963853	9.662858	TC20-SV1 + LE-1DV MkII
KIRN/KIR	Kirchlinteln	mini array	52.99500	9.39944	TC20-SV1 + LE-1DV MkII
WIED	Wiedingen	mini array	52.998447	9.782409	TC20-SV1 + LE-1DV MkII
BELL	Bellen	mini array	53.067453	9.570577	TC20-SV1 + LE-1DV MkII
NBRE	Neu-Bretel	single station	53.044946	9.538729	TC20-SV1
BEHN	Behningen	single station	53.004175	9.672163	TC20-SV1
HIDD	Hiddingen	single station	53.020058	9.608764	TC20-SV1

Table 2. Location and instrumentation of the mini-arrays and single stations used in this dataset.

Note that the coordinates for the seismic small arrays relate to the respective central station.



References

Bischoff, M., et al. *Characteristics of seismicity induced by gas production in Northern Germany*.
Hannover : LBEG, BGR, 2017.

Joswig, M. 2008. Nanoseismic monitoring fills the gap between microseismic networks and passive seismic. *First Break* 26:121–128.

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