Seismological long-time monitoring of the inner burden dump in Schlabendorf-South

Investigations of hazards of soil liquefaction that cause deformations of the terrain surface

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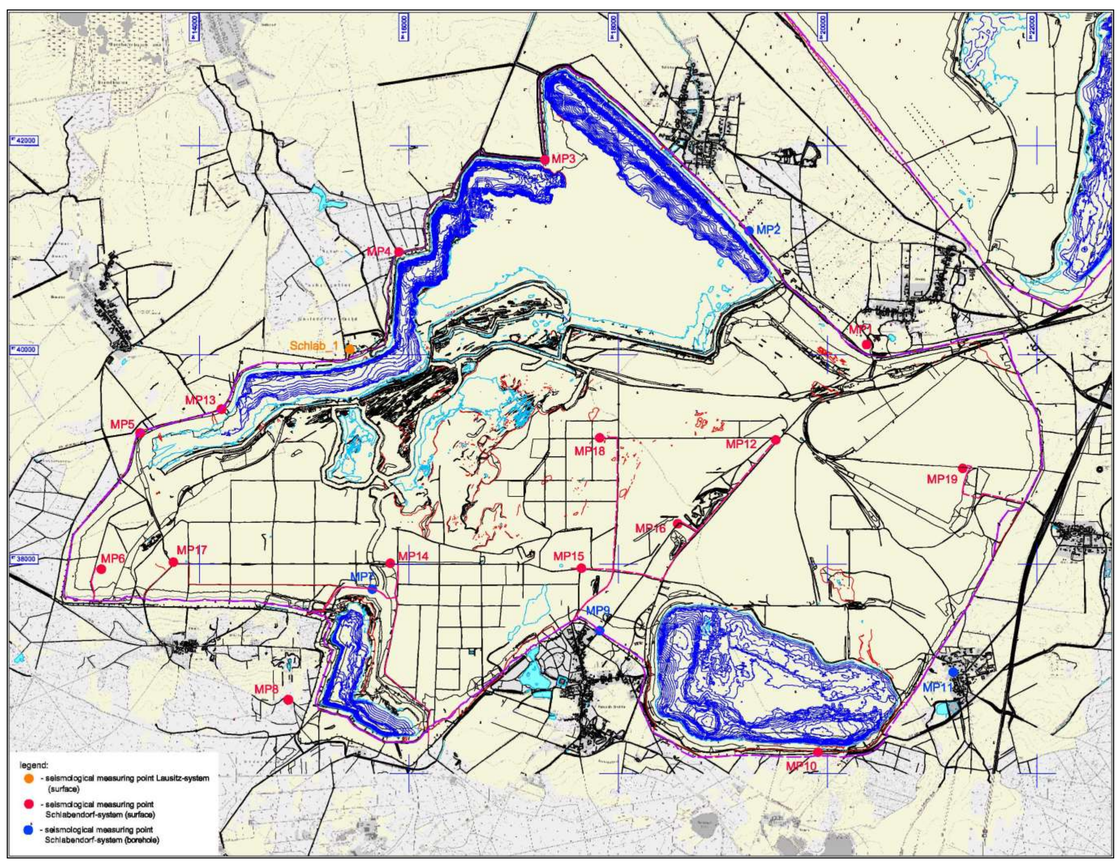
History:

- Backfilling of former brown coal mines with heterogeneous material
- Regions extend often more than 50 km²
- Hazards of unpredictable landslides/ mass movements cause complete closure of this area
- Installation of 20 seismological stations around and on the inner burden dump Schlabendorf-South

Aim:

- seismological monitoring to detect mass movements in real time
- Warning and information of working staff
- Observation of the rising of the groundwater level
- Registration of seismological events
- Monitoring of soil-liquefaction

Study area

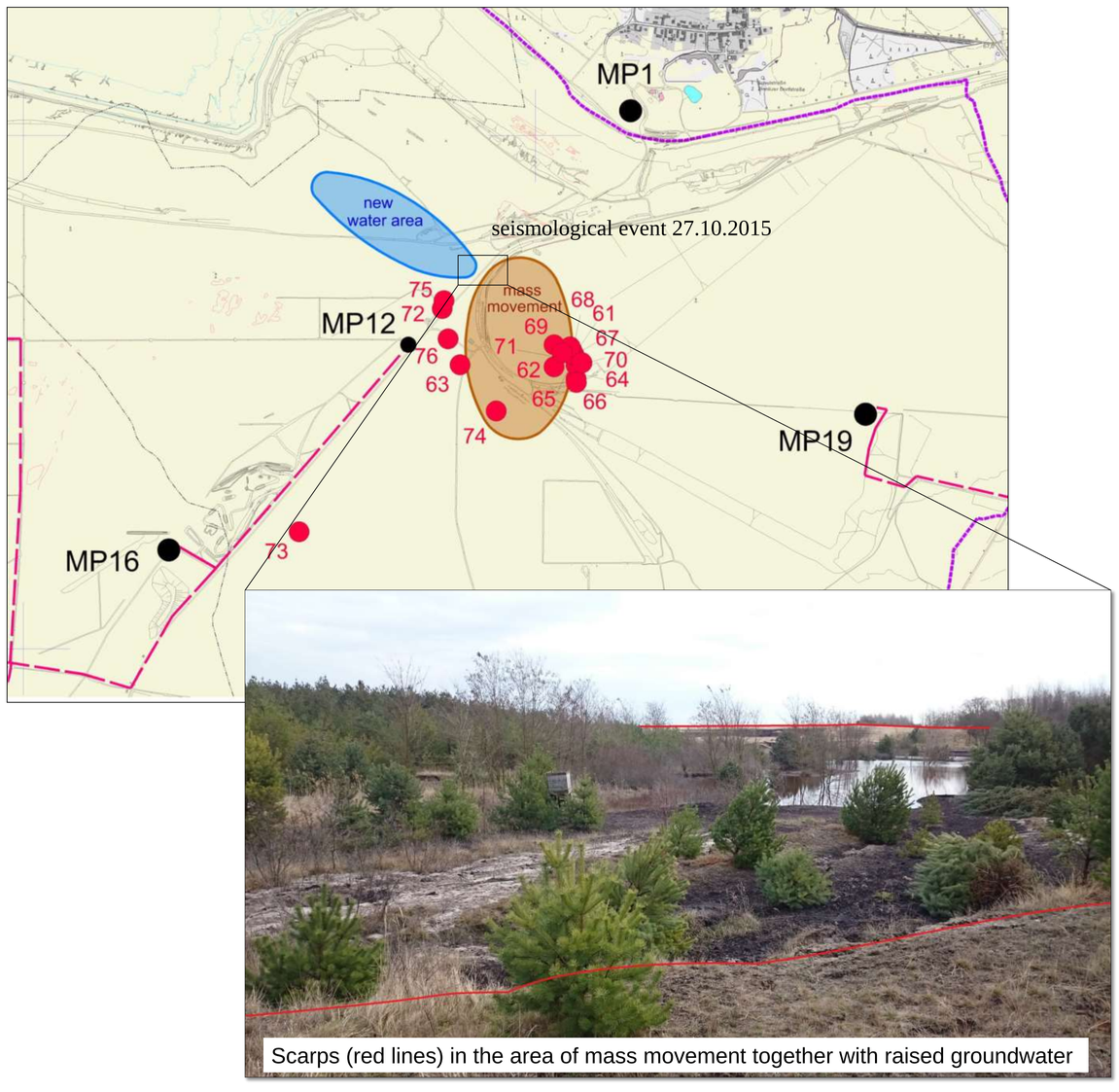


measurement point MP 10

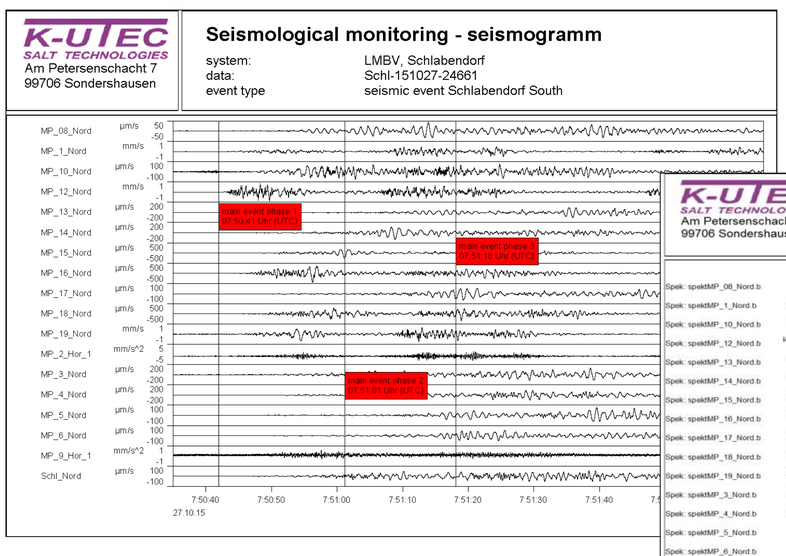
seismological event 27.10.2015

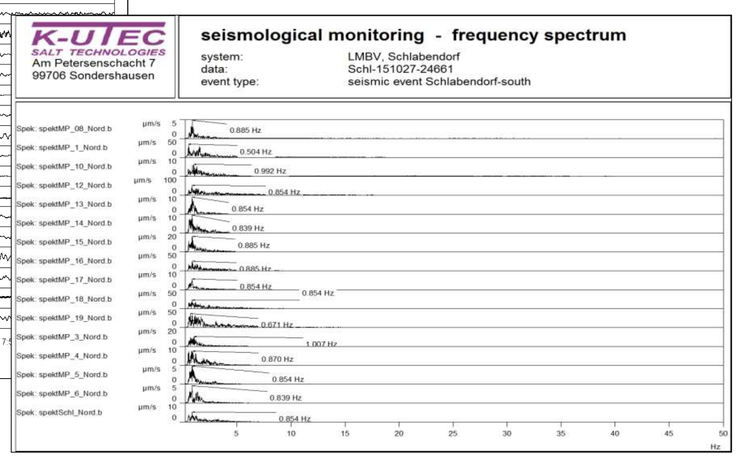
- Alerting and registration by seismological monitoring system Lausitz
- Registration by seismological monitoring system Schlabendorf-South, localization of approximately 16 seismological events between 07:48 UTC and 11:30 UTC
- Information send to LMBV and the responsible geotechnical consultant
- Looking for effects in a radius around localized epicentral positions with the result of finding new water area and new depression (mass movement)
- Evaluation of seismological and geotechnical parameters in a special report with e.g. analyses of frequencies, amplitudes and waveforms

Located seismological events



seismological events and frequencies caused by geotechnical event





Summary:

From the start a relative high number of seismological events have been monitored. Not all of the events implicated effects on the surface which can be observed because of the considerable depth of the events. Many parameters and correlations with geotechnical, hydraulic and meteorological facts could be deducted from the logged data.
At run time of the system, a number of seismological events occurred with visible mass movements. Some take place as multiple seismological events with rising hypocentres from deeper layers to the surface. On the surface this is mostly reflected as vertical and /or horizontal ground movements/displacements.
After almost two years of the seismological monitoring in Schlabendorf-South it becomes apparent that there are a lot of seismological activities inside of the dump. These can be related to particular focus areas. Possible causes are grain-relocations due to the changes of the groundwater level and the pore pressure possibly in conjunction with special weather conditions. But the potentials which occur in these processes do not necessarily lead to a soil liquefaction with visible ground movements on the surface.