

The influence of underground mining on cities geodynamics

The example of the Upper Silesian Coal Basin in Poland

Maria Przyłucka, Zbigniew Perski, Kamila Karkowska, Przemysław Kowalski
Geohazards Center, Polish Geological Institute - National Research Institute

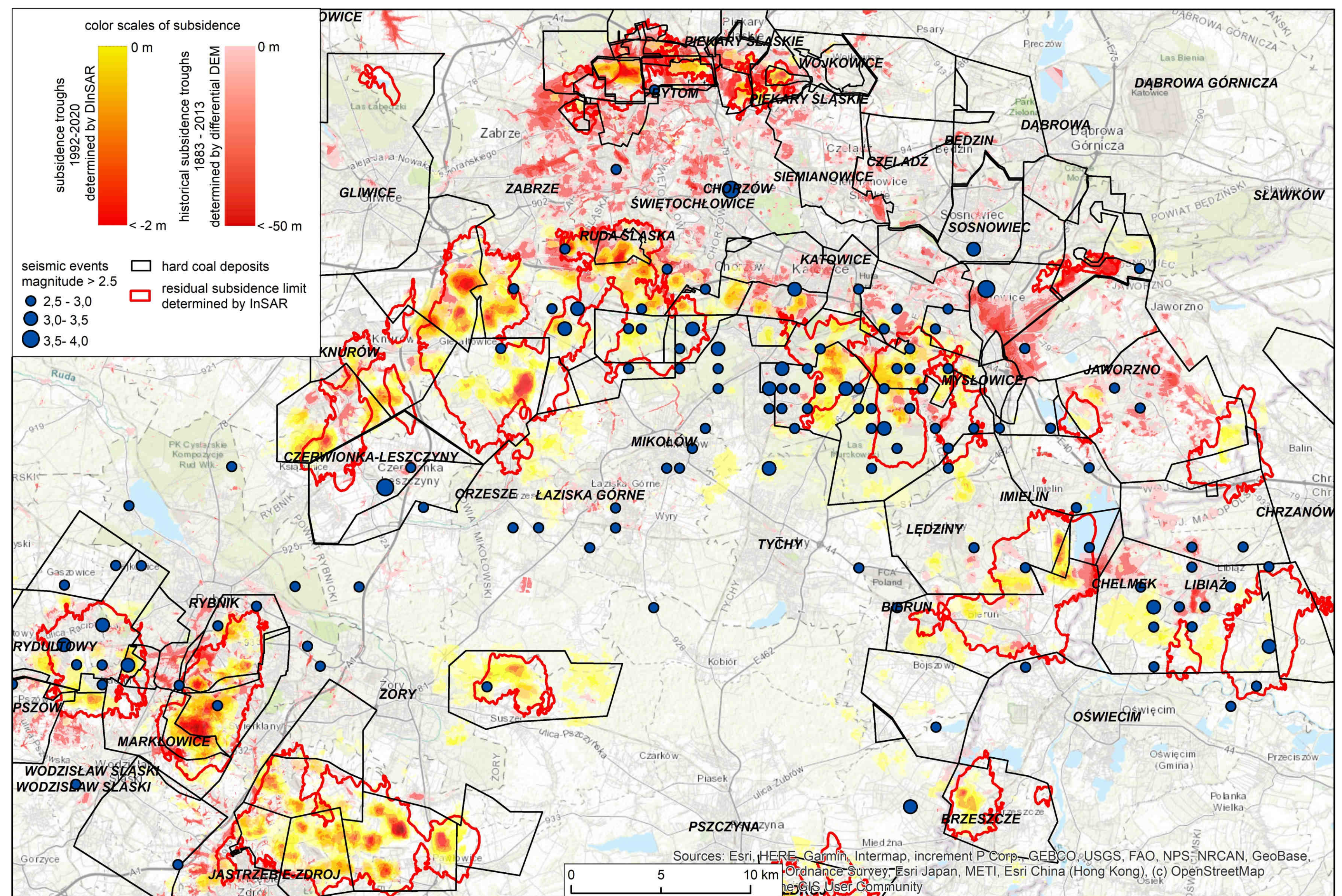
maria.przylucka@pgi.gov.pl, zbigniew.perski@pgi.gov.pl, kamila.karkowska@pgi.gov.pl, przemyslaw.kowalski@pgi.gov.pl

The poster presents the complex, long-term impact of underground mining on the terrain surface in the Upper Silesian Coal Basin, the largest coal basin in Europe inhabited by 3.5 million people.

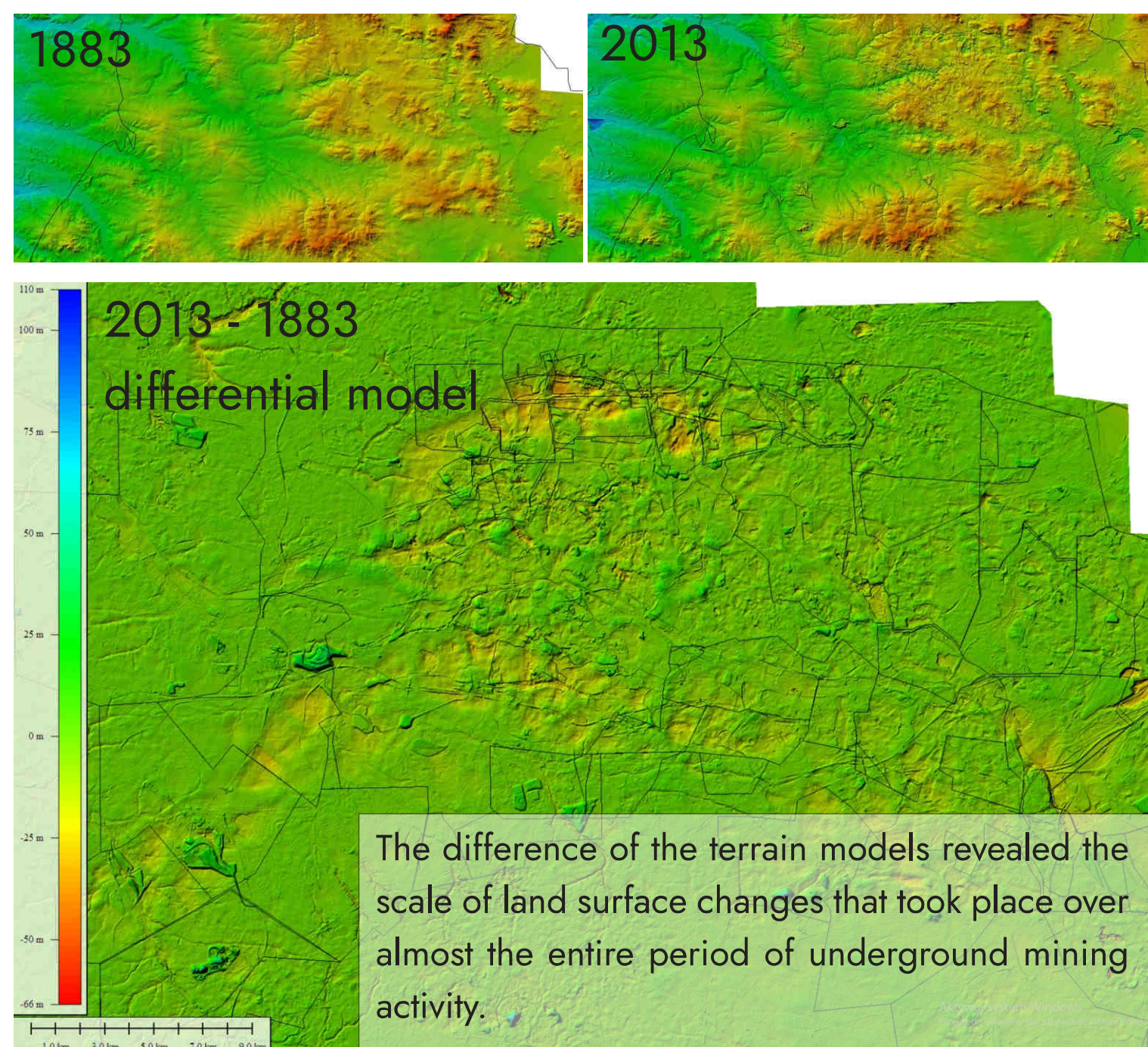
Based on the data from various sources, maps of ground surface deformation throughout the history of hard coal mining were compiled. Archival topographic maps, various terrain models and LIDAR data revealed an area of 600 square kilometres under the influence of subsidence.

Present terrain changes were estimated by satellite radar interferometry (InSAR). Processing the data recorded from 1992 to 2020 made it possible to identify the basins where the subsidence was faster than 1 cm per year, overlapping the urbanized areas of nearly 100 sq km.

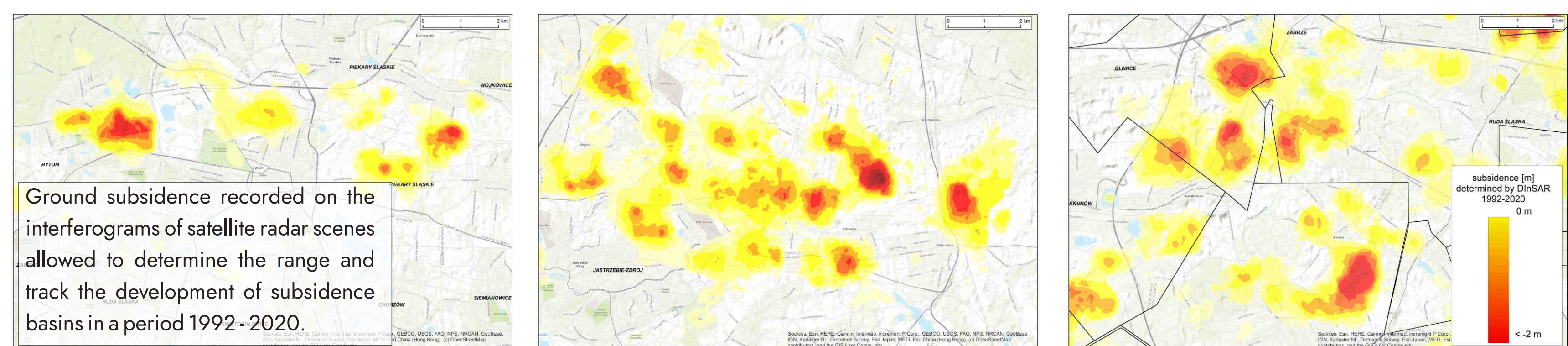
The study was supplemented with a distribution of seismic events associated with mining activity and their impact on this highly industrial area.



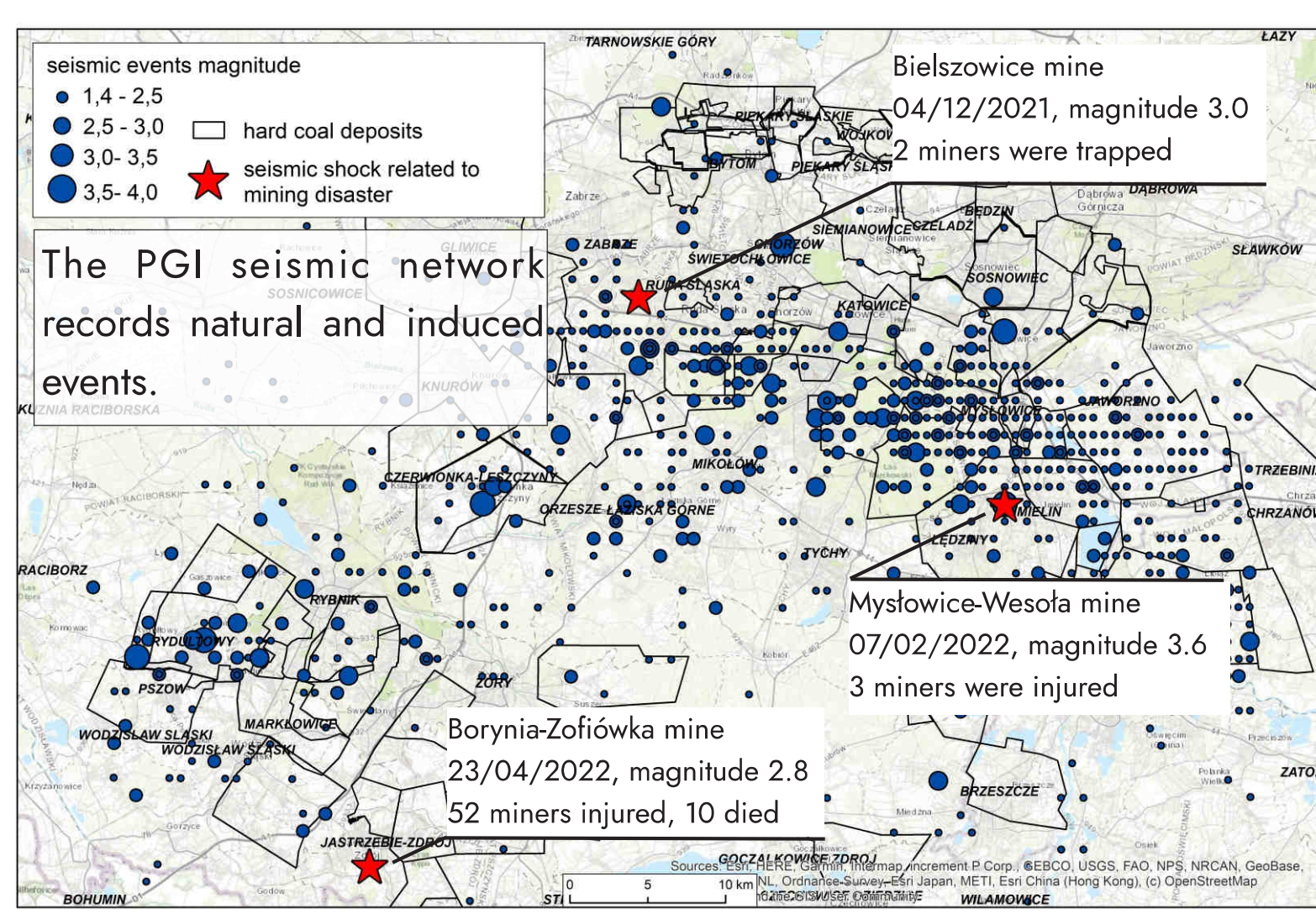
Large-scale and long-term analysis of deformation caused by mining



Identification of subsidence basins on the basis of satellite data



Monitoring of seismic events since 2016



Detailed monitoring of ground movements in urbanized areas

