Monitoring deformation processes of Provadia salt depot area

Mila Atanasova-Zlatareva and Vassileva Keranka (Bulgaria)

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SUMMARY

Our research interest is focused on determining the earth's crust deformations that have occurred in the area of the Provadia salt depot (Bulgaria). An archaeological site of the Solnitsa-Provadia is located in the areas, as well. The research is many years old and it is now being supplemented with data provided by the European Ground Motion Service EGMS for a 5-year period.

Since the mid-20th century, Provadia salt deposit underwent intensive industrial salt extraction by the injection of pressurised water, leading to the formation of underground dissolution chambers and salt leaching. The area is exposed to various anthropogenic, tectonic, seismic acting mixed with different intensity. In the area seismicity is characterized with frequent low-magnitude earthquakes no greater than M<2.5 over the last few decades.

In prehistoric times, the area was dedicated to salt extraction through water boiling, and it has been recognized as the oldest salt production canter, with settlements dating back to 5500-4200 BCE.

The European Ground Motion Service (EGMS), part of the Copernicus Land Monitoring Service (CLMS), provides free pan-European ground motion data to support local and regional ground deformation analyses. The EGMS data has been used to monitor contemporary geodynamic processes in the salt deposit region Provadia. The InSAR method was applied to study surface deformations for the period 2019-2024. The displacements are compared with the multi-year repeated results from geodetic measurements of the Provadia geodynamic network. The results of this study show, that the activity on the Earth's crust in the area still goes on and confirm, that the methods applied are appropriate for determining the technogenic movements of the earth crust.