

Combining different investigation methods for a global risks analysis dedicated to brine production: Safety and sustainable measures

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Abstract

The ability to predict surface subsidence associated to brine production is fundamental for both environmental impact and operational hazards assessments. Taking advantages of a long term monitoring of Solvay's leaching zones in Italy, different ground responses were identified. Relevant criteria were sorted out based on real-case studies over the ten-year period of monitoring.

Microseismicity has proved to be effective to monitor fast and spreading phenomena, especially collapse episodes or important ground movements, directly induced by leaching activities. It therefore appears as a performing tool to prevent imminent danger for on-site workers.

Subsidence analysis, combined to residual microseismic analysis, allows the characterization of long and continuous phenomena and underlines ground responses, even small. It consequently allows the complete rehabilitation of abandoned zone.

These two domains coupled to production data analysis lead to set warning criteria during the whole brine production process flow. Production data (linked to rock mass removal) can indeed induce the first warnings, prior to ground responses (or at the same time). It gives the first information about safety measures which have to be taken. Rock mass movement induces ground responses, which can lead to issue other warning criteria.

Thus, relevant criteria are defined to set up a global risks analysis, from the beginning of injection and extraction to site rehabilitation, insuring safety to on-site workers and, finally sustainable environment.

