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**Meeting Paper**



**Subsidence Evaluation over Salt  
Solution Cavities by Means of High  
Resolution 3D Seismic Reflection in  
the Hengelo Field, the Netherlands**

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*by*

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# **Subsidence Evaluation over Salt Solution Cavities by Means of High Resolution 3D Seismic Reflection in the Hengelo Field, the Netherlands**

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## **Abstract**

In the Hengelo area, East Netherlands, solution mining of rock salt is carried out by Akzo-Nobel from a 50 m thick deposit of Triassic age, located at about 350 m depth. Overmining in the past brought about progressive roof failure at some of the oldest wells. Ample evidence exists that stoping through the rock overburden, comprising mainly claystones, may proceed up to the base of the Tertiary and Quaternary soil formations. Then the overlying soil mass gradually deflects over the debris chimney, resulting in trough subsidence at the surface. At one location a sinkhole was formed.

3D high resolution seismic reflection data have been acquired, covering an area of about 280 ha. Generally roof failure can be recognized clearly by disturbances of one or more cycles of the salt reflection. The horizontal extent of these disturbances corresponds roughly with the outline determined by sonar. Subsurface subsidence at the level of the rock-soil interface at the base of the Tertiary is indicated by downward deflection of reflections. The horizontal extent of these deflections corresponds well to areas of trough subsidence at the surface, and their magnitude is correlated to the measured surface subsidence rates. The disturbance of the salt reflection corresponding with the cavity where the sinkhole developed was bounded by a near-vertical normal fault. High amplitude wavelets near the base of the salt correlate to intact, brine filled cavities, which are completely situated within the salt formation.

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