

Salt Mining Deformation Veendam



Figure 1: Topographic map Veendam area

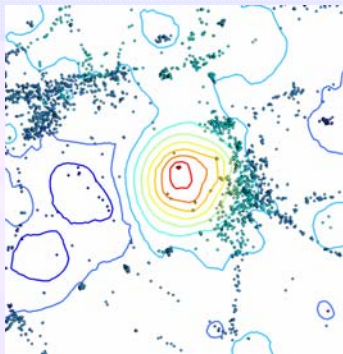


Figure 3: Permanent scatterers and contour lines of subsidence bowl

A subsidence bowl is created near Veendam due to solution salt mining. Twelve wells have been drilled with a depth ranging from 1.400 until 1.800 meters between 1972 and 1991. Nedmag uses solution mining to mine carnallite and bischofite salt near Veendam. This technique injects water into the salt layers. The water dissolves the salt, which is pumped up to be transported via a pipeline to the Nedmag factories. The injection does not disturb the halite layers, situated between the salt layers. Hence the dissolution proceeds sideways, see figure 2. Dissolution of the salt results into overburden that is not fully supported from below causing surface subsidence. (www.nedmag.com)

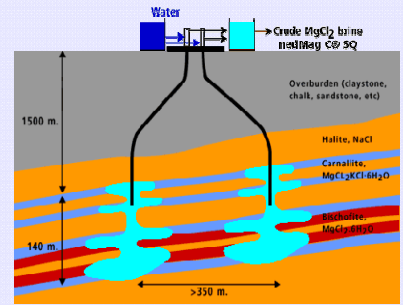


Figure 2: Solution mining (Nedmag)

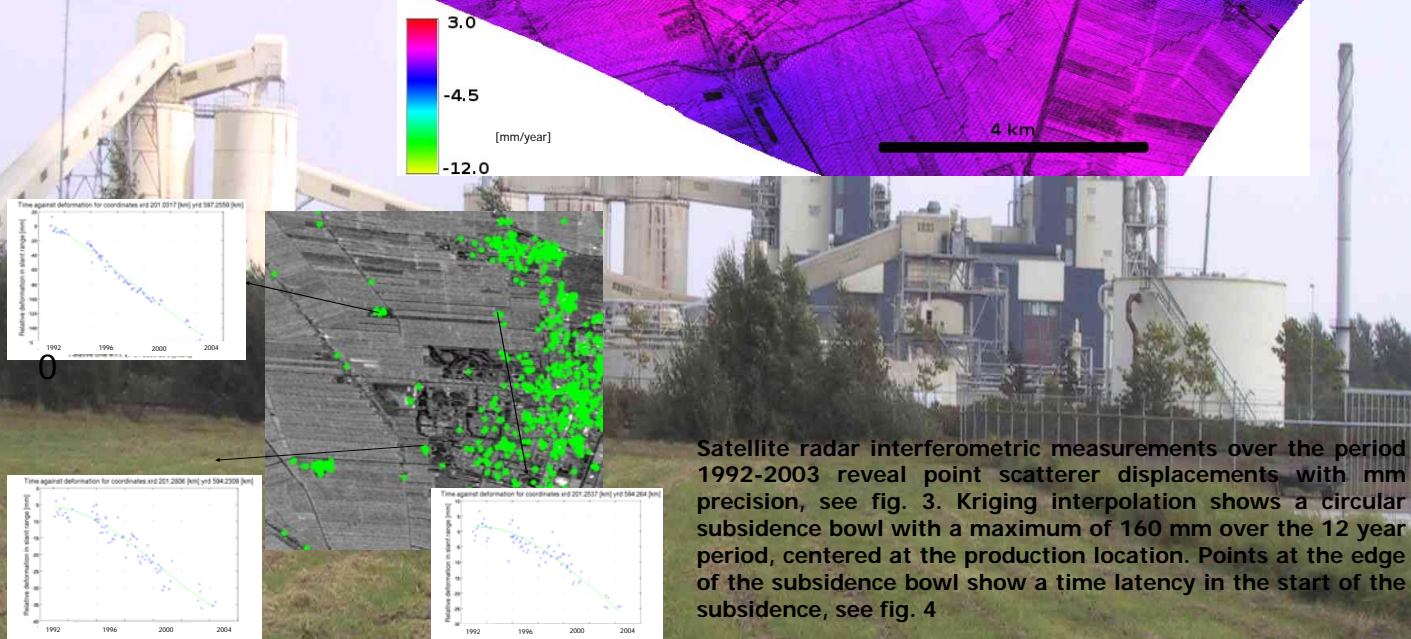
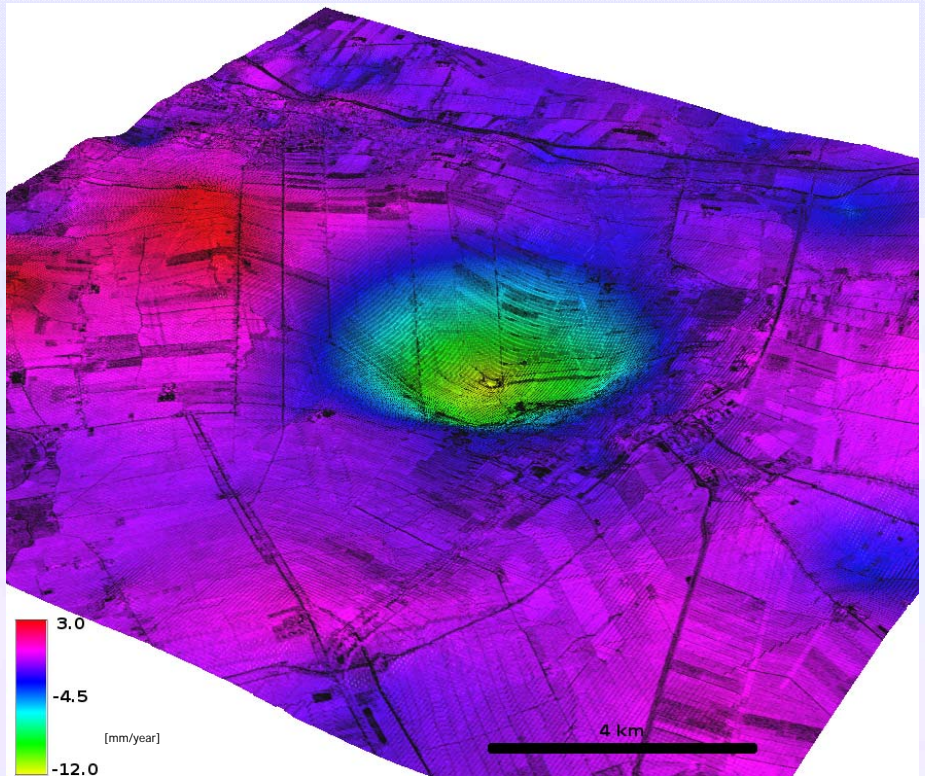


Figure 4: Radar (PS) scatterers and temporal deformation graphs of indicated points

Satellite radar interferometric measurements over the period 1992-2003 reveal point scatterer displacements with mm precision, see fig. 3. Kriging interpolation shows a circular subsidence bowl with a maximum of 160 mm over the 12 year period, centered at the production location. Points at the edge of the subsidence bowl show a time latency in the start of the subsidence, see fig. 4

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