



## **InSAR observations and LIDAR measurements in the Alsace's potash basin**

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The Mines De Potasse d'Alsace (MDPA), located in the south of the Rhine graben near Mulhouse (France), was operational between 1904 and 2002. Two distinct potash layers were exploited over a total average surface of 100 km<sup>2</sup> at a mean depth of 635 m and 655 m and a thickness of 1-2 m and 2-5.5 m, respectively.

We used ERS, Envisat and Sentinel SAR, data acquired along both ascending and descending tracks, to estimate the surface deformation during both operational and post-operational periods. Because of the low interferometric coherence due to fields and forests, we used the Stanford Method for Persistent Scatterers (StaMPS) (Hooper & al, 2012) to track the displacements at permanent scatterers and follow the surface evolution using a time series analysis. Doing so, we are able to estimate the displacement rate over about one third of the total area above the whole gallery network.

By assuming that the deformation corresponds to vertical displacement, we observe a signal characterized by small patches of subsiding areas up to 36 cm through the period 1995 to 2000, mainly located above the tip of the most recent dug galleries but also, nearby small faults previously identified in the southern graben. The time evolution of these displacements fits the available levelling data, consistent with exponential decay over time.

Alongside these surface observations, in-situ LIDAR measurements have been regularly conducted in the underground galleries since April 2017 to estimate the convergence rate of the walls in the salt layer creeping.

After successfully completing in-situ measurement campaigns and remote measurements of the surface displacement field during the different periods of time, we aim to build a geomechanical model by coupling the datasets and draw the short and long-term evolution of the mine and its surrounding medium.