Summary

The thesis covers the proof of the usability of a newly available interpolation and visualization technique. So far, contours of storage caverns in salt rock are designed by cuts and perspective views, based on linear interpolations of sonar reading points. But this design is not equal to the smooth and variously curved shape of the dissolved void. This has effect on the calculation of the volume and the convergence of the cavern. Therefore, the more plausible interpolation with parameterized curves and thereon based surface modelling and rendering is tested.

The operational and official request to the interpolation of the sonar measurements are fulfilled best with Non-Uniform-Rational-Basic-Splines (NURBS). NURBS interpolate the variously curved shape plausibly and computationally accurately. Biased errors of past linear interpolations can be avoided thereby.

The approach was tested successfully with exemplary operational tasks. Beyond that, the combination of interpolation, surface modelling and rendering techniques enables an analysis of sonar measurements, which was not possible so far. A method for the quantification of roof convergence, visualizations for the investigation of spatial anomalies, as well as representations for the analysis of the sump modifications are presented.