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New possibilities for a detailed and reliable interpretation of sonar surveys

Abstract

The aim of a cavern survey with sonar is to scan the void from inside with a sufficiently high point density so that its shape is detected with all irregularities and its spatial expansion and the geometric volume are to be indicated exactly.

The boundary of the cavern is usually no smooth contour, that means you can find either large-area irregularity like pockets and protrusions or small structure variations as shingles, holes, roughness, etc. The development of a cavern wall during the leaching process is strongly influenced by different salt solubility. Therefore the cavern boundary is often not immediately unambiguously recognizable. A detailed analysis of the signal reflections of the transmitted sonar signal has to be carried out in these situations. This is not automatically feasible due to the ambiguities.

By means of analysis of the complete analoguous echogram traces on paper printouts a manual estimation is possible in most cases.

The new introduced integration of these information into the interpretation-program CavDat increases the efficiency of the available interpretation procedures in horizontal and vertical cross section interpretation.

An additional functionality in form of a 3D-Interpretation enables now to visualize complicated structures very clearly and therefore to estimate the received reflections with its total spatial information content.

It is important to keep in mind that a transmitted sonar signal has a finite focussing and that its returning reflections can contain a lot of information from adjacent areas depending on the reflecting area which has to be analysed.

The new 3D-function is helpful because it improves the spatial imagination of the interpreter in the estimation of multiple reflections.

3D-reflection models can be generated now, that can serve as an interpretation basis for complex irregular cavern structures, to enable a reliable analysis and interpretation to fulfil better the demanded aim of the survey also for very complicated structures.

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