



Another look of imaging of shallow subsurface. Real examples from the Dead Sea sinkhole development areas

S. Keydar, B Medvedev, A. Al-Zoubi, and M. Ezersky
Israel (shemer@gii.co.il)

Abstract

A new approach for imaging shallow subsurface is presented. This approach combines several, recently developed imaging techniques. The first one is zero-offset Common Shot Point (CSP) stacking. This technique whereby an information about the structure of the subsurface is obtained. The other one is a diffraction imaging method. This method utilizes the waves diffracted on, or scattered from, subsurface inhomogeneous objects such as faults, sinkholes, cavities, caves, tunnels. Imaging of subsurface using those methods is performed by a spatial summation of seismic waves along time surfaces. The summation can be implemented using either of two approaches. In the first, conventional, approach, the target waves are stacked along the time surfaces defined by some "optimal" parameters such as velocity or wavefront parameters. These parameters are estimated by a time-consuming procedure of parameters analysis involving visual examination and interpretation of intermediate seismic images. In our new approach we use an alternative, a more formal recently proposed multipath summation with proper weights. The multipath summation is performed by stacking the target waves along all possible time surfaces having a common apex at the given point. This approach does not require any explicit information on parameters since the involved multipath summation is performed for all possible parameters values within a wide specified range.

We will show how using the CSP stacking and diffraction method using weighted multipath summation makes possible obtain a better image than using conventional CMP method. Application of the new approach is illustrated by a real data-sets from the Mineral beach at the Dead Sea area.

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