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Context and adaptive transformation applied to interpretation of acoustic pseudoimpedance images of rocky surroundings

Abstract

Underground hydrocarbon storage plays an important role in the world. The most of them is located in depleted natural gas reservoirs. Rocky salt deposits with homogenous inner structure and horizontal or semi-horizontal stratum may be the best for future plans of under ground reservoir localisation. Within salt deposit, stratum inhomogeneity as well as changes of thickness and lithology should be especially examined and predicted before the underground reservoir location plan is fixed. Seismic surface measurement data are the most economical source of such information. Calculations of seismic section inversion leads to approximation of distribution of acoustic pseudoimpedance. The pseudoimpedance acoustic sections analysis and visualisation are effective ways to stratum homogeneity identification goal. In this paper, the improvement of geologic section image resolution by use of minimum entropy deconvolution method before inversion (for synthetic data generated by INVERS system) is applied. The authors propose context and adaptive transformation of images also as a way to increase the effectiveness of correct interpretation of simulated images. The paper introduces the algorithms of visual transformation and analysis of results to define quality of rock section structure interpretation. The goal of the study is to develop applications of image transformation tools to inhomogeneity detection of lithology-phacial structure of seam-like salt deposits.