Skeletonization of Potential-Field and Seismic Images

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Abstract

We apply skeletonization approach to geophysical data to recognize geologic structures and pick seismic horizons automatically. We formulate the technique to be explicitly applicable to all gridded geophysical data. The method consists in extracting multiple features of "wavelets" which may be single or double peaks or troughs characterized by amplitudes, widths, orientation angles, spatial dimensions, polarities, and other attributes. The wavelets are further connected based on similarities of these attributes to form the "skeleton" of the geophysical image. In addition, optional 2-D or 1-D filtering conducted during the identification process allows extracting parameters of background trends and reduce the adverse effects of low frequencies on skeletonization. Gravity, magnetic, and seismic data are used to illustrate the utility and effectiveness of the algorithm. The results show that the approach is useful for identifying structures in complex geophysical images and for automatic extraction of their attributes.