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ADVANCES IN THE VISUALIZATION OF THREE-DIMENSIONAL SEISMIC VOLUME DATA

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Abstract

The analysis of seismic images is of significant importance to multiple industries and research fields. While traditionally relying on two-dimensional slices, three-dimensional seismic interpretation has gained substantial ground in the last decade. The field of volume visualization offers numerous methods for the exploration and analysis of three-dimensional seismic datasets. This paper explores various techniques and approaches encountered throughout the related literature, which exploit the potential of computer-aided information visualization to provide a more intuitive, informative and easily accessible means of interpreting seismic images. The paper shows how various authors make selective use of volume rendering, surfaces and color coding, to perform tasks such as the three-dimensional visualization of seismic datasets, the extraction and representation of geological features such as horizons and faults, and the visual assessment of dynamics for the analysis of earthquake simulations and data. Relevant examples and explanations are provided to illustrate the results of the techniques discussed throughout the paper. The goal is to provide an understanding of the interdisciplinary field of three-dimensional seismic visualization, while facilitating related research and documentation efforts.

Key words: fault visualization, horizon visualization, seismic dataset, seismic dynamics, volume rendering

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