

方法技术

各向异性含气砂岩模型正演及AVO响应特征分析

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摘要 为认识和研究各向异性含气砂岩储层中弹性波的多波波场特征,以利于多波地震资料解释。在各向异性弹性波方程基础上,采用高阶交错网格有限差分技术模拟地震波在各向异性含气砂岩模型中的传播,得到该类储层的弹性波场。同时结合AVO分析技术分析了各向异性系数对多波波场特征的影响,比较了地震波在各向同性含气砂岩模型和各向异性含气砂岩模型中的波场响应异同。对比研究表明,地层的各向异性对波场特征和AVO响应有明显影响,并且这种影响在纵波和转换波上表现不一致;正演记录中的振幅特征与AVO异常响应是吻合的,说明将正演模拟与AVO分析相结合可为准确识别多波波场提供一种思路。

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Forward modeling based on anisotropic gas bearing sandstone model and characteristics analysis of AVO response

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Abstract In order to investigate the multi wave characteristics of elastic waves in anisotropic gas bearing sandstone reservoirs to facilitate the interpretation of multi wave seismic data, this paper adopts high order staggered grid finite difference method to simulate propagation of seismic waves in anisotropic gas bearing sandstone media based on anisotropic elastic wave equation. The effect of anisotropic coefficients on multi wavefield was analyzed, and the responses of the wavefield in isotropic and anisotropic gas bearing sandstone reservoirs were compared. Results show that anisotropy significantly affects wavefield characteristics and AVO response, and the impact manifests different behaviors on P waves and converted waves. The amplitude characteristics in seismic record is consistent with the AVO response, indicating that the combination of forward modeling and AVO analysis can provide a solid base for identifying multi wavefield.

Key words [multi wave and multi component; wavefield characteristics; AVO analysis; perfectly matched layer; forward modeling](#)

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