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薄互层地震切片解释中的几个问题——以一个三维地质模型为例

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Phenomena in inter-bed reservoir interpretation on seismic slices: an example of 3D geological model

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摘要

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摘要 在对薄层干涉效应进行分析的基础上, 通过一个地质模型对地震切片技术存在的问题及其发展潜力进行了相对客观的实验分析。实验分析结果表明: ①相对于地震剖面本身, 薄层砂体在地震切片上具有更好的可识别性和可检测性; ②地震切片能够相对可靠地反映不同砂体的分布特征和物源方向, 当砂体累计厚度小于1/4地震波波长时, 均方根振幅与砂体累计厚度具有较好的正相关关系; ③某层砂体的“零值时间”地震切片不包含该层砂体本身的反射贡献, 不同深度砂体的“零值时间”能够较好地反映砂体之间的垂向距离, 有助于建立不同深度砂体的沉积模型和叠置关系; ④同一层砂体具有多个“零值时间”, “零值时间”地震切片具有周期性, 且“零值时间”地震切片与单层砂体具有较好的对应关系, 但其出现次序与地层深度是反序的。

关键词: 薄互层 地震切片 砂体分布 叠置关系 零值时间

Abstract: Based on analysis of interference effect of inter-bed layers, problems and potentials of reservoir interpretation on seismic slices are analyzed through a 3-D geologic model experiment. The following observations are obtained from the experiment: 1Thin inter-bed sand layers can be more easily identified and detected on seismic slices than seismic sections; 2The distribution and source direction of different sand bodies can be relatively reliably detected on seismic slices, and RMS amplitude slice has a good positive correlation to the accumulate thickness of the sand bodies when the accumulative thickness is less than 1/4 wavelength; 3"zero-value time" seismic slices of one sand body have no attribution of the sand body itself, and the vertical distance of sand bodies in different depths can be derived from the difference of "zero-value time" slices, which are helpful to recognize the sedimentary evolution and superimposed relationship of sand layers in different depths; 4Each sand body has more than one "zero-value time" and the "zero-value time" seismic slices appear periodically, and "zero-value time" seismic slices well depict the spatial distribution of single sand layer, however the time sequence of "zero-value time" slices is reverse to the depth sequence of sand bodies.

Keywords: thin inter-bed layers seismic slice sand distribution superimposed relationship "zero-value time"

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