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## 时移地震监测天然气水合物开采可行性分析

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Feasibility analysis of the gas hydrate exploitation by time-lapse seismic monitoring

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摘要

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摘要 时移地震储层监测是一种提高油气采收率的有效技术,但该技术应用需要满足一定的储藏条件,因此时移地震的可行性研究是必要的.天然气水合物的开采过程,主要是通过有关措施(加温、降压、注入化学材料等)使沉积物中的固态水合物变成气体开采,从而改变水合物储层的物理性质和地震反射特性,原理上为进行时移地震监测提供了条件.本文通过数值模拟分析发现:扩散型水合物开采过程中有明显的地震信号变化,可以用时移地震对这类水合物藏的开采进行监测;渗流型水合物藏的时移地震监测是否可行与气体含量大小有关,气体含量低的可以用时移地震进行检测,气体含量高的是否能用时移地震进行检测要视具体情况而定.

关键词: 岩石物理 时移地震监测 天然气水合物开采

Abstract: Time-lapse seismic monitoring has been proved an effective tool for enhanced oil recovery. If the application of this technology requires certain reservoir conditions, so it's rather necessary to study its feasibility before applying it. In the process of extracting gas hydrate, the solid hydrate in sediments is transformed into gas and extracted mainly through the relevant measures (heating, decompression, injection of chemical materials, etc.). This will change the physical properties of the hydrate reservoir and its seismic reflection character, so it's possible to carry out time-lapse seismic monitoring in principle. In this paper, we found significant change of seismic reflection character in the process of extracting seeping type hydrates by the analysis of numerical simulation, so time-lapse seismic monitoring technology can be used in extracting this gas hydrate. For diffusing type hydrates, the feasibility of time-lapse seismic technology monitoring is influenced by its gas content. The hydrates of low gas content can be detected using time-lapse seismic, but for the hydrates of high gas content it depends on the actual

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