

检索...

检索

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纵横波速度联合预测地层压力的方法及应用

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Methods and Application of the Formation Pressure Forecast Combining V_p and V_s

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摘要/Abstract

摘要 :

研究表明,在页岩气中无论是游离气含量还是吸附气含量都随着地层压力的增加而增加,因此开展精细的地层压力预测对提高页岩气的产量有重要意义。目前主要利用纵波速度随着地层压力的升高而降低的特点开展压力预测,但是地层纵波速度的变化并不仅仅由地层压力的变化决定,因此为了建立高精度的地层压力预测模型,分别从杨氏模量和体积模量的定义出发,结合波动方程推导了有效应力与纵波、横波速度之间的关系,开发出了一种新的预测地层压力的方法——弹性参数联合法来计算地层压力。该方法通过引入横波速度,降低了压力预测的多解性,提高了预测的精度,并在页岩气地层中取得了良好的应用效果。

关键词: 横波速度, 弹性模量, 纵波速度, 有效应力, 异常压力

Abstract:

It suggests that the shale gas content, regardless of the free gas or the adsorbed one, increases with the formation pressure. Therefore, it is of significance to carry out the fine formation pressure forecast to improve the shale gas production. Current studies on the pressure forecast are mainly based on the fact that the P-wave velocity decreases with the increasing formation pressure. The P-wave velocity change, however, depends not just on the formation pressure change. So in order to build a high-precision forecast model of the formation pressure, we start with the definition of the Young's and Bulk modulus, deduce the relationship between the effective stress and the V_p and V_s combined with the wave equation, and develop a new forecast method, Elastic Parameters Combination, to calculate the formation pressure. By introducing the S-wave velocity, this method reduces the multiplicity of the pressure forecast, improves the accuracy, and demonstrates its effectiveness through the application on the shale gas strata.

Key words: S-wave velocity, Elastic modulus, P-wave velocity, Effective stress, Abnormal pressure

中图分类号:

TE132.1

参考文献

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