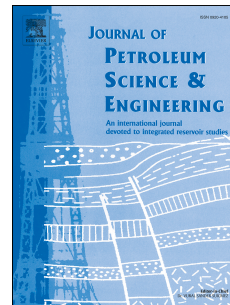


# Accepted Manuscript

Application of well logs integration and wavelet transform to improve fracture zones detection in metamorphic rocks

Huajie Yang, Heping Pan, Aiping Wu, Miao Luo, Ahmed Amara Konaté, Qingxin Meng



PII: S0920-4105(16)31060-9

DOI: [10.1016/j.petrol.2017.07.057](https://doi.org/10.1016/j.petrol.2017.07.057)

Reference: PETROL 4143

To appear in: *Journal of Petroleum Science and Engineering*

Received Date: 19 November 2016

Revised Date: 19 July 2017

Accepted Date: 20 July 2017

Please cite this article as: Yang, H., Pan, H., Wu, A., Luo, M., Konaté, A.A., Meng, Q., Application of well logs integration and wavelet transform to improve fracture zones detection in metamorphic rocks, *Journal of Petroleum Science and Engineering* (2017), doi: 10.1016/j.petrol.2017.07.057.

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

# Application of well logs integration and wavelet transform to improve fracture zones detection in metamorphic rocks

Huaijie Yang<sup>a,b,\*</sup>, Heping Pan<sup>b</sup>, Aiping Wu<sup>c,\*</sup>,  
Miao Luo<sup>b</sup>, Ahmed Amara Konaté<sup>b</sup>, Qingxin Meng<sup>d</sup>

<sup>a</sup> Beijing Research Institute of Uranium Geology, Beijing 100029, China

<sup>b</sup> Institute of Geophysics and Geomatics, China University of Geosciences, Wuhan 43007, China

<sup>c</sup> Electronics and Information School of Yangza University, Jinzhou 434023, China

<sup>d</sup> School of Prospecting Technology and Engineering, Hebei University of Geosciences, Shijiazhuang 050031, China

**Abstract:** The traditional approach to fracture zones detection is based on a visual inspection of core samples, or the application of special well logging program represented by imaging well logging. However, not all wells are fully cored, as the core description of fractures in laboratory is time consuming and expensive. Additionally, the interpretation of special well logging program in detecting fracture zones also needs the geologists' experience. This study provides a complete set of methodology for fracture zones detection and fracture numbers calculation in which wavelet analysis is utilized. For the sensitive well logs in fracture zones, we have made a contrast between well logs and imaging logging that shows up density, caliper, resistivity and acoustic logs are more or less suitable. To meet little changes with the same trends in one curve which indicates the present of fracture zones, we proposed a method that integrates the above four well logs into one, named fractured integrated index. Decomposing the integrated curve with discrete wavelet analysis shows that the detailed wavelet coefficients(cD1) energy are highly suitable for detection of fracture zones. In addition to the above four well logs, microsphere focusing logging is also used to enhance the accuracy of the detecting analysis. The method is applied to Chinese Continental Scientific Drilling Main Hole located about 17 km southwest of Donghai in the southern segment of the Sulu UHP terrane, and the results are promising in accordance with the imaging logging and cores information.

## Keywords:

Fracture zone detection

Wavelet transform

Fractured integrated index

CCSD-MH

Well logs

Corresponding author:

E-mail address: [yhj870624@126.com](mailto:yhj870624@126.com) (Huaijie Yang)

[wuaping@yangtzeu.edu.cn](mailto:wuaping@yangtzeu.edu.cn) (Aiping Wu)

Download English Version:

<https://daneshyari.com/en/article/5483984>

Download Persian Version:

<https://daneshyari.com/article/5483984>

[Daneshyari.com](https://daneshyari.com)