# Article information:

Anisotropic characteristics of acoustic emission and the corresponding multifractal spectrum during progressive failure of shale under cyclic loading - ScienceDirect  
<https://www.sciencedirect.com/science/article/abs/pii/S1365160923000382?via%3Dihub=>

# Article summary:

1. The use of cyclic hydraulic fracturing (CHF) for shale gas development can reduce fracture initiation stress, generate a denser fracture network, and potentially reduce induced earthquakes.

2. Acoustic emission (AE) is an effective technique for studying the fracture process and instability mechanism of shale under cyclic loading and unloading.

3. The anisotropic characteristics of shale, such as bedding inclination angle (θ), have a significant impact on the AE characteristics and fracture mechanism during progressive failure under cyclic loading and unloading.

# Article rating:

Appears moderately imbalanced: The article provides some useful information, but is missing several important points or pieces of evidence that would be required to present the discussed topics in a balanced and reliable way. You are encouraged to seek a more balanced perspective on the presented issues by exploring the provided research topics and looking at different information sources.

# Article analysis:

The article titled "Anisotropic characteristics of acoustic emission and the corresponding multifractal spectrum during progressive failure of shale under cyclic loading" discusses the use of cyclic hydraulic fracturing (CHF) as a method for shale gas development. The authors highlight the problems associated with traditional hydraulic fracturing, such as high fracture initiation pressure and single-fracture morphology leading to induced earthquakes. They argue that CHF can address these issues by reducing fracture initiation stress, generating a denser fracture network, and potentially reducing the magnitude of induced earthquakes.

The article provides a comprehensive review of previous studies on the mechanical behavior of shale under different loading conditions. It emphasizes the importance of understanding the anisotropic properties of shale and how they affect its failure mechanism. The authors propose using acoustic emission (AE) as a technique to study the evolution of mesoscopic damage in shale under cyclic loading and unloading.

While the article presents valuable information on the topic, there are several potential biases and limitations that should be considered. Firstly, the article focuses primarily on the benefits of CHF without adequately discussing its potential risks or drawbacks. While it mentions that CHF may reduce induced earthquakes, it does not provide evidence or data to support this claim. Additionally, it does not address other potential environmental impacts or concerns associated with CHF.

Furthermore, the article lacks a balanced discussion on alternative methods for shale gas development. It assumes that CHF is the most effective approach without considering other techniques or technologies that may have fewer environmental risks or greater economic viability.

Another limitation is that the article relies heavily on previous studies without providing sufficient evidence or data from their own experiments. While they mention conducting AE tests on anisotropic shale specimens, they do not present any specific results or findings from these tests. This lack of empirical evidence weakens their arguments and limits the overall credibility of their claims.

Additionally, there is a lack of consideration for potential confounding factors or variables that may influence the results. The article does not discuss the specific conditions or parameters of their experiments, such as the loading rate, temperature, or moisture content, which could significantly impact the observed AE characteristics and fracture mechanisms.

Overall, while the article provides a comprehensive overview of the topic and highlights the potential benefits of CHF for shale gas development, it lacks empirical evidence, balanced discussion of alternative methods, and consideration of potential risks and confounding factors. These limitations undermine the credibility and objectivity of the article's claims. Further research and experimentation are needed to validate their findings and provide a more comprehensive understanding of shale failure mechanisms under cyclic loading and unloading.

# Topics for further research:

* Environmental impacts of cyclic hydraulic fracturing
* Comparison of different methods for shale gas development
* Risks and drawbacks of cyclic hydraulic fracturing
* Evidence for the reduction of induced earthquakes with cyclic hydraulic fracturing
* Alternative technologies for shale gas extraction
* Factors influencing acoustic emission characteristics in shale under cyclic loading

# Report location:

<https://www.fullpicture.app/item/00345d4d11f98f30576fb43c4a516e6f>