

No Surprise!

Mineralogy influences Induced Seismicity in the Duvernay East Shale Basin

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Summary

Vesta Energy has been operationally active in the Duvernay of the East Shale Basin since 2014.

Since March 2018, Vesta Energy has been operating a passive surface seismic array to monitor induced seismicity (IS) related to their hydraulic fracture operations on 22 well pads. The resultant 4 + year IS catalogue has 17,000 events; and this IS dataset has revealed numerous aspects to the character of seismicity in the Duvernay East Shale Basin.

One of the most striking points in this catalogue is that there is an asymmetrical distribution of induced seismicity events in Vesta's area of operation (Fig. 1). Essentially, the fracking parameters are similar for all pads, but virtually all the 17,000 events occur SW of this red, acoustic impedance contour line seen below. This talk will further examine the relationship between IS and acoustic impedance.

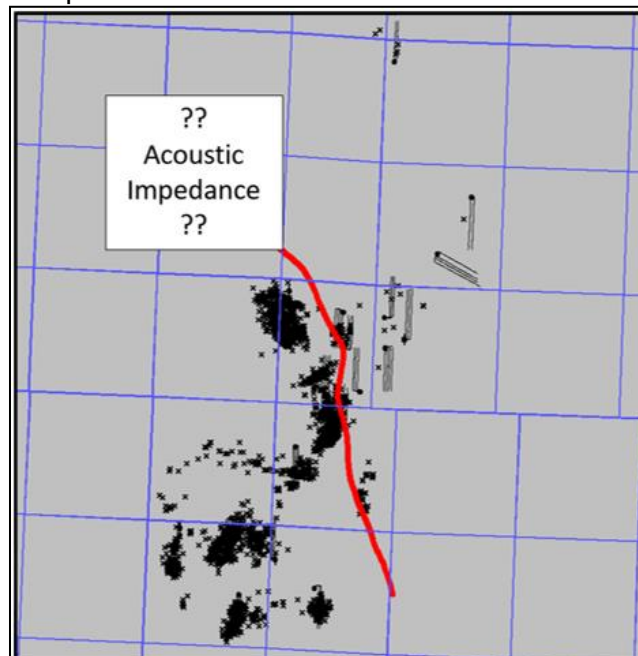


Fig. 1 There is an apparent correlation between detected induced seismicity (IS) and acoustic impedance. The vast majority of detected IS events are to the SW of the red acoustic impedance contour.

Middle Duvernay carbonate content vs clay content seems to influence the depth location, the magnitude, and the frequency of occurrence of seismic events induced by hydraulic fracture programs (Fig.2). This relationship between mineralogy and seismicity will be examined further utilizing both microseismic data and Vesta’s passive surface seismic array catalogue.

