

Use of Seismic AVO Inversion and Ant Tracking Techniques to Understand and Predict Fracture Behaviors

Homayoun Gerami¹, Jiwu Lin¹, Amer Haque², James Johnson¹
¹Schlumberger, ²Mosaic Energy LTD

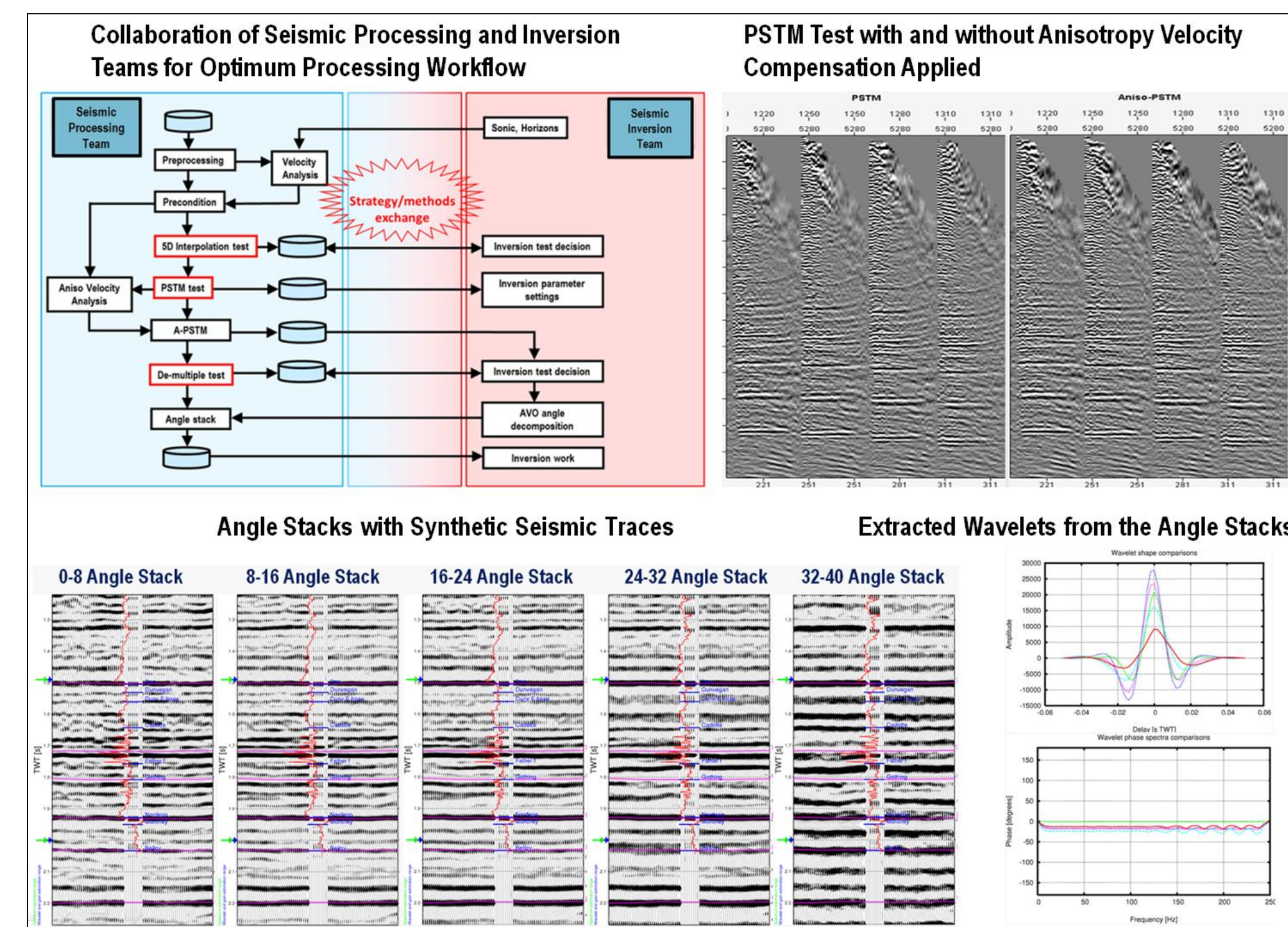
Summary

Unconventional tight oil and gas reservoirs have increasingly been the targets of development, and the use of AVO inversion for unlocking reservoir rock properties has become more popular. In this study, AVO inversion has been applied in the Montney formation, a tight gas siltstone and shale unconventional reservoir in Alberta, Canada. The workflow consisted of seismic processing and data conditioning followed by AVO inversion and ant tracking.

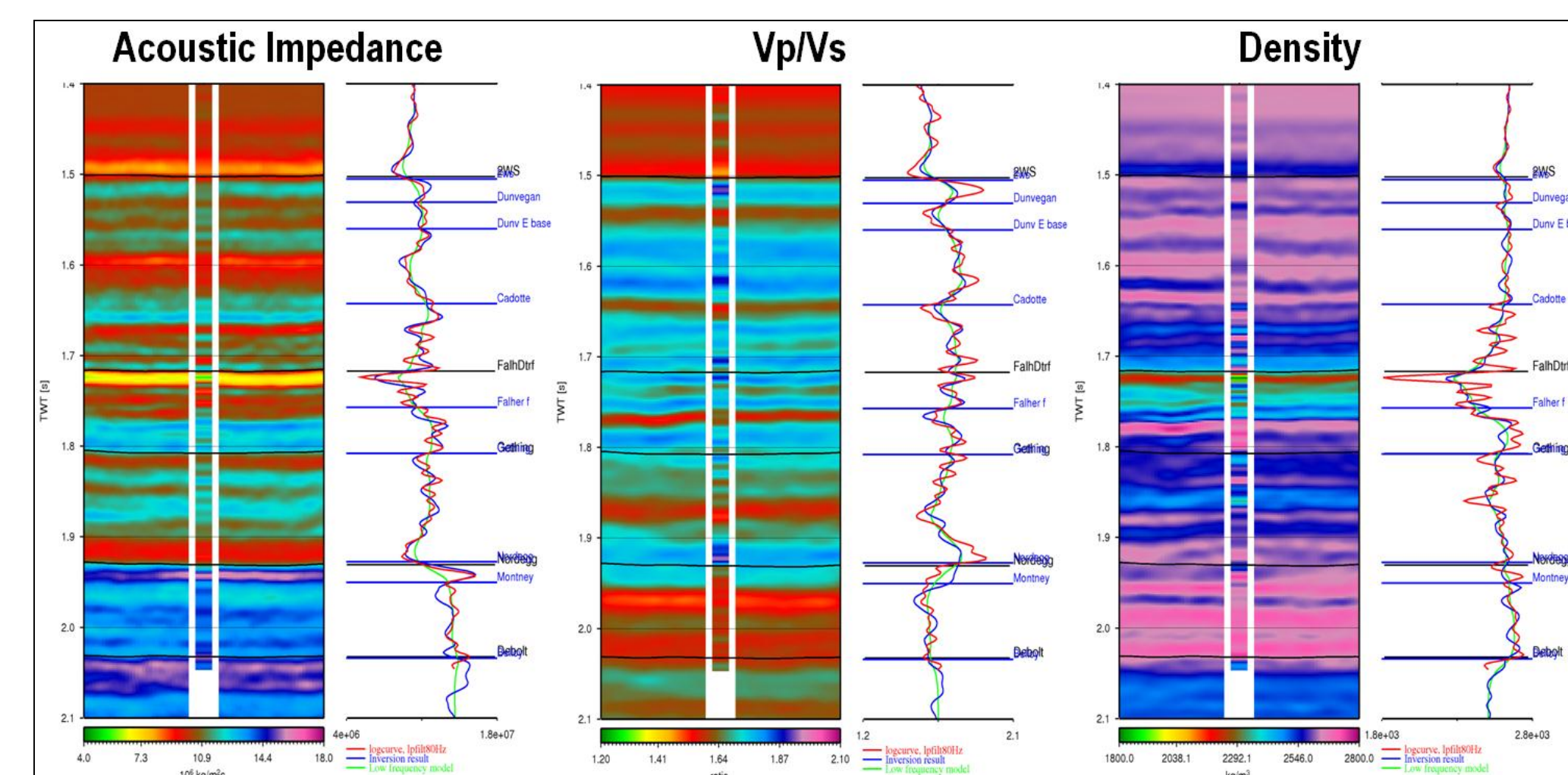
AVO inversion produces a number of elastic reservoir properties such as Compressional and shear impedance, Vp/Vs ratio, Young's modulus, Poisson's ratio and density. These properties are useful for unconventional plays because they can be related to the petrophysical properties and/or rock reservoir qualities.

Ant tracking is also an indicator of discontinuities in the subsurface. Integrating the results of inversion and ant tracking reveals a more complete picture of the reservoir that can be used to optimize field development strategies. The integrated results can be also used for better planning of infill horizontal drilling and hydraulic fracturing aiming for higher production rates.

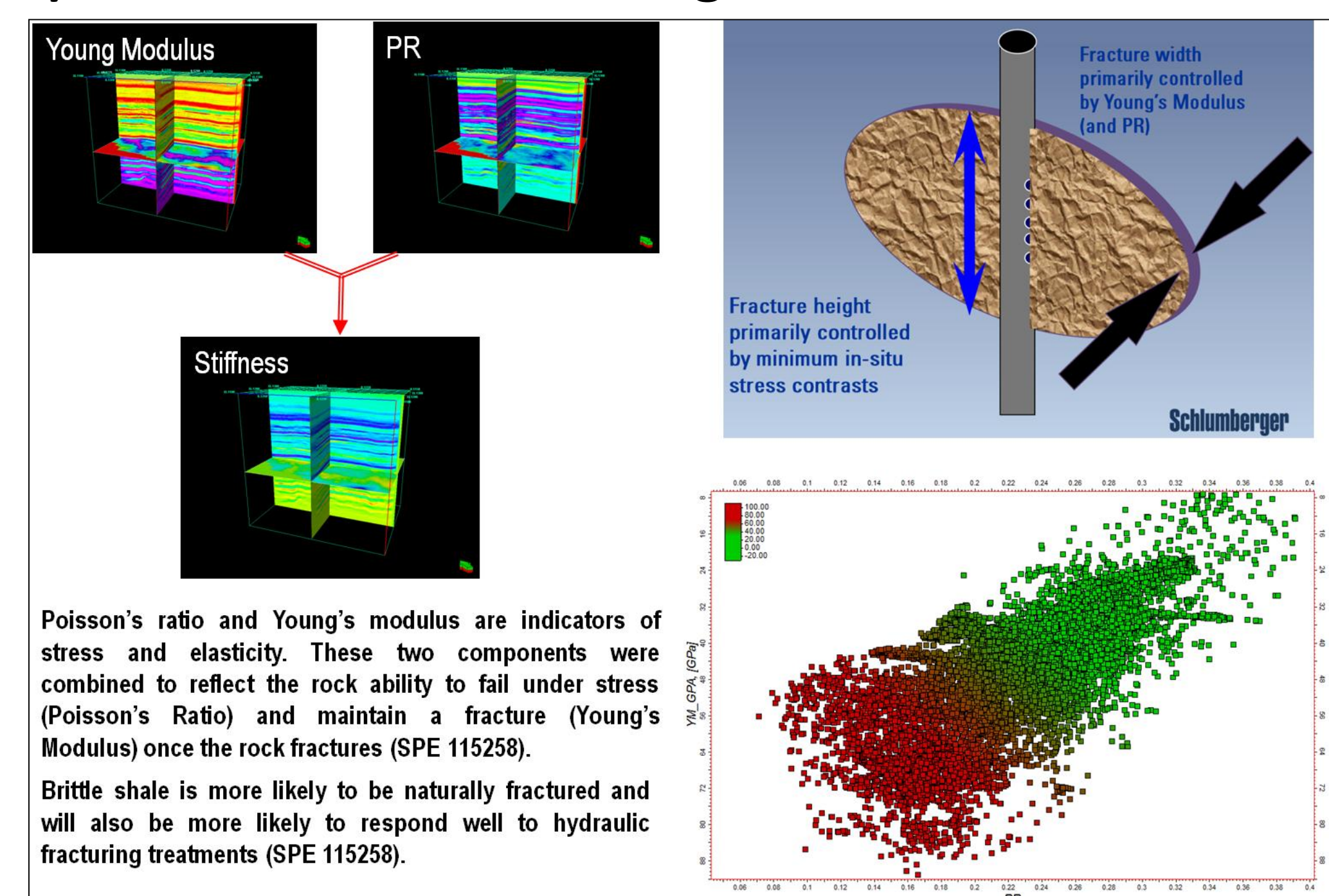
1) Seismic Data Pre-Conditioning for AVO Inversion



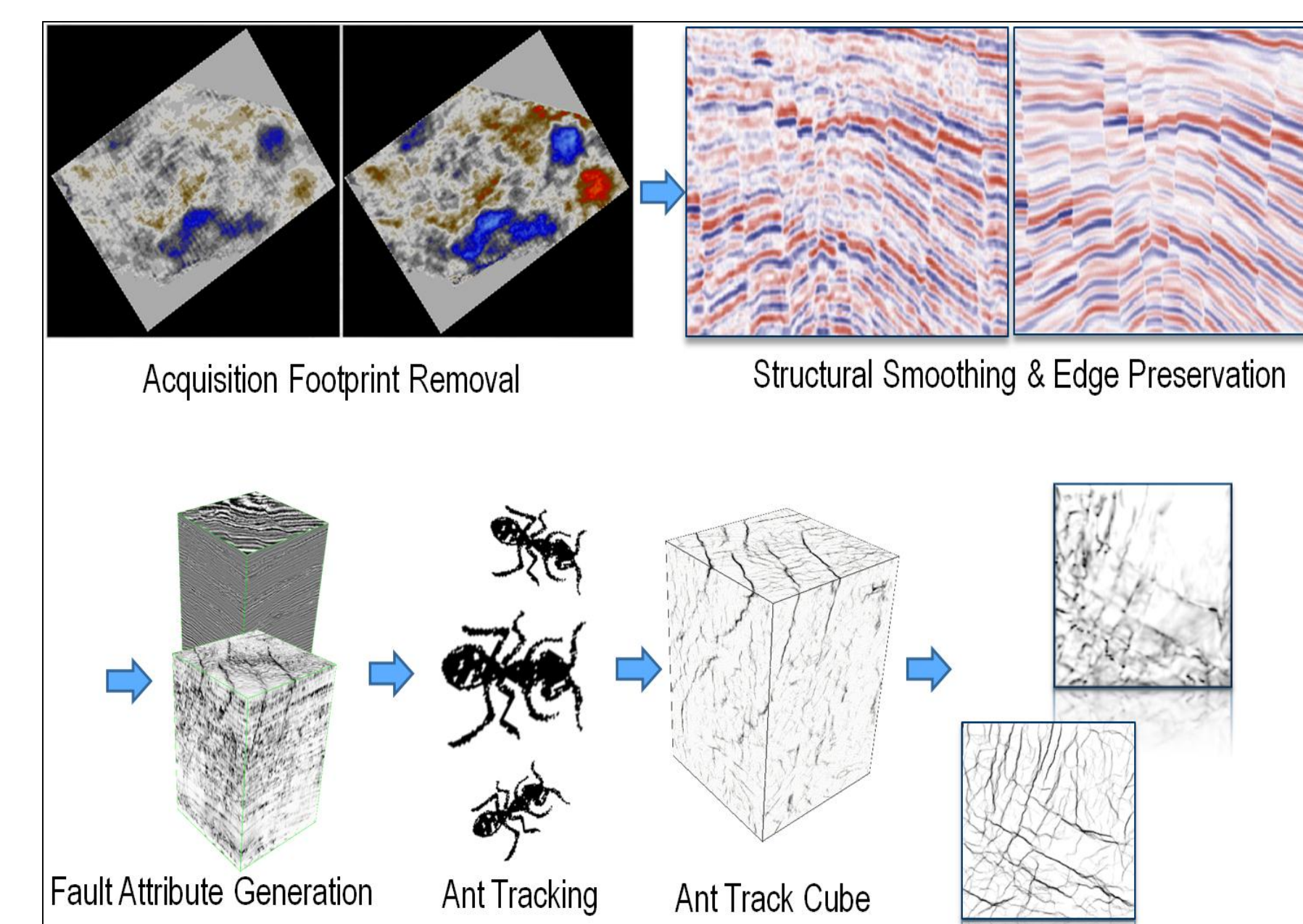
2) Simultaneous AVO Inversion Results



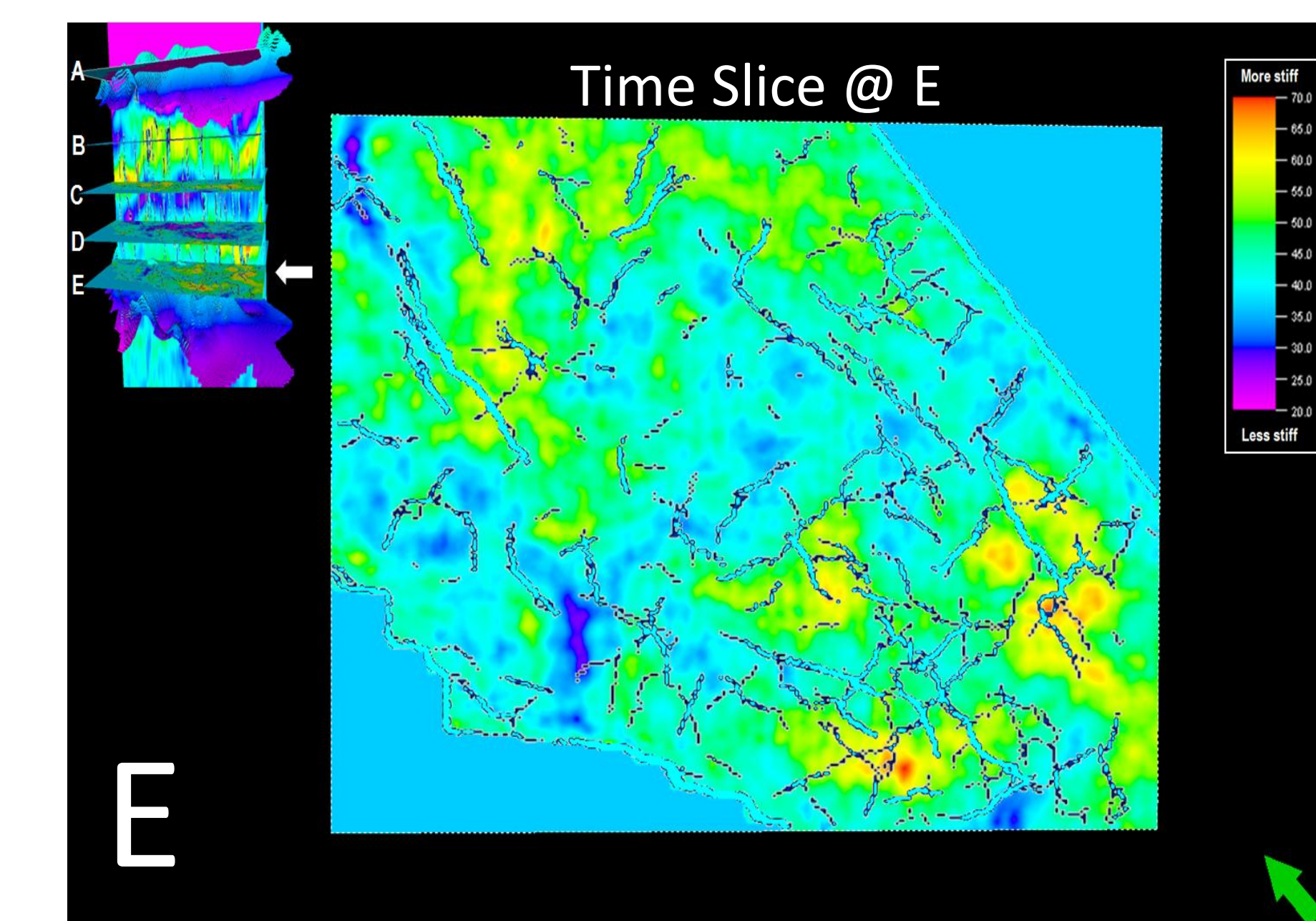
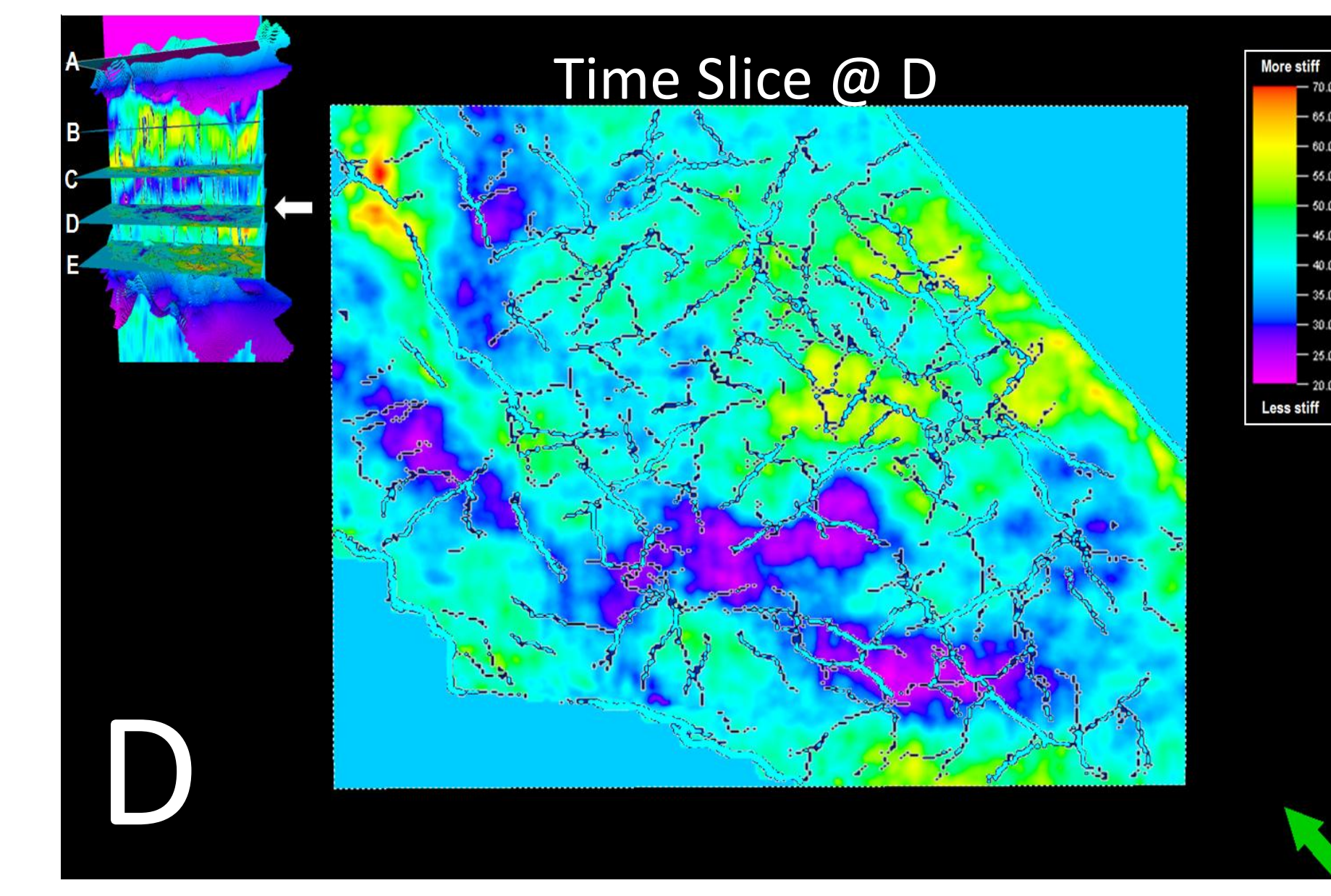
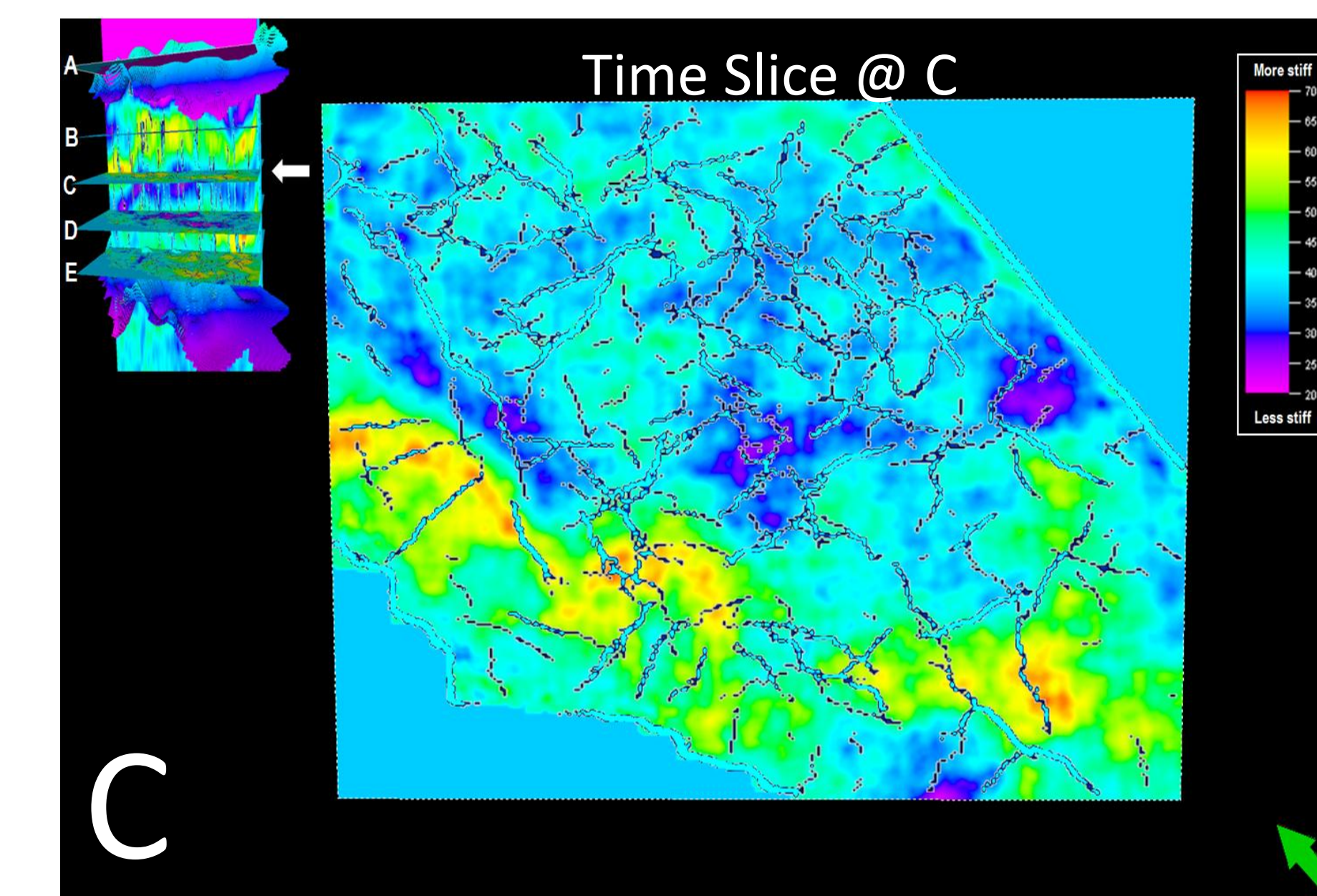
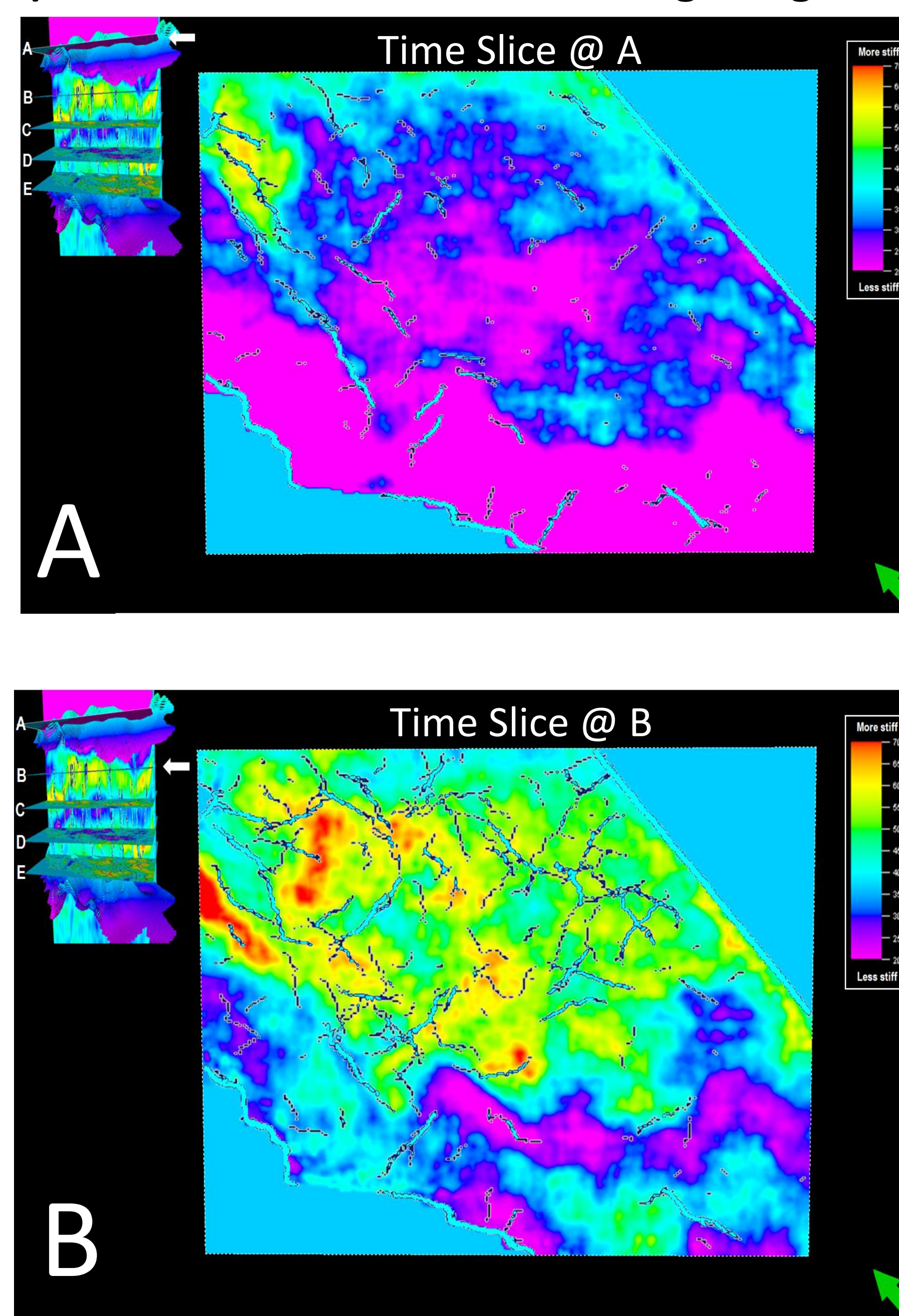
3) Poisson Ratio and Young Modulus Combination



4) Ant Tracking



5) AVO Inversion and Ant Tracking Integration



6) Conclusion

- Good correlation in between of Ant Tracking and Stiffness from AVO inversion suggest to always run and integrate these two products together.
- Such integration provide further confidence to use the result for future hydraulic fracturing optimization and filed development plans.

7) Acknowledgement

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8) Contact

Please contact Homayoun Gerami hgerami@slb.com for any queries.