



**TeriC**

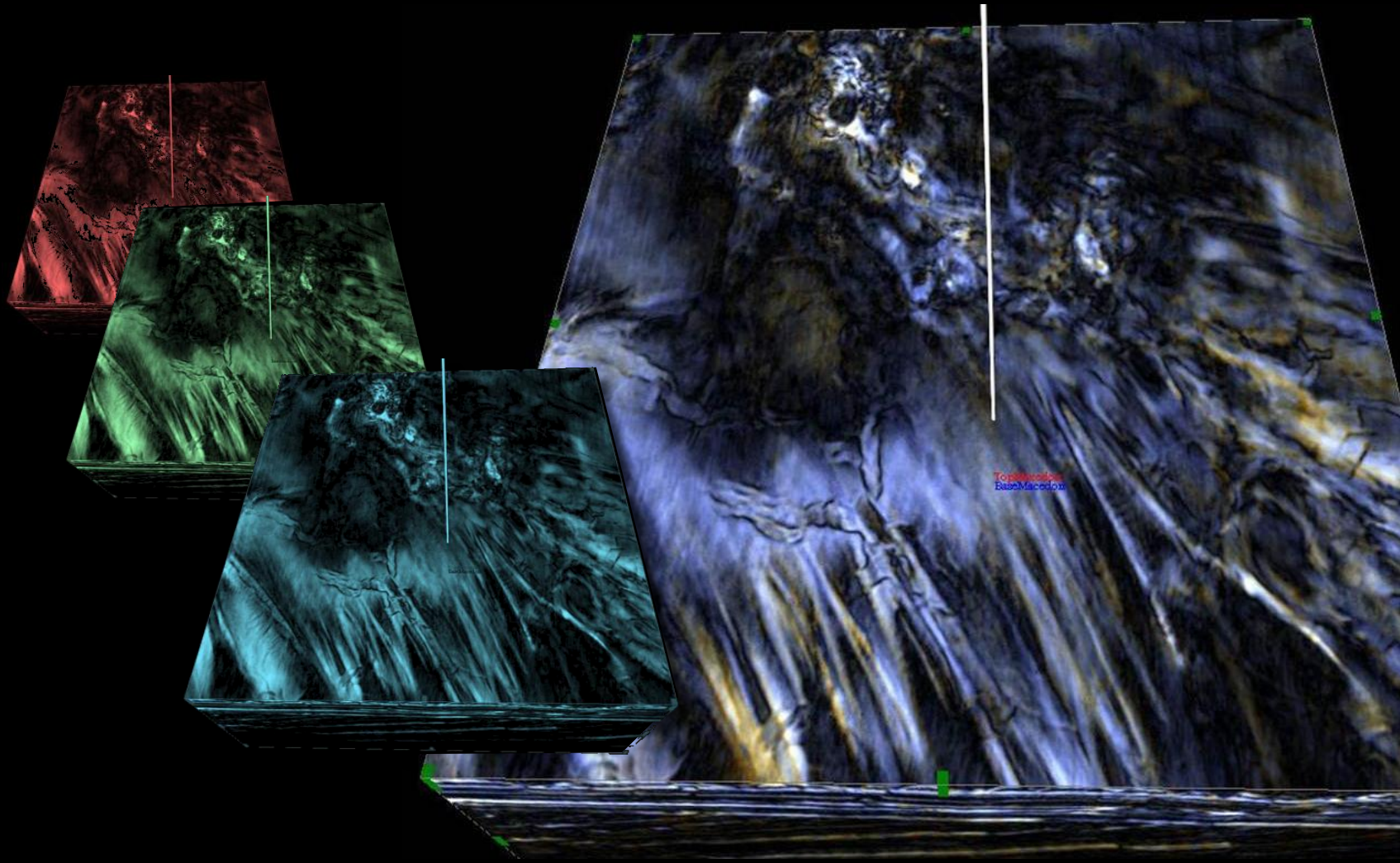
from ffA



# High Definition Frequency Decomposition and its Application to Carbonate and Clastic Data

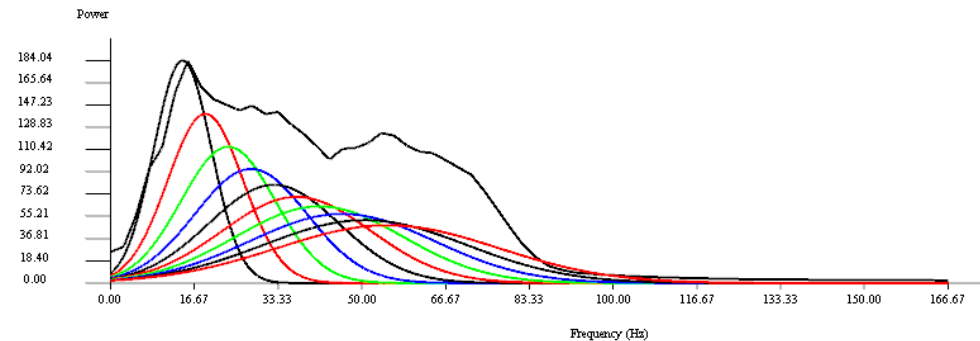
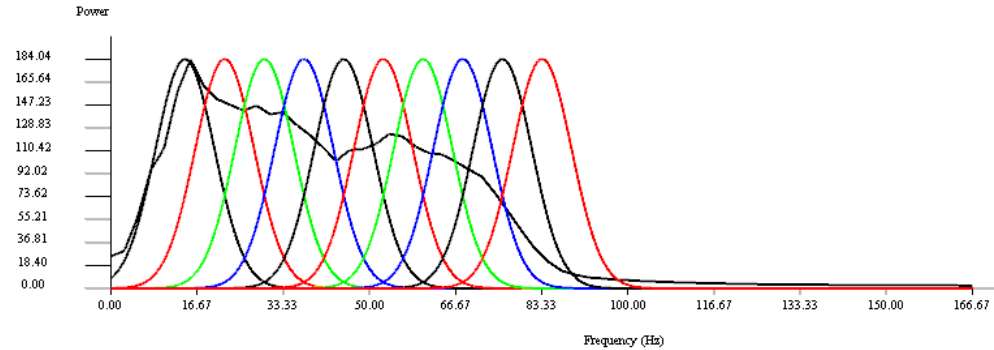
Maral Halliyeva

# HD Frequency Decomposition



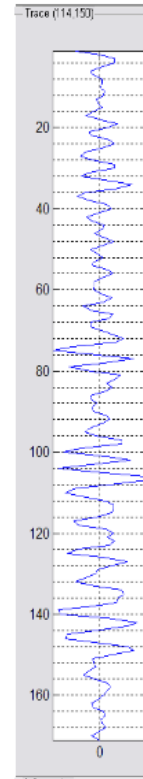
# Standard Frequency Decomposition

- Fast Fourier transform – good frequency contrast at the expense of vertical resolution
- Wavelet transform using Gabour wavelets – good frequency contrast, better vertical resolution

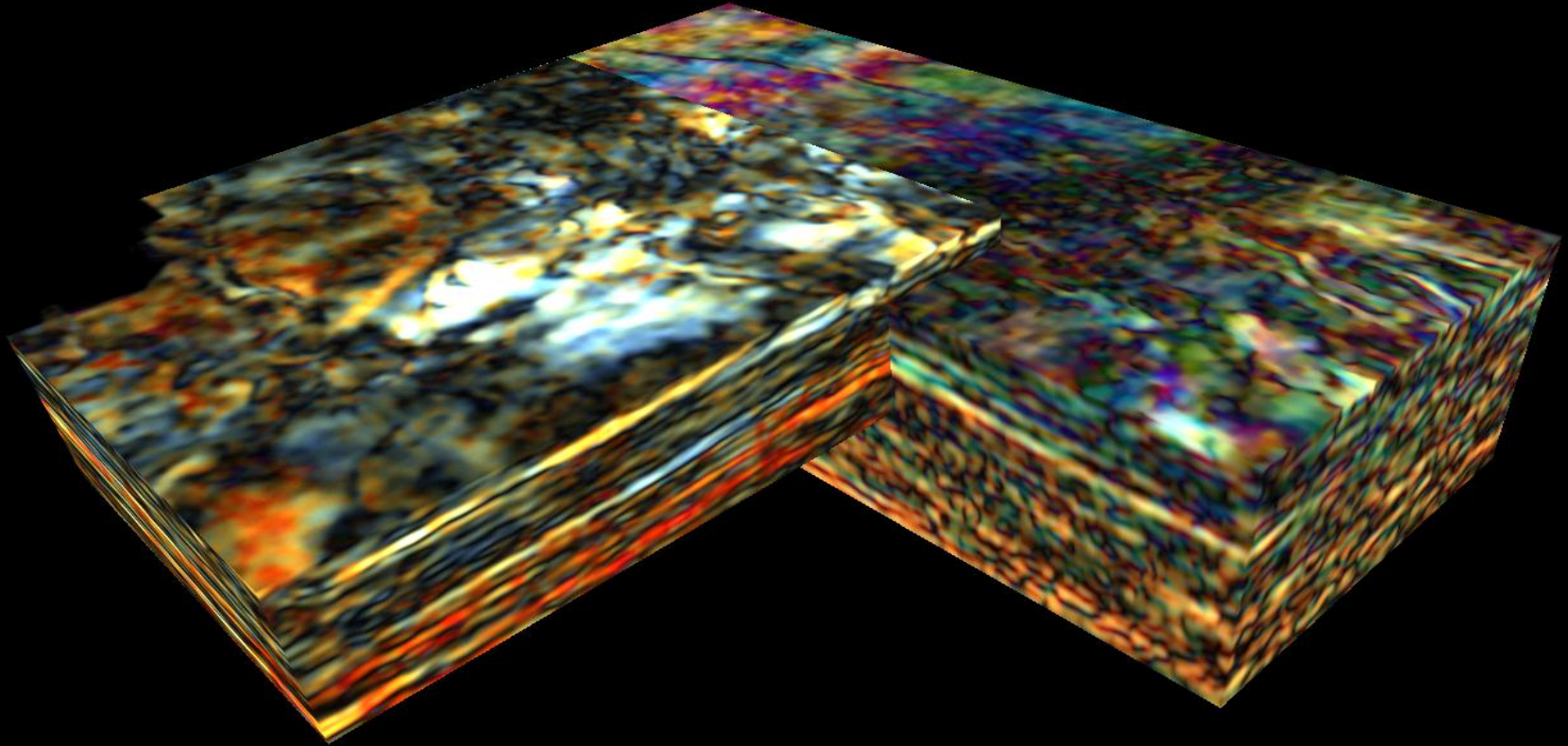


# HD Frequency Decomposition

- Gabor Wavelet Transform combined with adaptive scale space analysis, decomposes the signal in terms of wavelets
- Frequency Decomposition with maximum resolution in the Frequency and Time domain



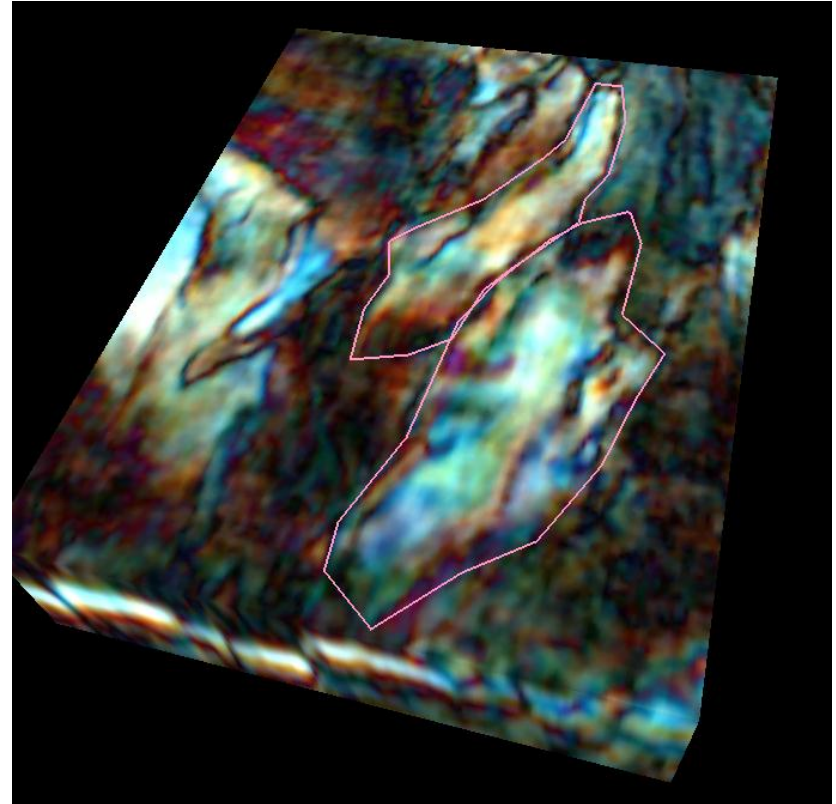
# Clastic Case Study: Offshore West Australia



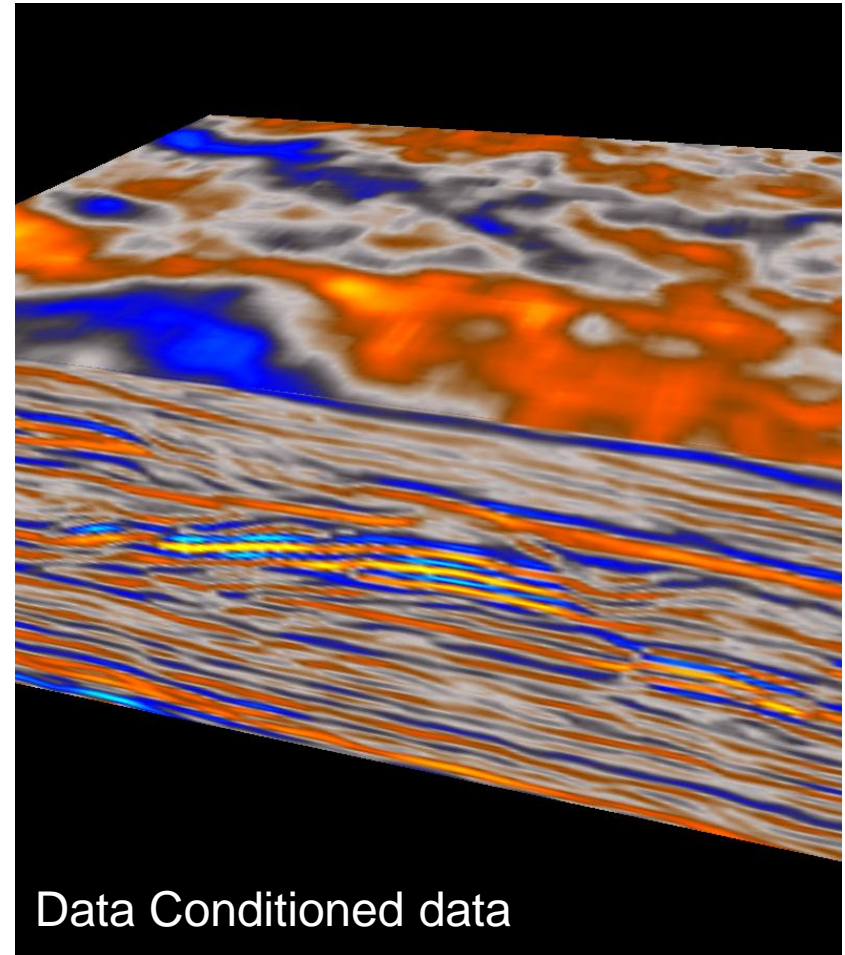
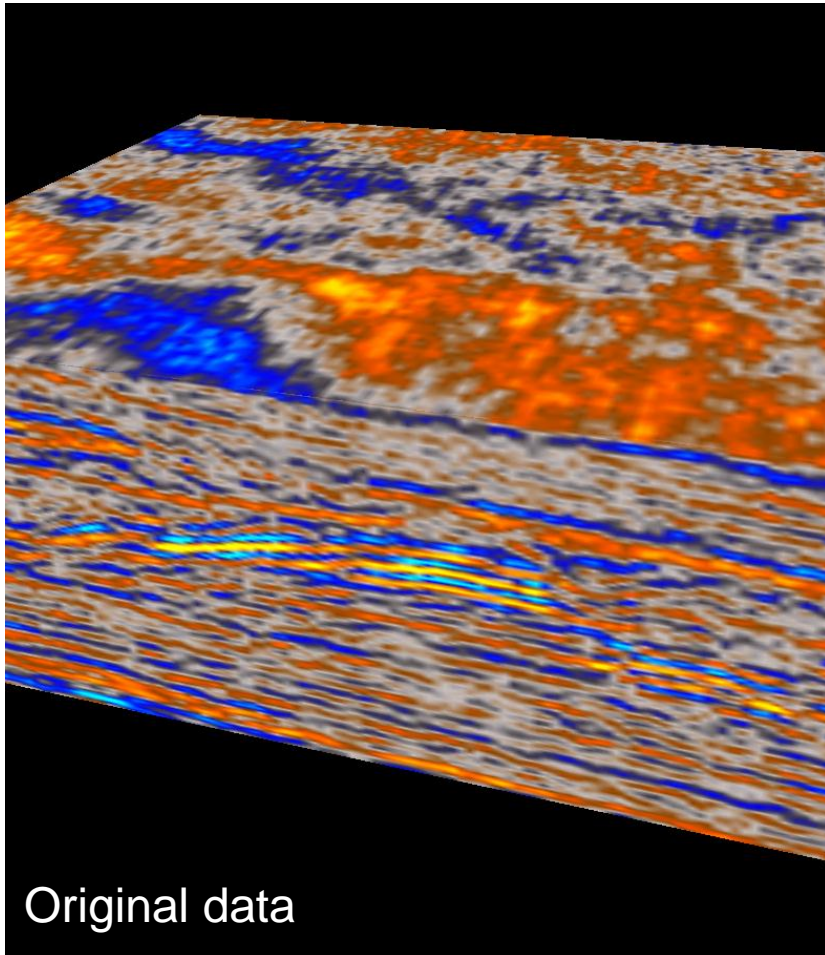
# Clastic Case Study: Offshore West Australia

## Objectives:

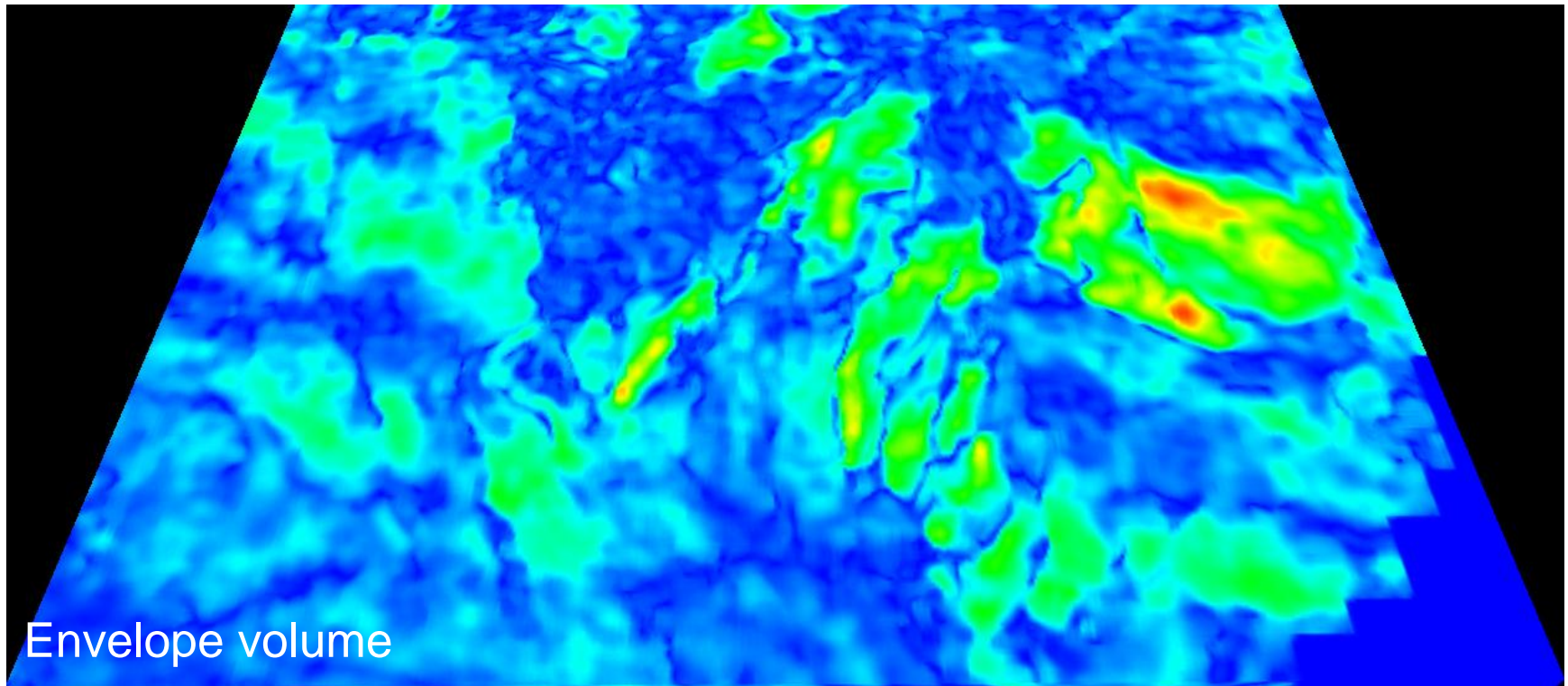
- Data Conditioning
- Investigate the depositional pattern of fans



# Data Conditioning



# Sub-reservoir stratigraphic delineation

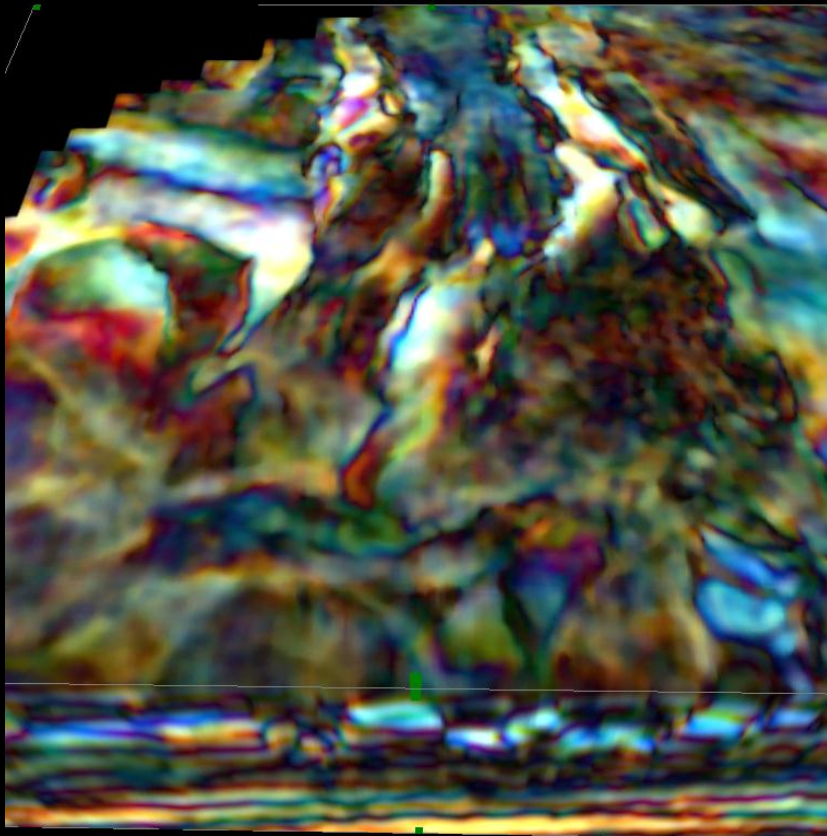


- It is important to know how the fans develop through time
- Highlight potential reservoir zones and targets for drilling

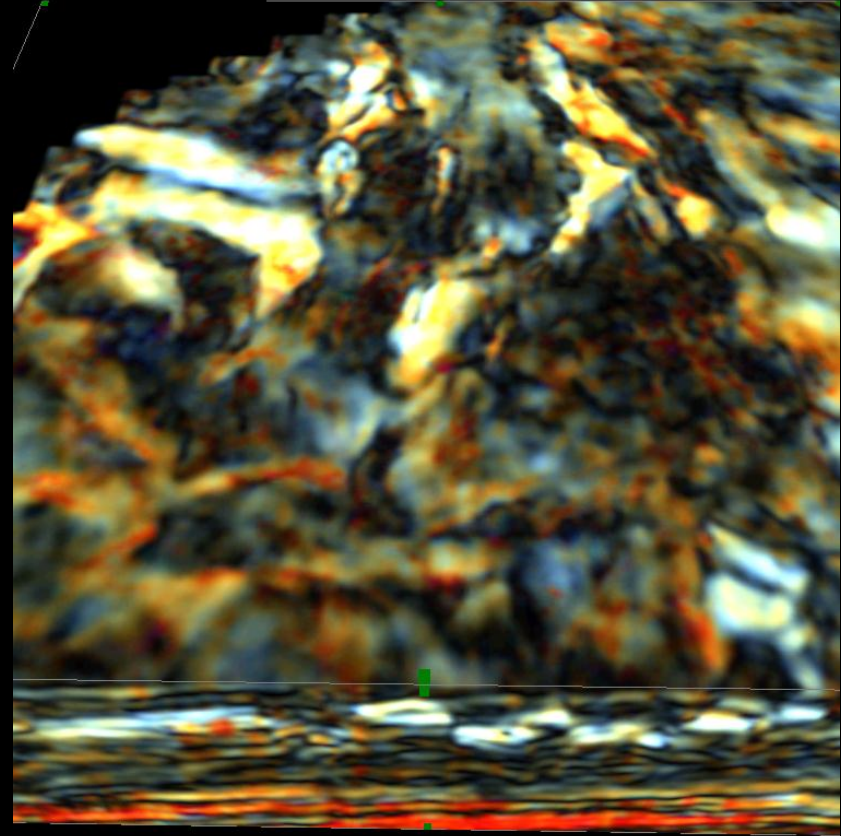




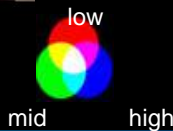
# Sub-reservoir stratigraphic delineation



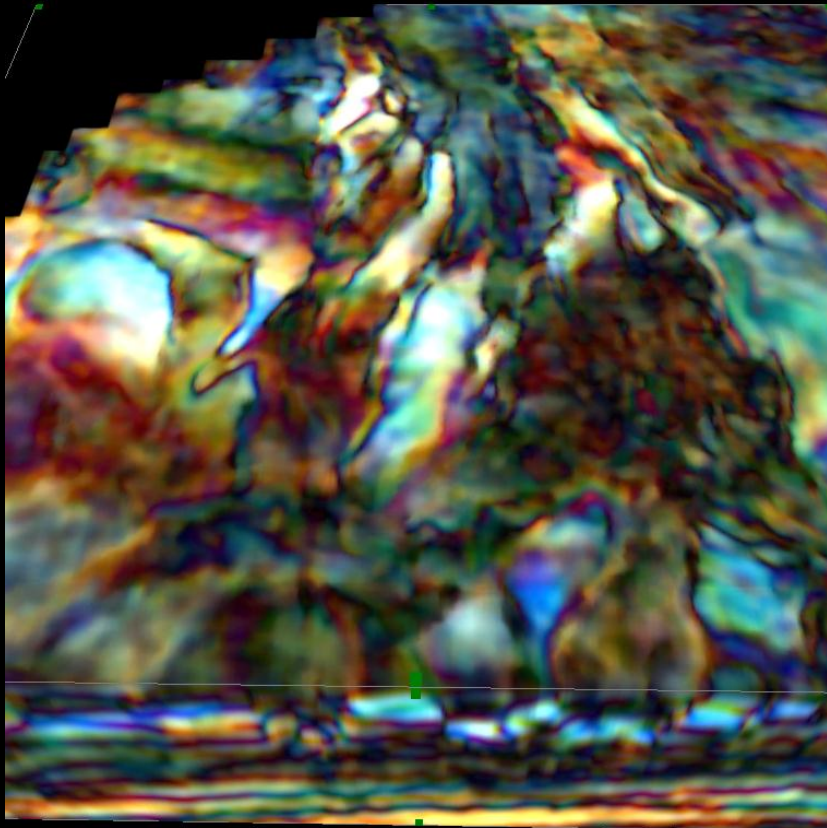
Standard Frequency  
Decomposition



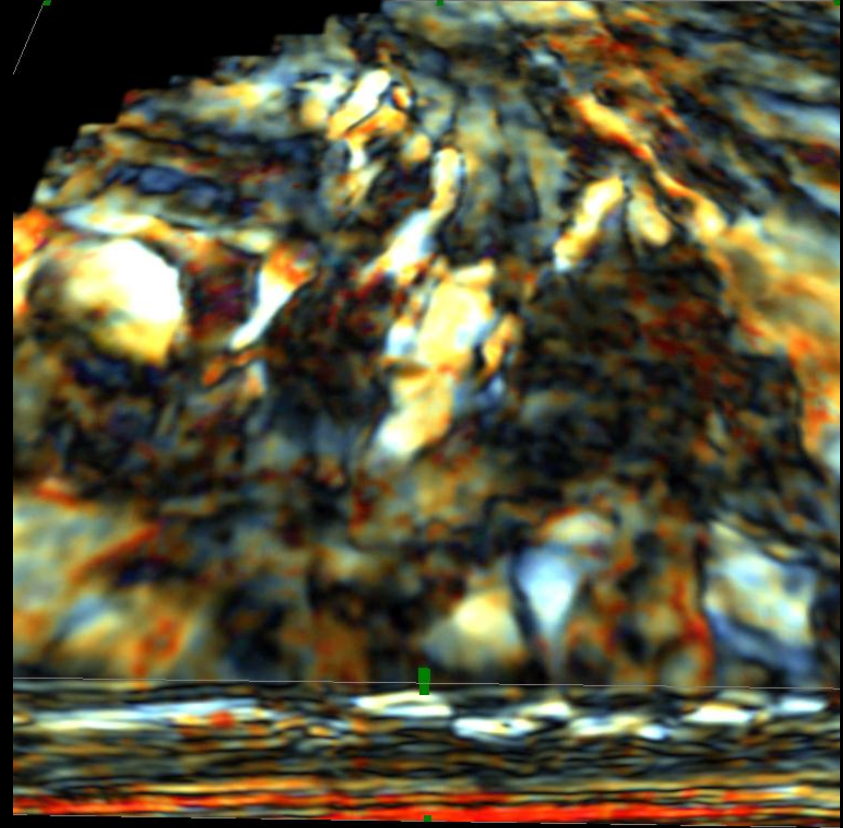
*HD* Frequency Decomposition



# Sub-reservoir stratigraphic delineation



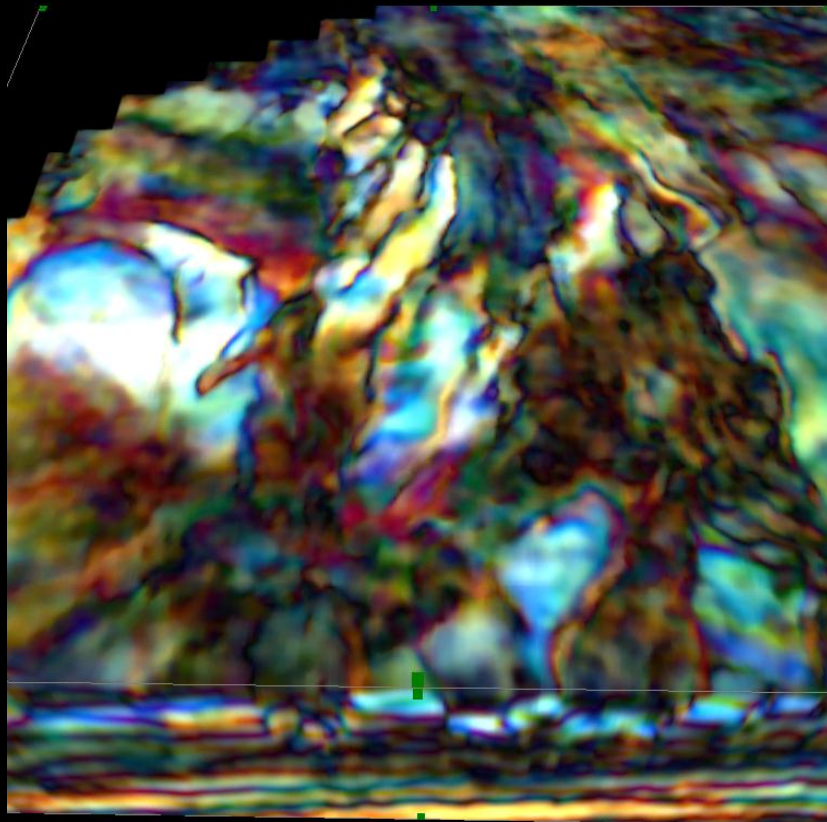
Standard Frequency  
Decomposition



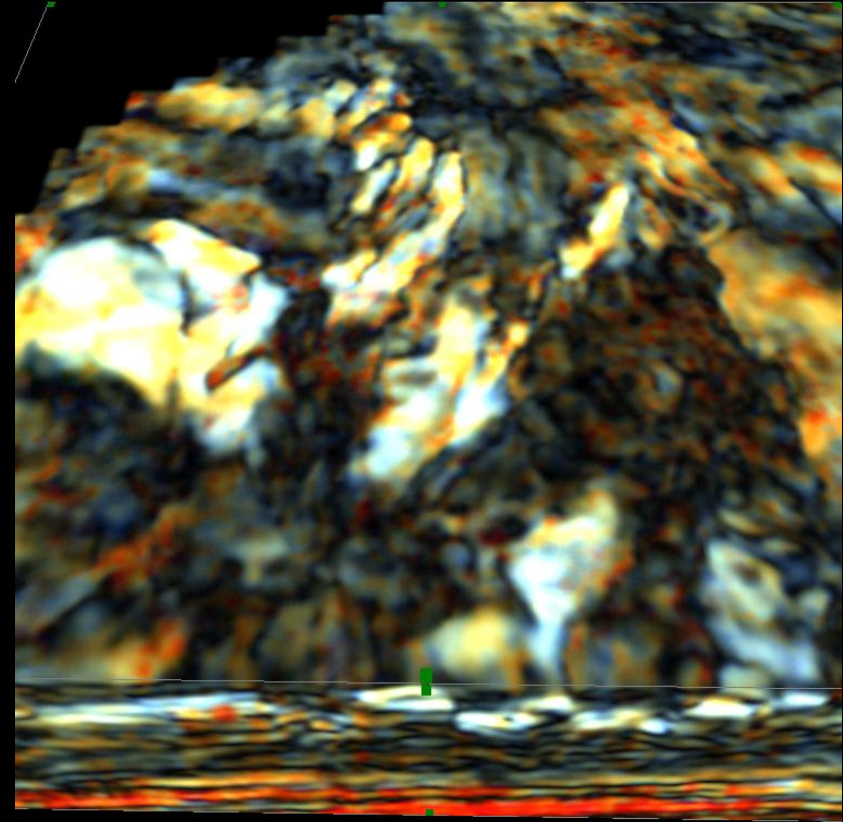
*HD* Frequency Decomposition



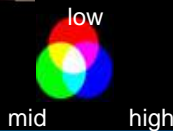
# Sub-reservoir stratigraphic delineation



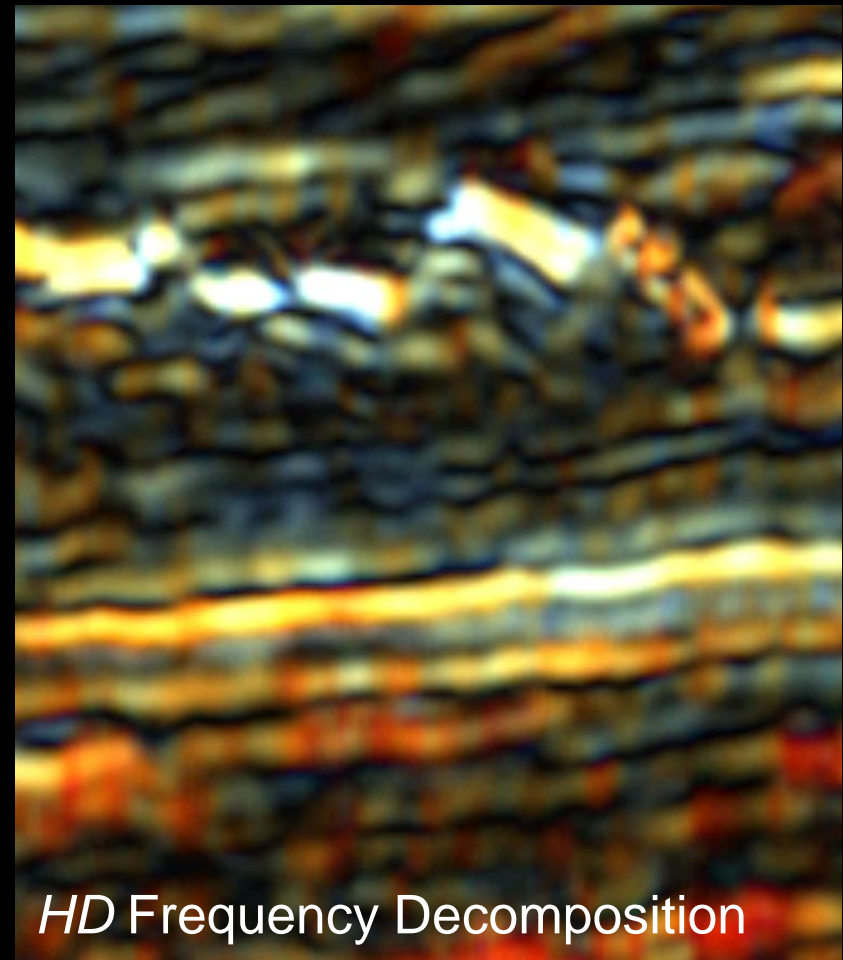
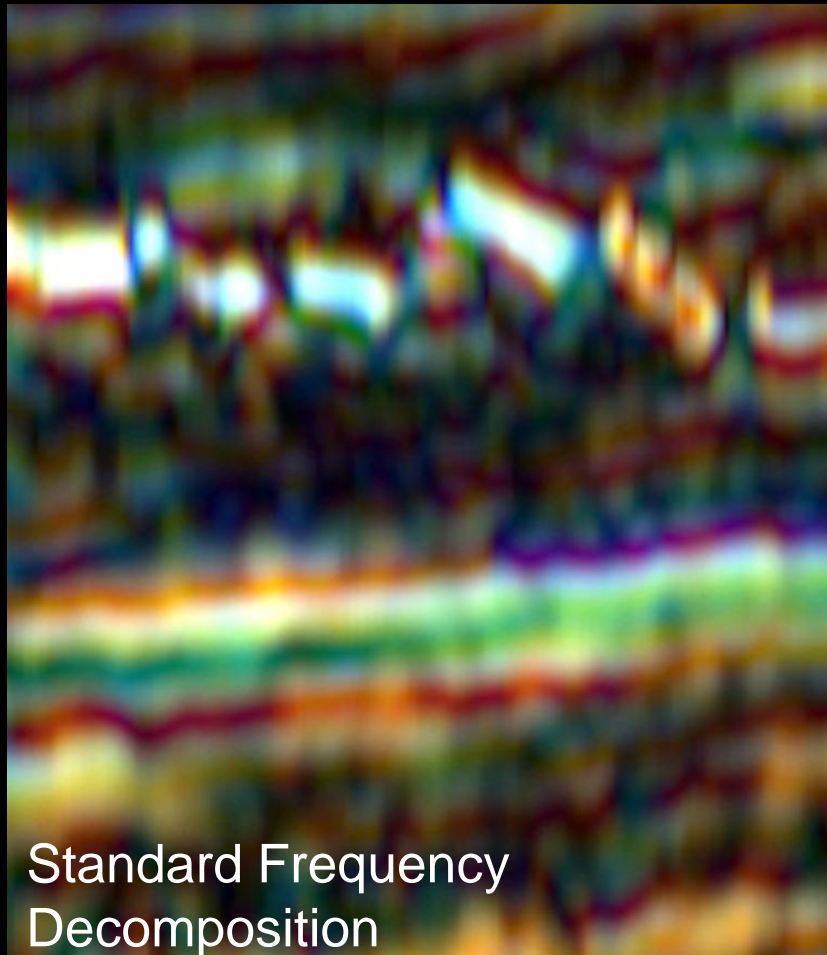
Standard Frequency  
Decomposition



*HD* Frequency Decomposition

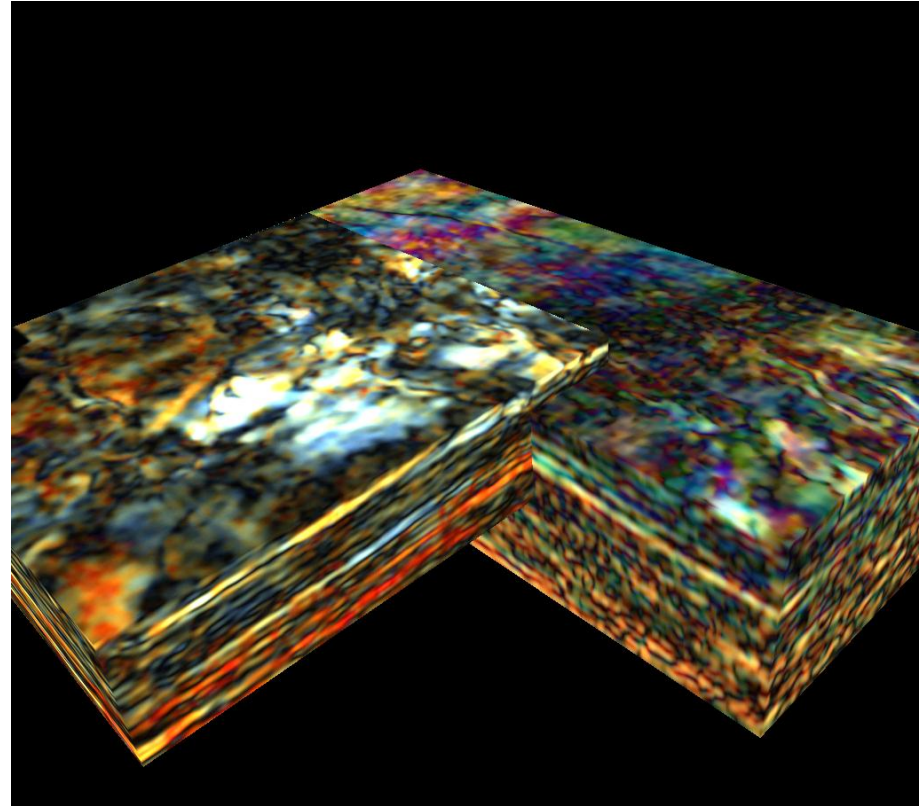


# Sub-reservoir stratigraphic delineation



# Clastic Case Study Conclusions

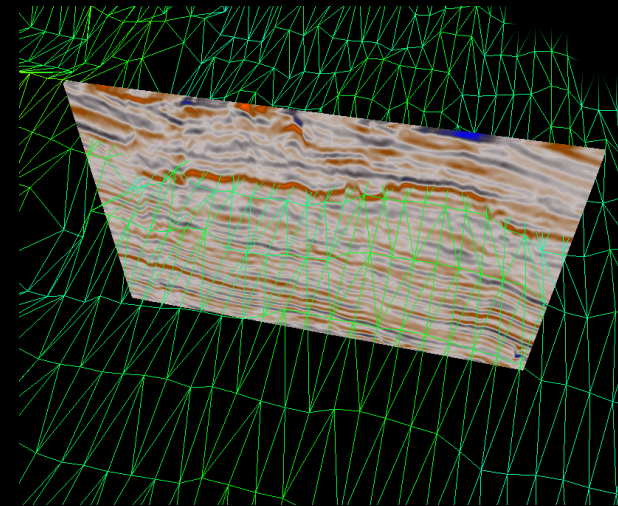
- Data conditioning has improved the overall result of the proceeding workflows
- The depositional pattern of the fans was successfully investigated using HDFD



# Carbonate Case Study – Offshore West Australia



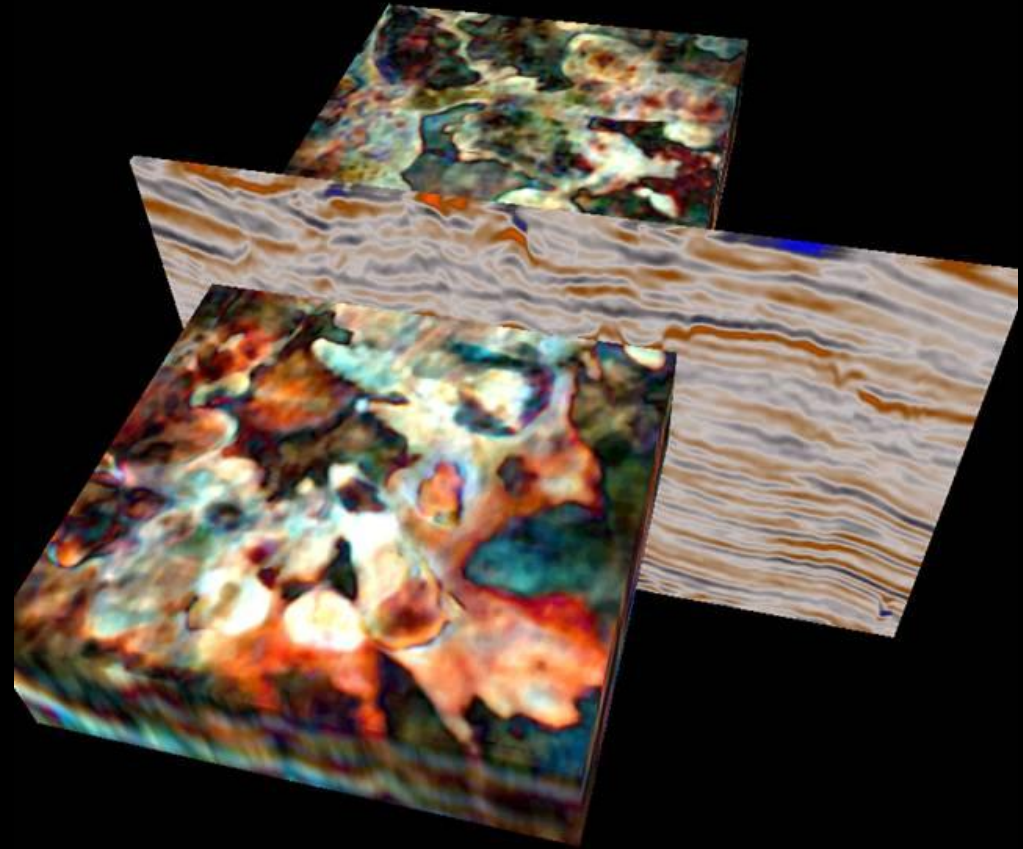
- Demeter area
- Thick carbonate section with different episodes of deposition
- Strong Top Platform event in the middle of the carbonate section



# Carbonate Case Study: Offshore West Australia

## Objectives:

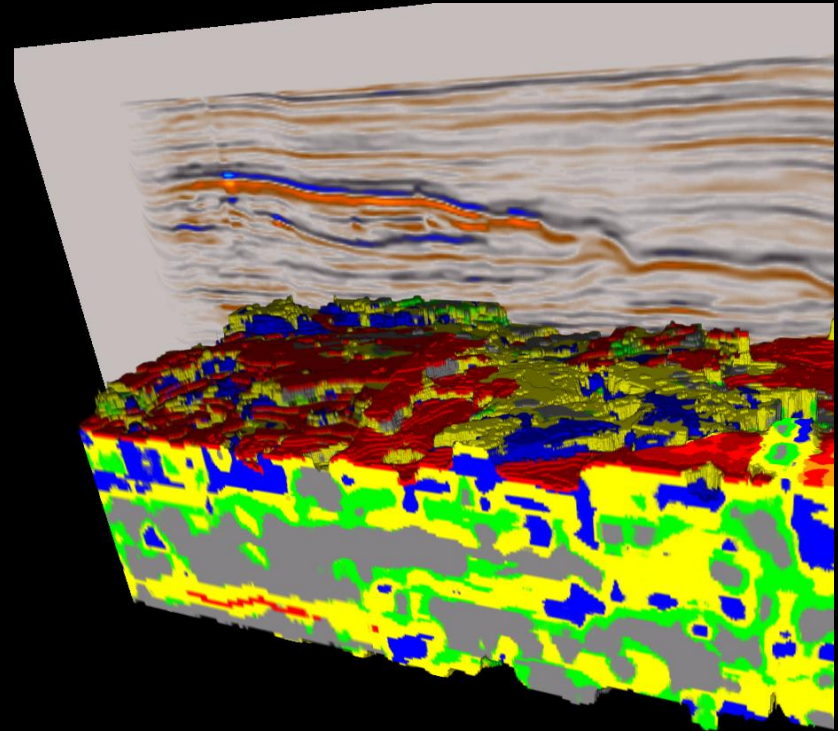
- Facies classification
- Highlight variation within the Top Platform
- Investigate variation within zones of high fracture



# Carbonate Case Study – Facies Characterisation

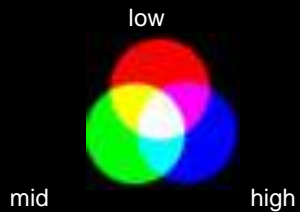
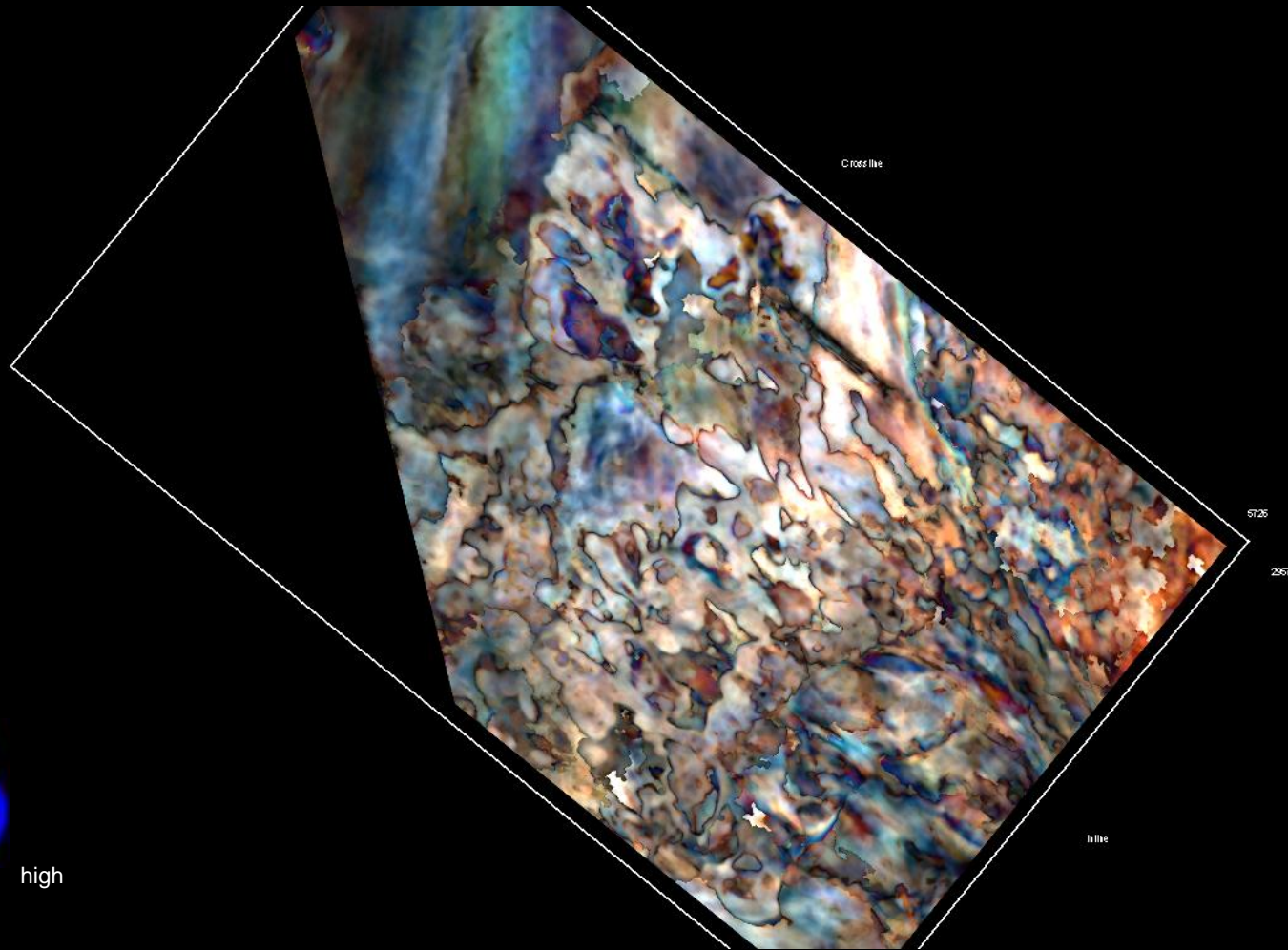
The two sections have a different depositional or diagenetic history

- Heterogeneity revealed with the classification:
  - Red – Top Platform event
  - Dark Blue – High Fracture density
  - Grey – Thin layers
  - Yellow – Thick layers

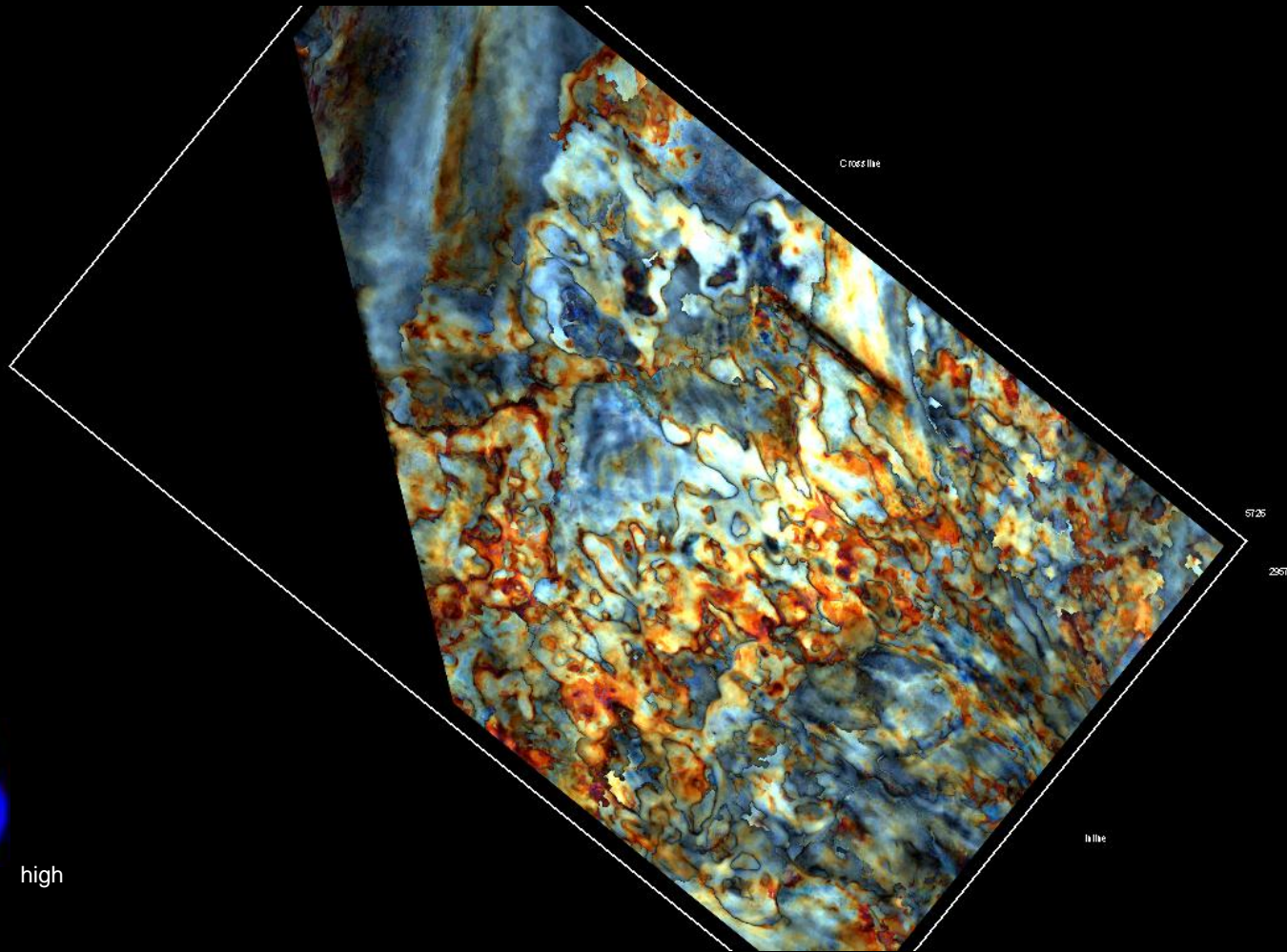




# Case Study – Facies variation in Top Platform



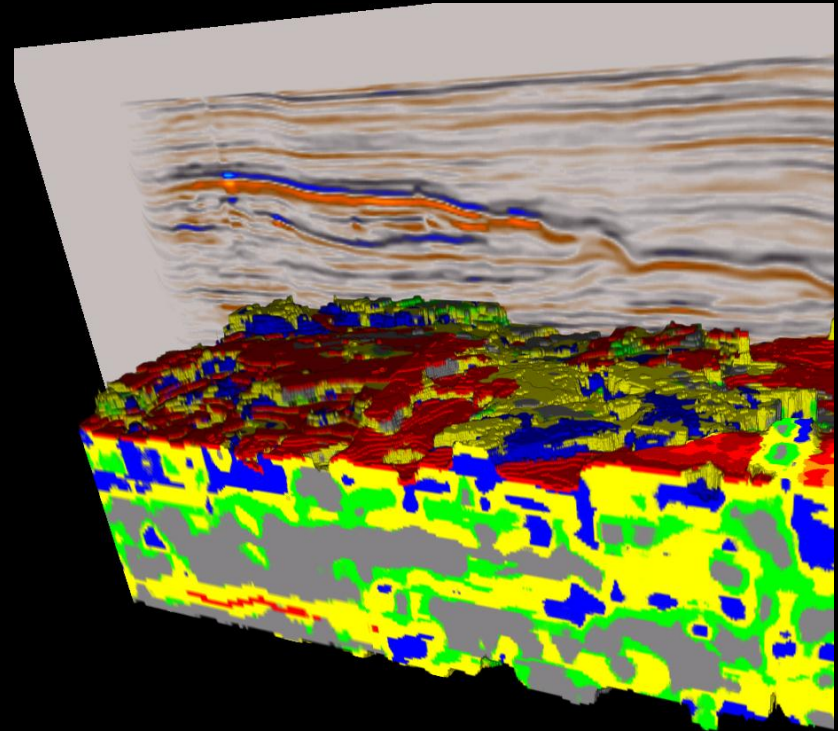
# Case Study – Facies variation in Top Platform



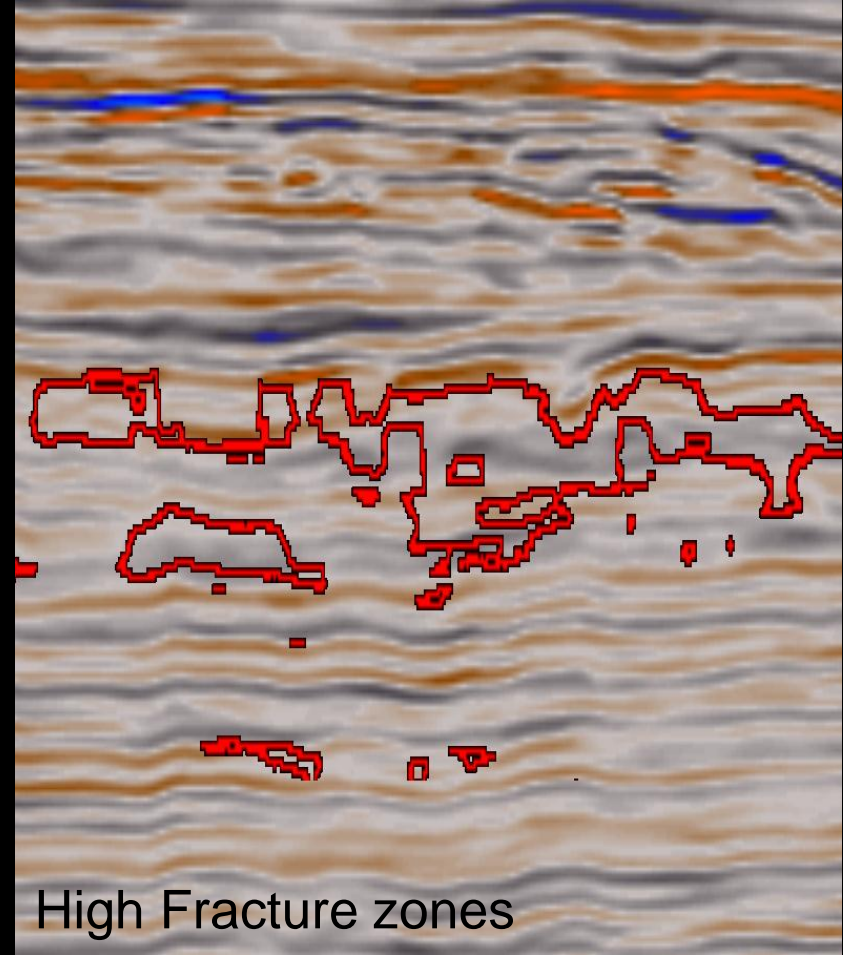
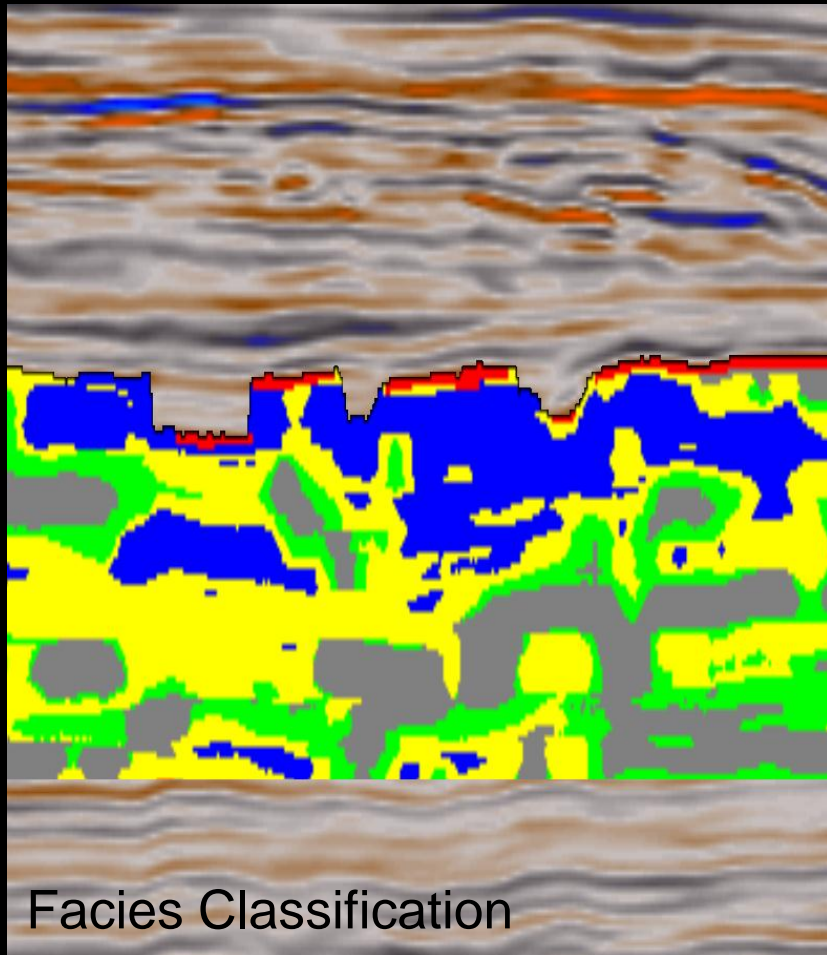
# Carbonate Case Study – Facies Characterisation

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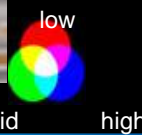
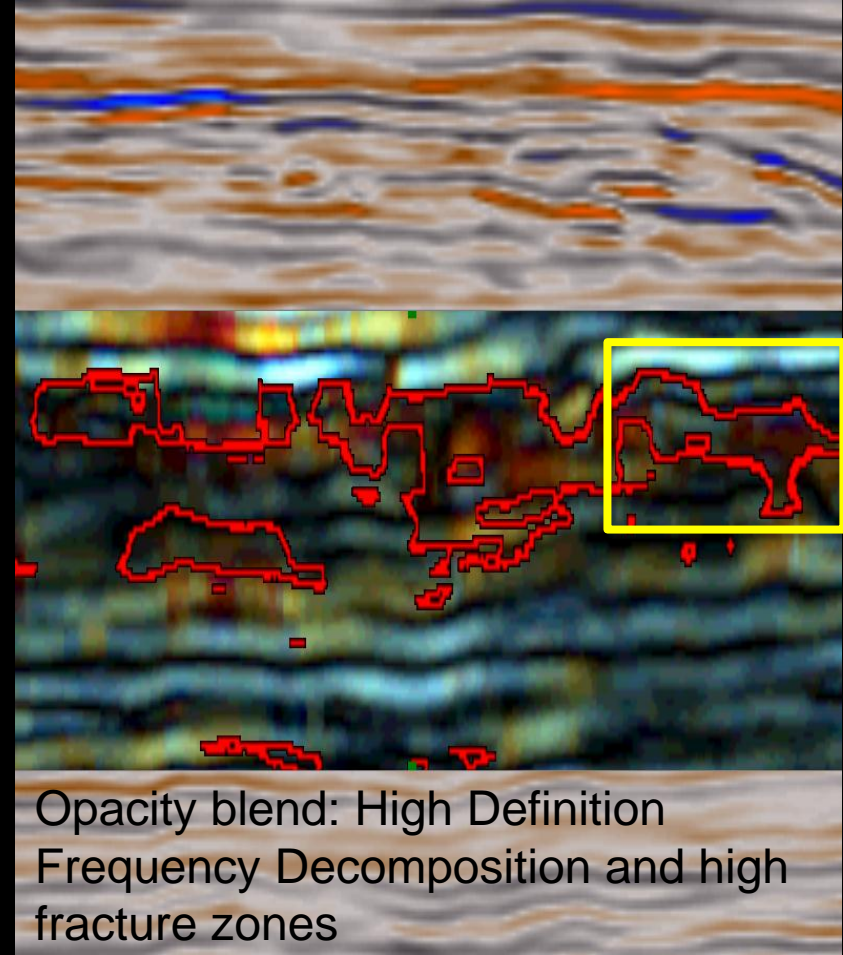
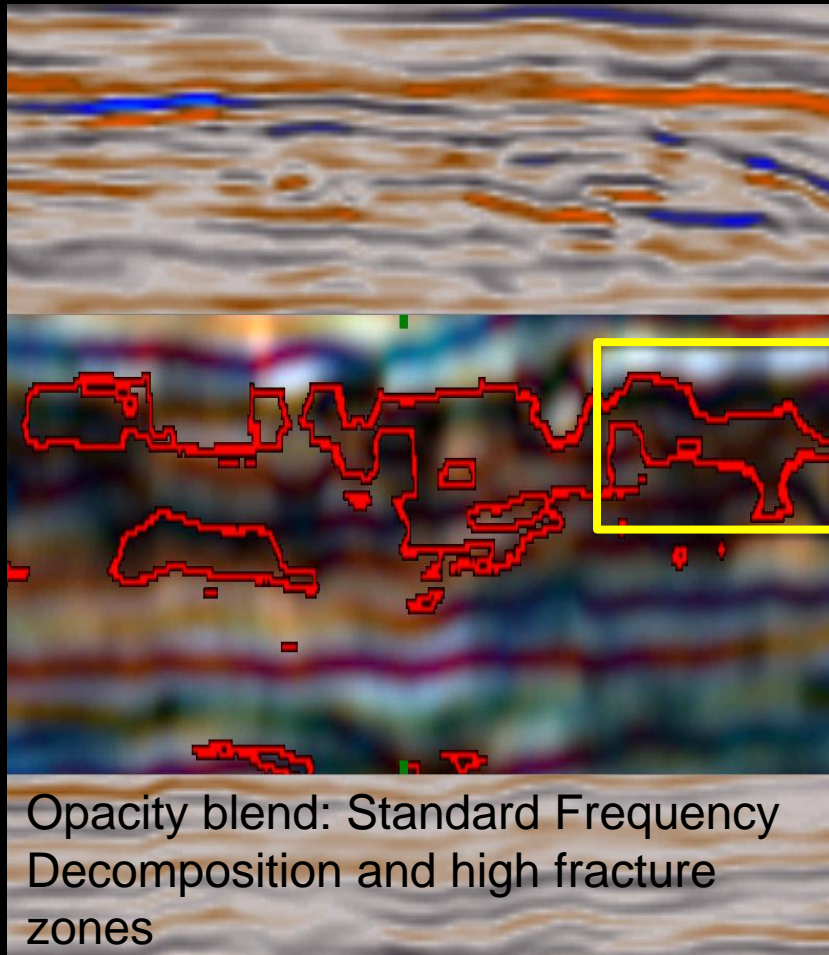
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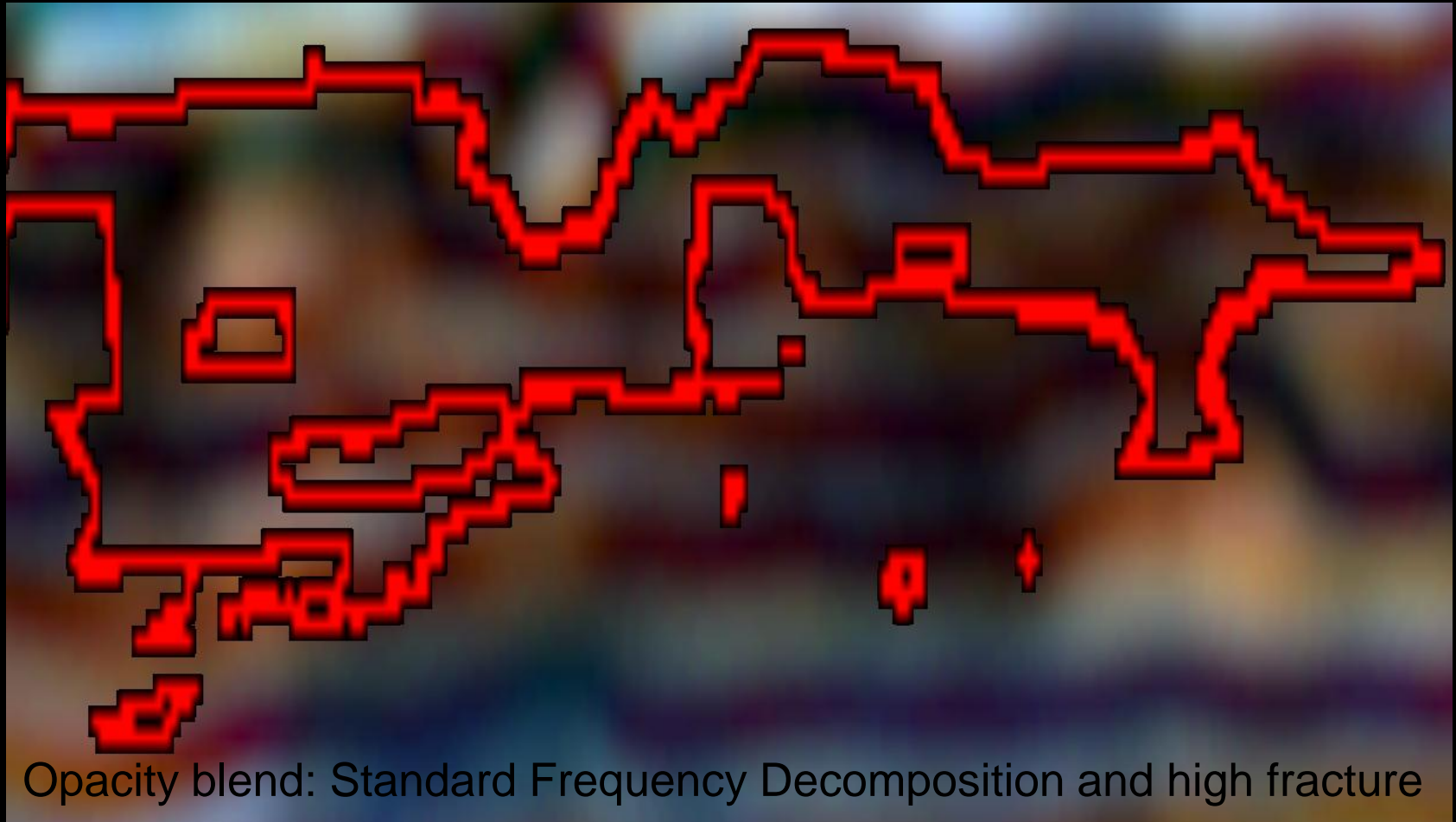
# Carbonate Case study – Zones of High Fracture



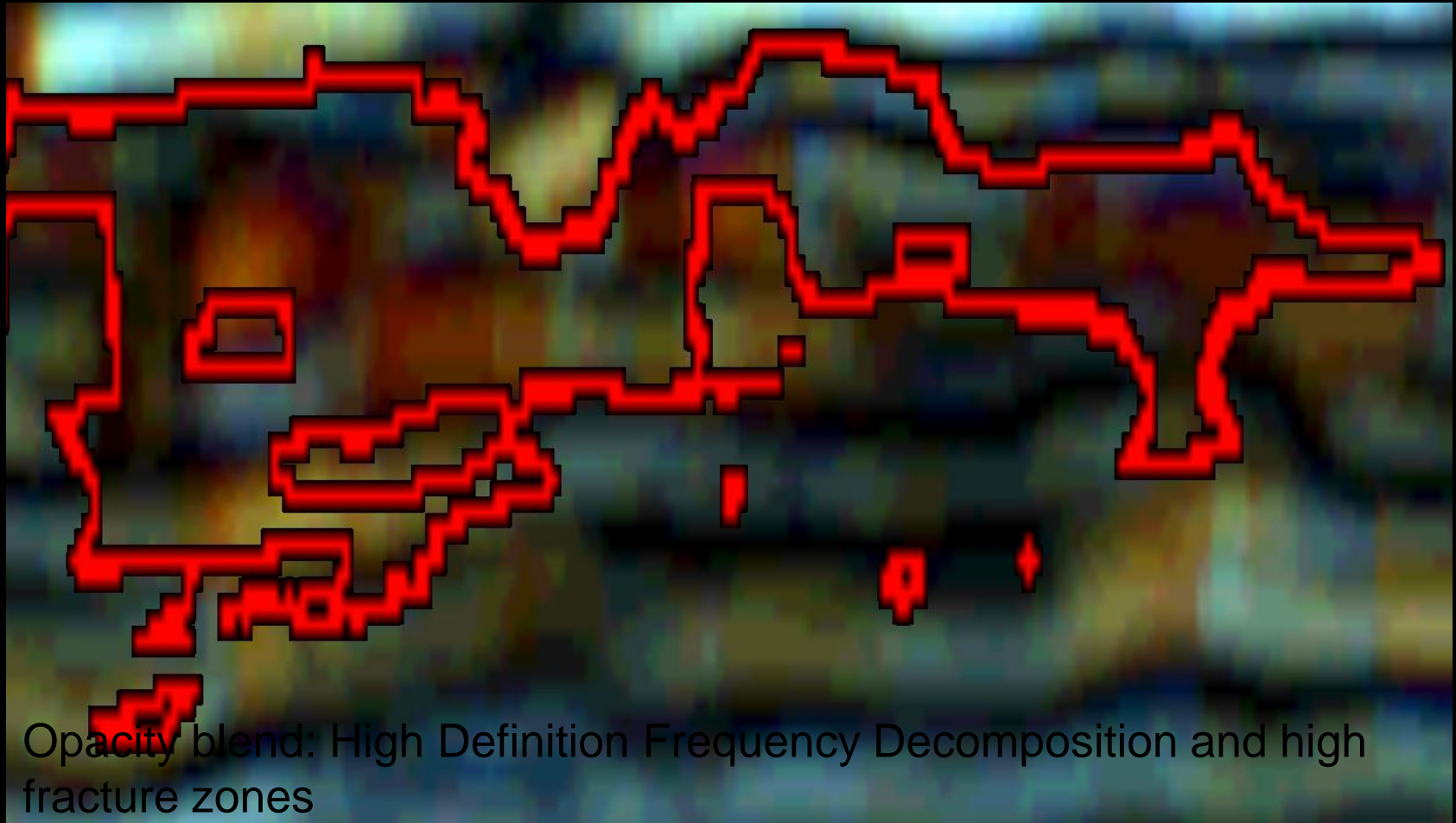
# Carbonate Case study – Zones of High Fracture



# Carbonate Case study – Zones of High Fracture



# Carbonate Case study – Zones of High Fracture



# Carbonate Case Study: Conclusions

- Facies classification has brought out changes on a regional scale
- Both the Standard and High Definition Frequency Decomposition have highlighted changes in the Top Platform
- Increased vertical resolution of HDFD meant that thin events around high fractures zones and the variation within those high fracture zones were imaged

