

# Reflection seismic 1 script

## **Educational Material**

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# Interpretation

- Structures
- Seismic Sequence stratigraphy
- Seismic Facies-Analysis
- Modeling
- (Interpretation of 2D and 3D Data)

# Assumptions by interpretation

- Coherent horizons in the processed data are reflections that are emphasized in the section
- The impedance contrast correspond with the layering in the subsurface  
⇒ Reflections reflect this layering
- Seismic details (waveform, amplitudes etc.) have their origin in the lithology

# **Analysis of geological Structures**

## **Mapping:**

**Position of the main horizons**

**Disturbances**

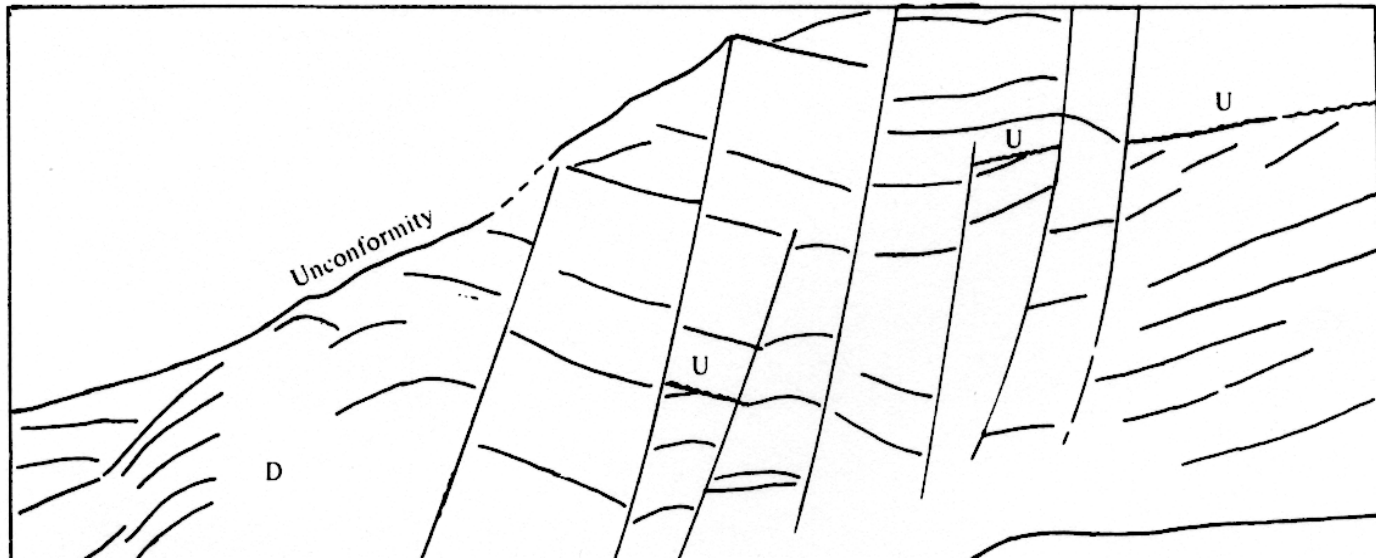
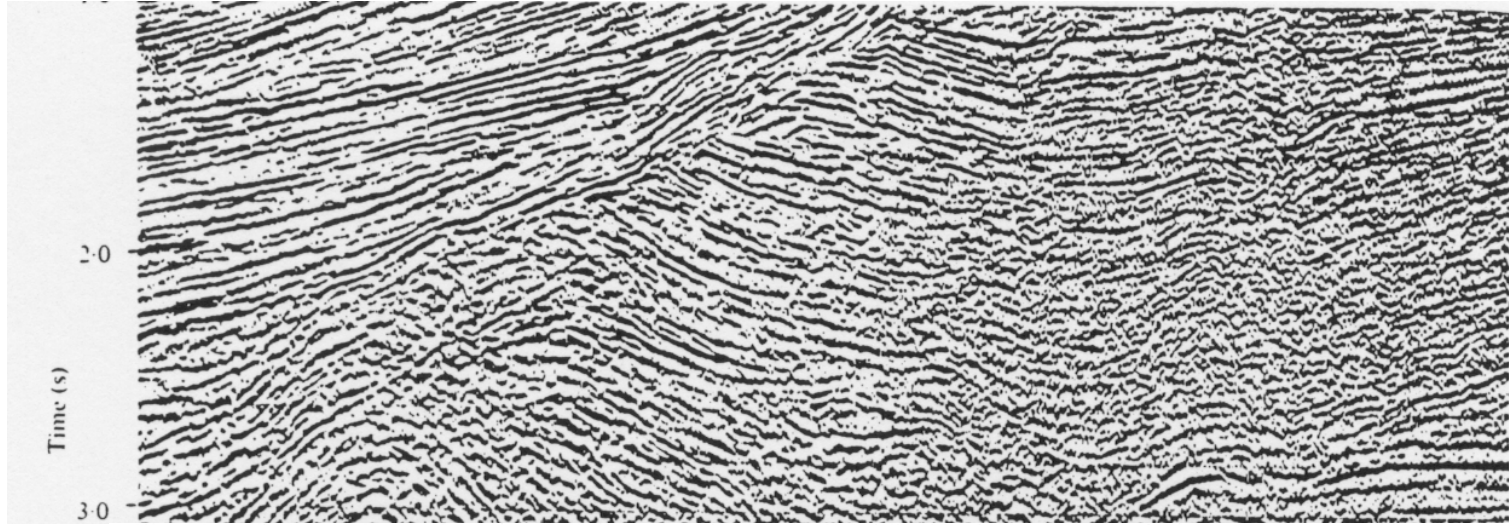
**Position and form of faults**

## **Aim:**

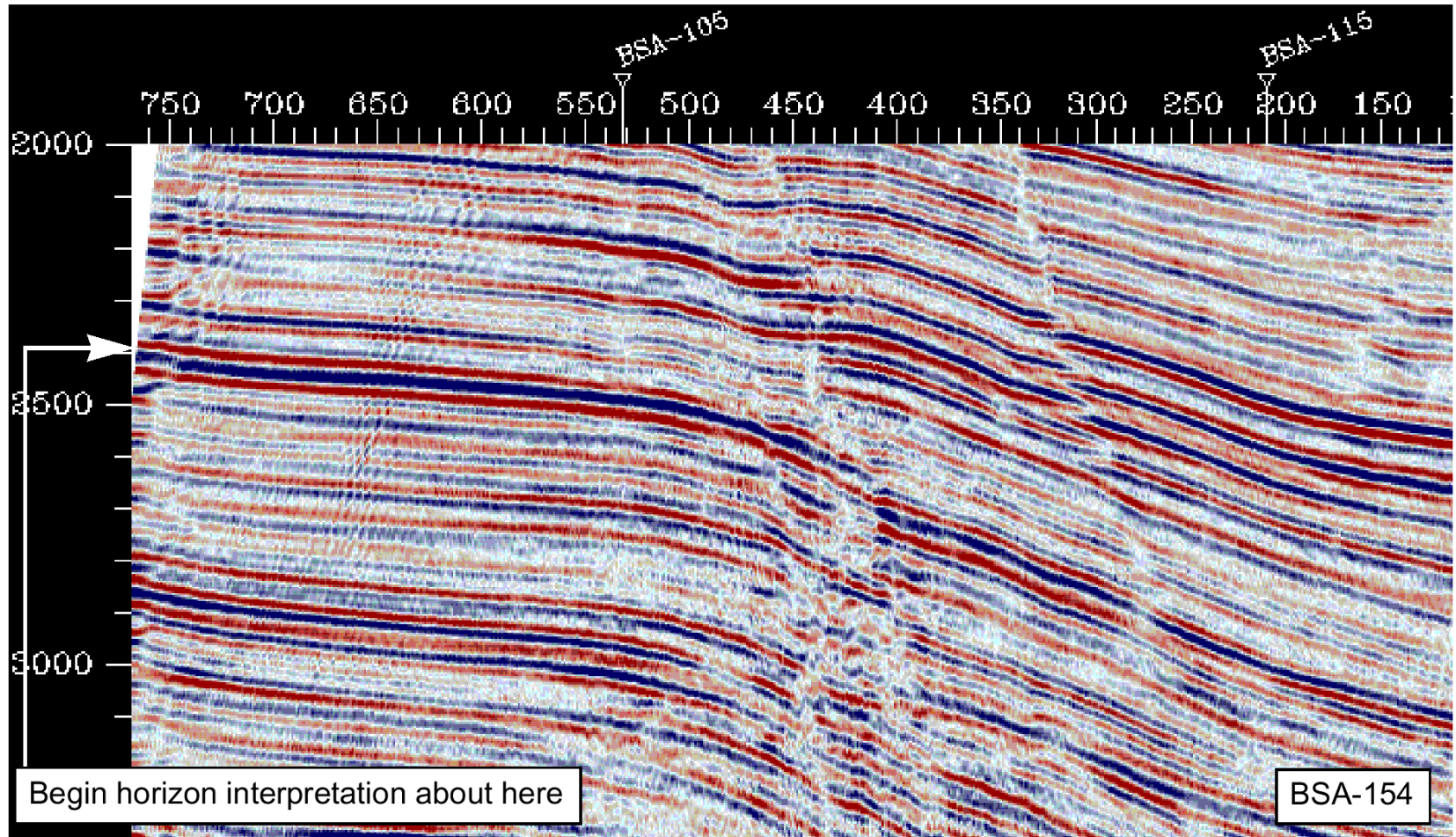
**geological Profile**

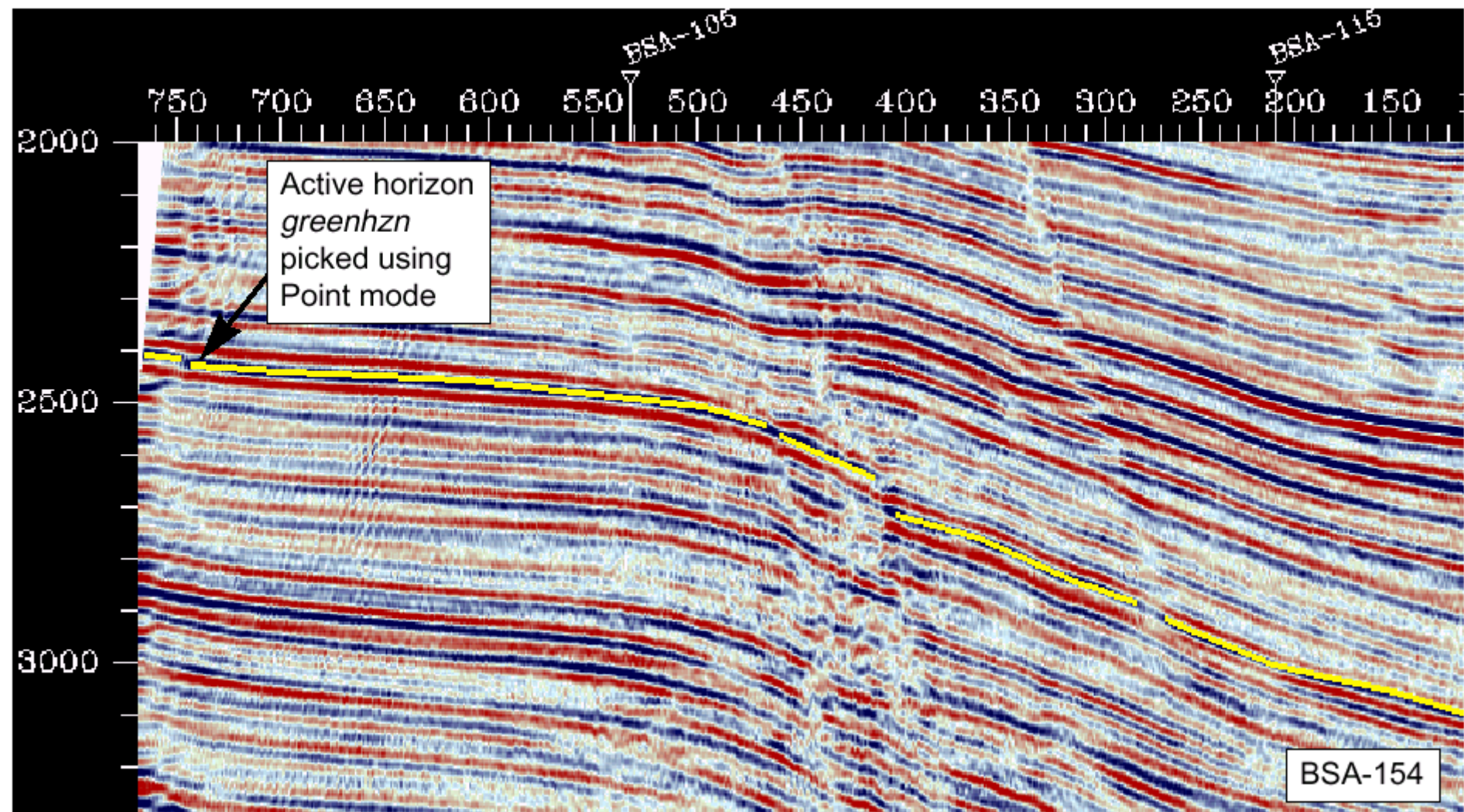
**Depth charts of Horizons and Disturbances**

# Geology versus Seismic

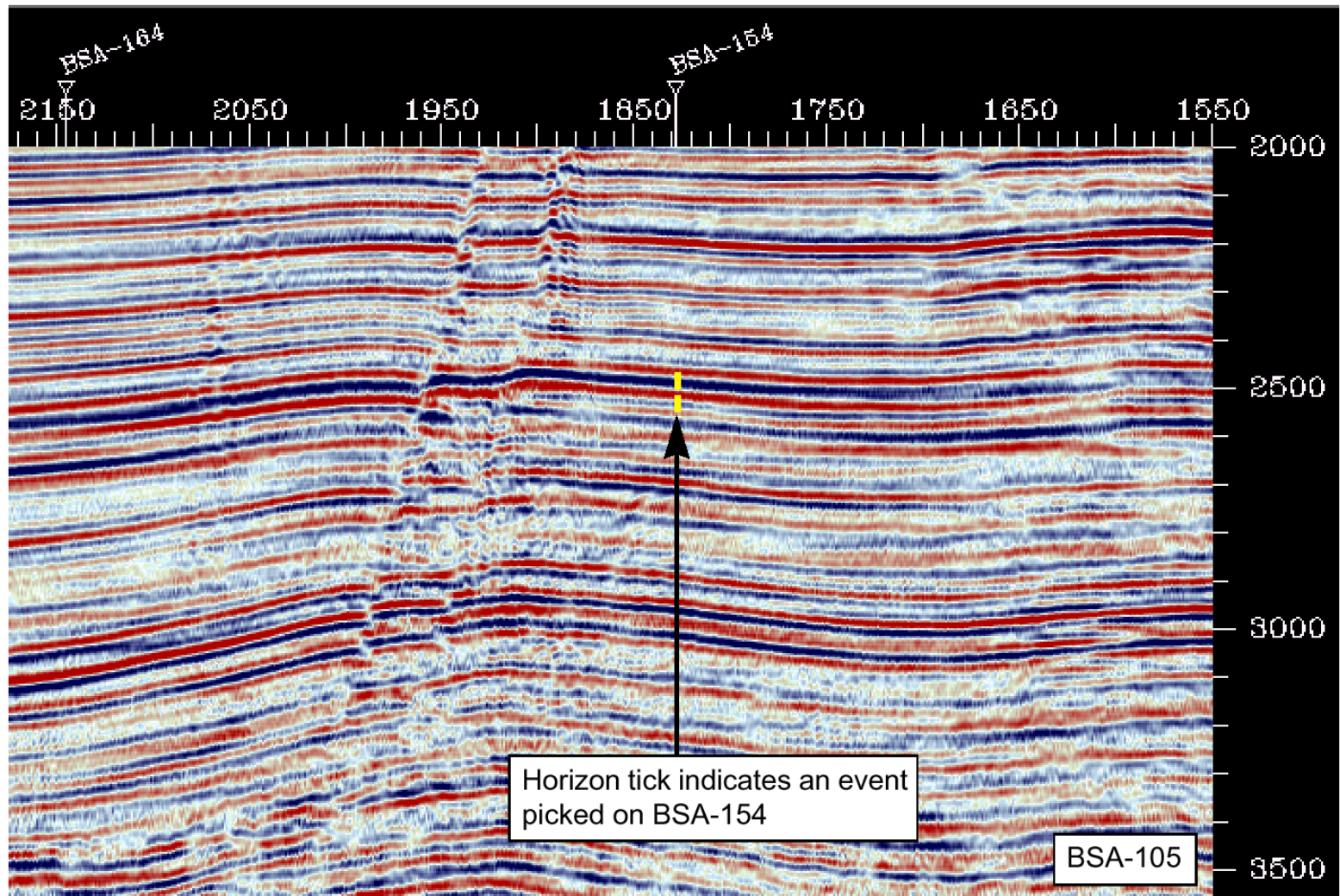


# Horizon 1



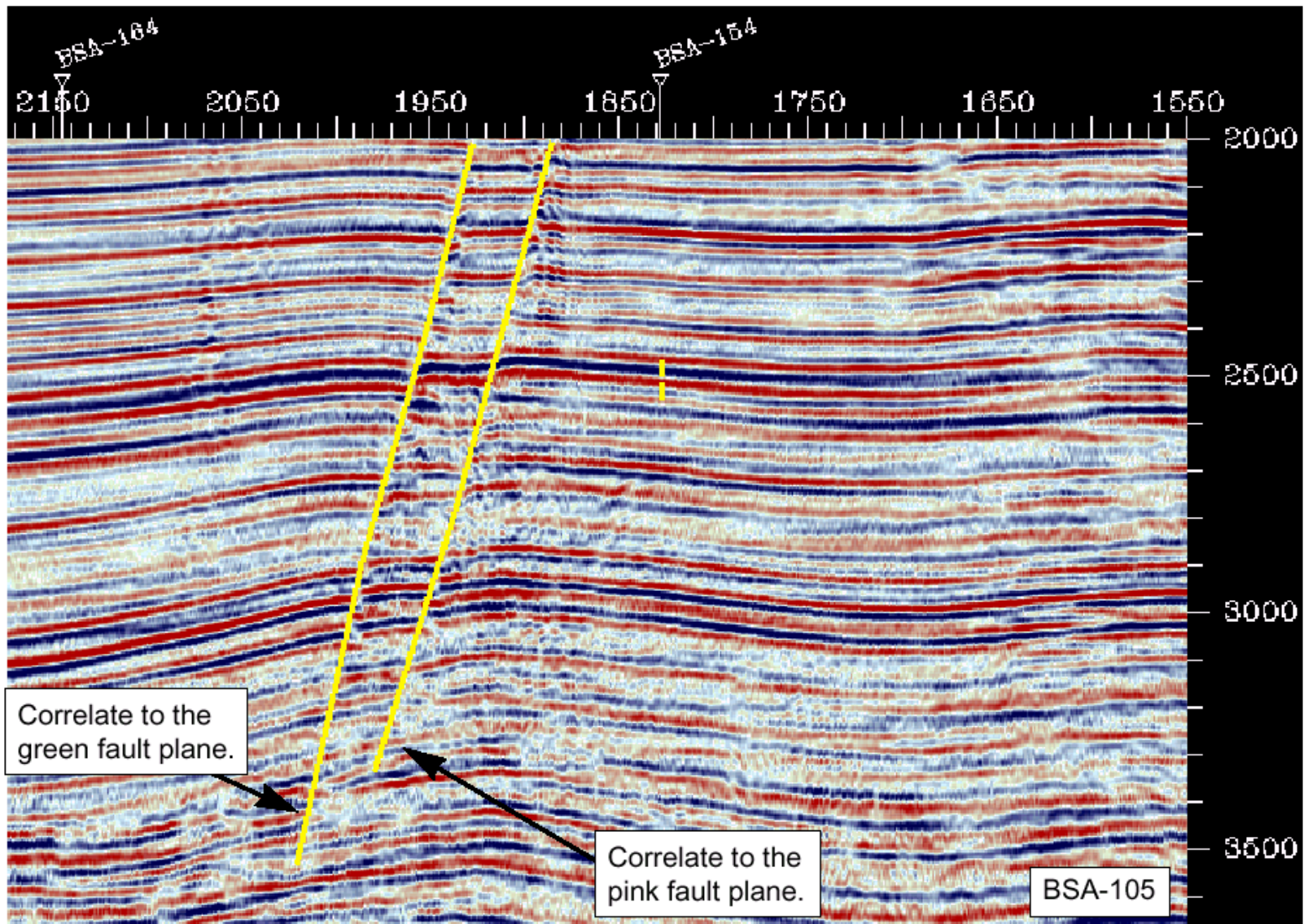


# Fault

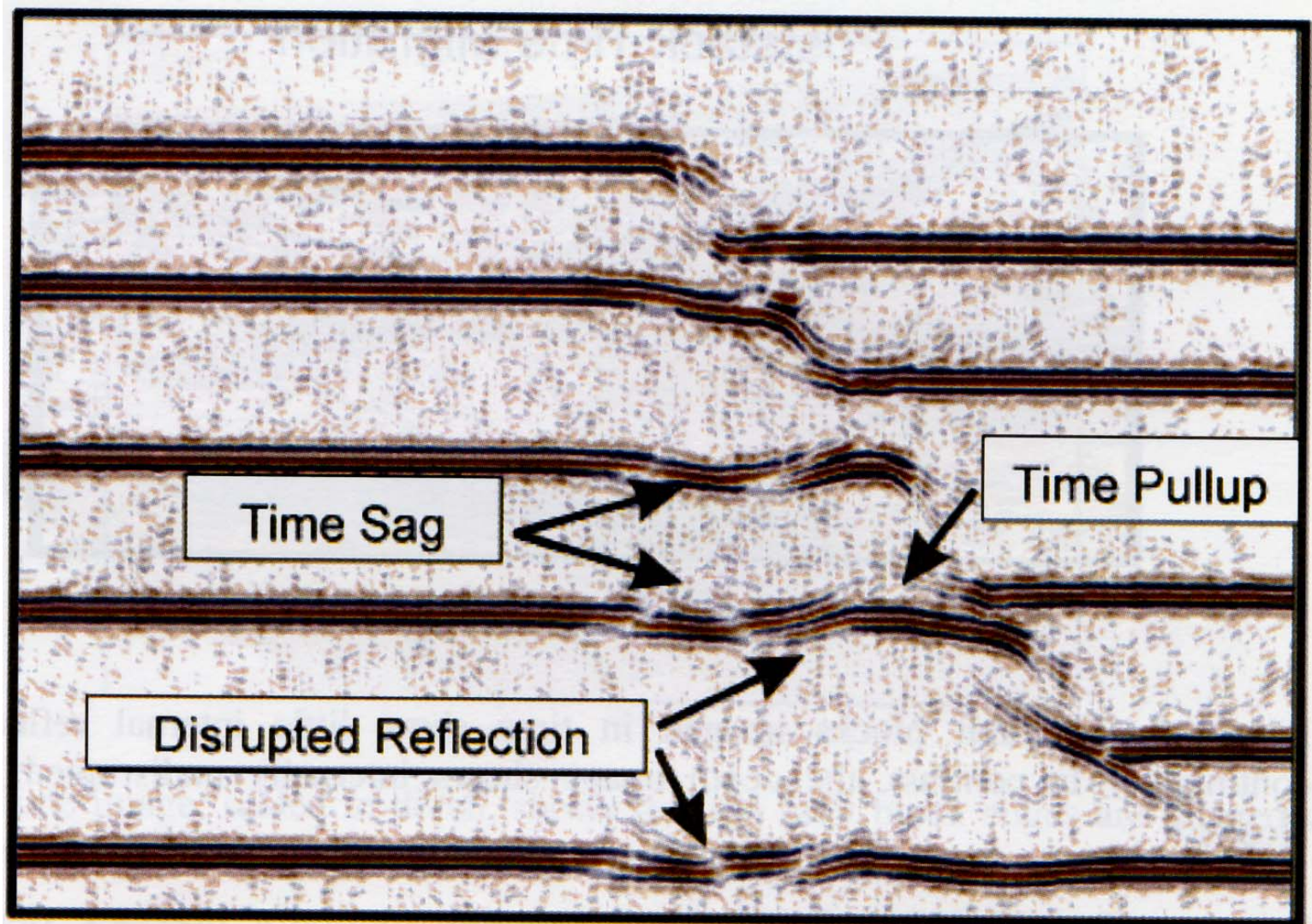




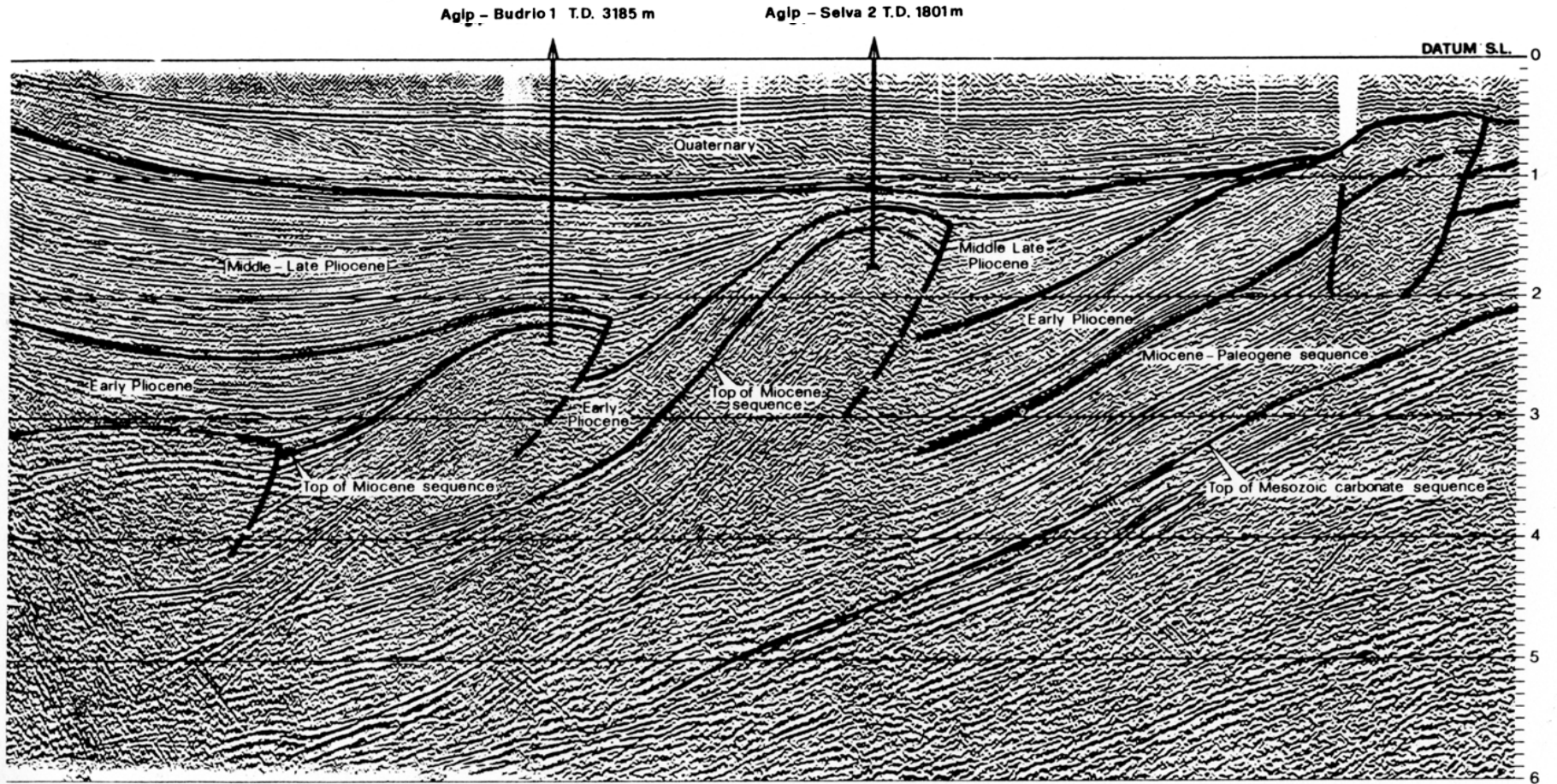
# Fault 2



# Problem with „picking“ of Disturbances

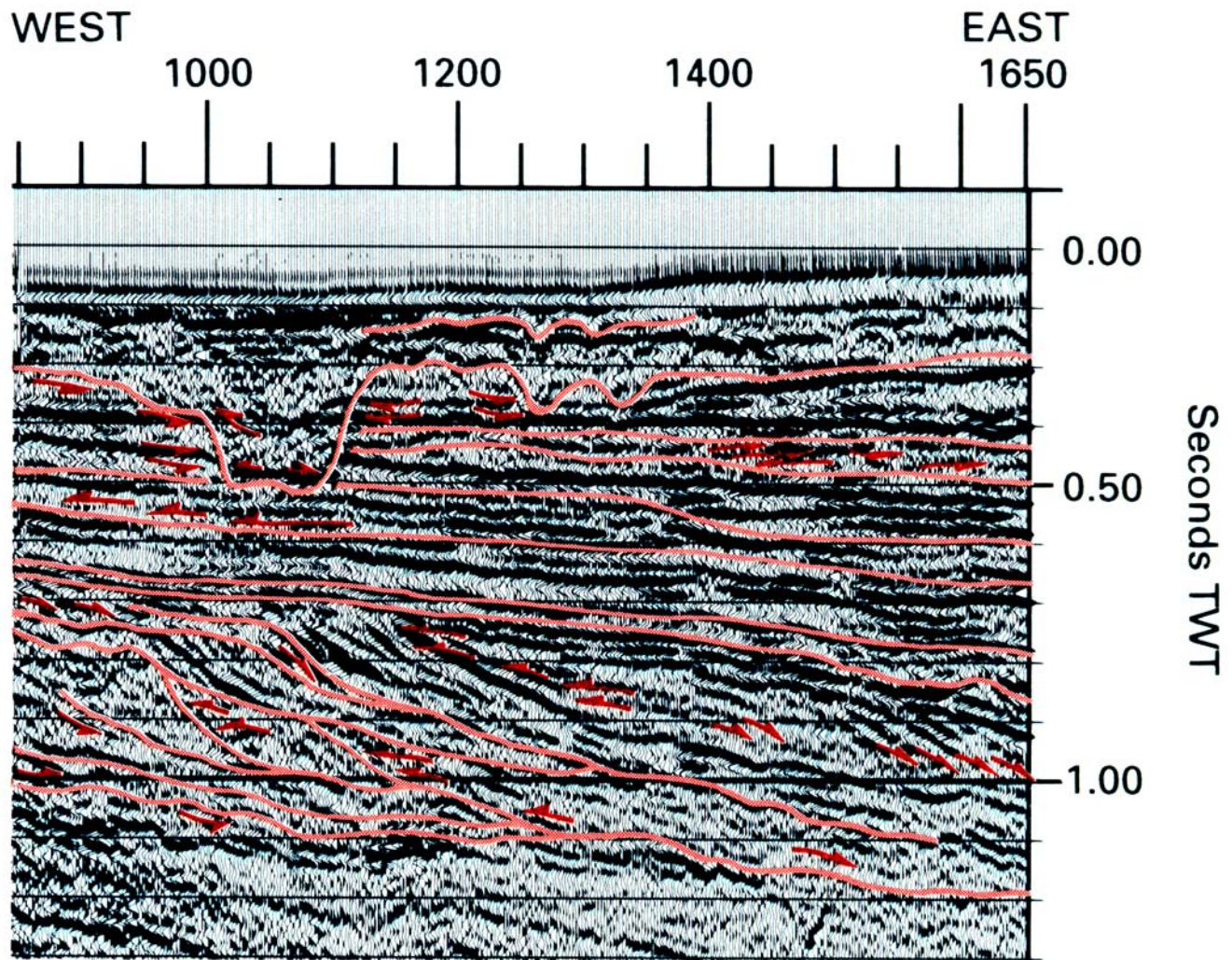


# Interpretation of seismic data





(b)



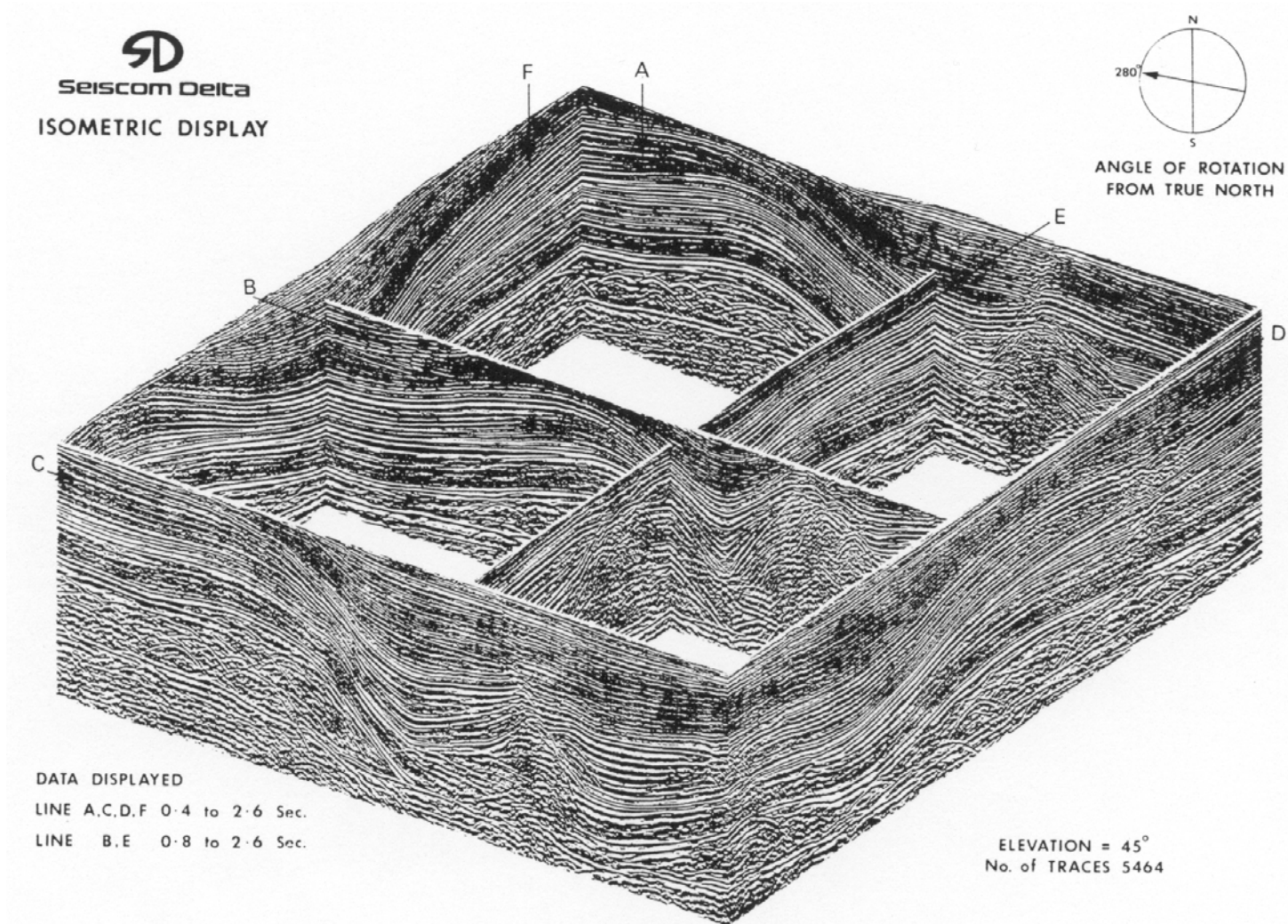


**Scale:**

1 km

-  Seismic surface
-  Reflection termination

# Fence Diagram



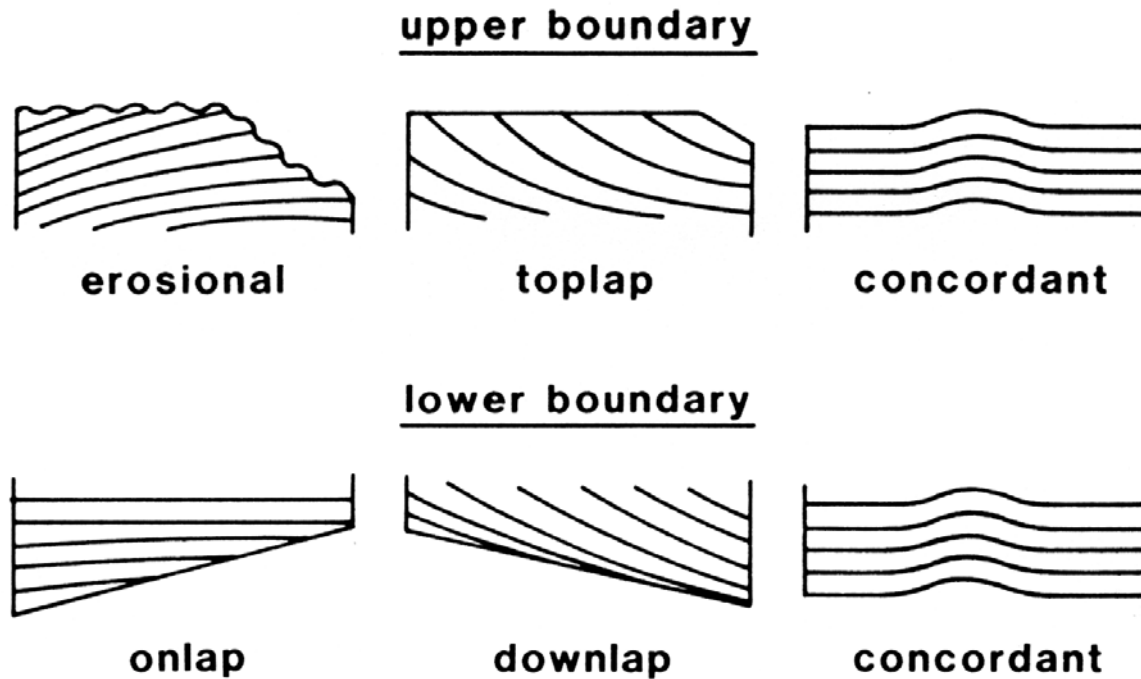
**Figure 6/8** Isometric section projection of a group of seismic 'loops' prepared to aid three-dimensional comprehension of a structurally complex area (Courtesy: Seiscom Delta).

# **Seismic Sequence-Analysis**

The procedure of picking unconformities and correlative conformities on seismic sections so as to separate out the packages involved with different time depositional units

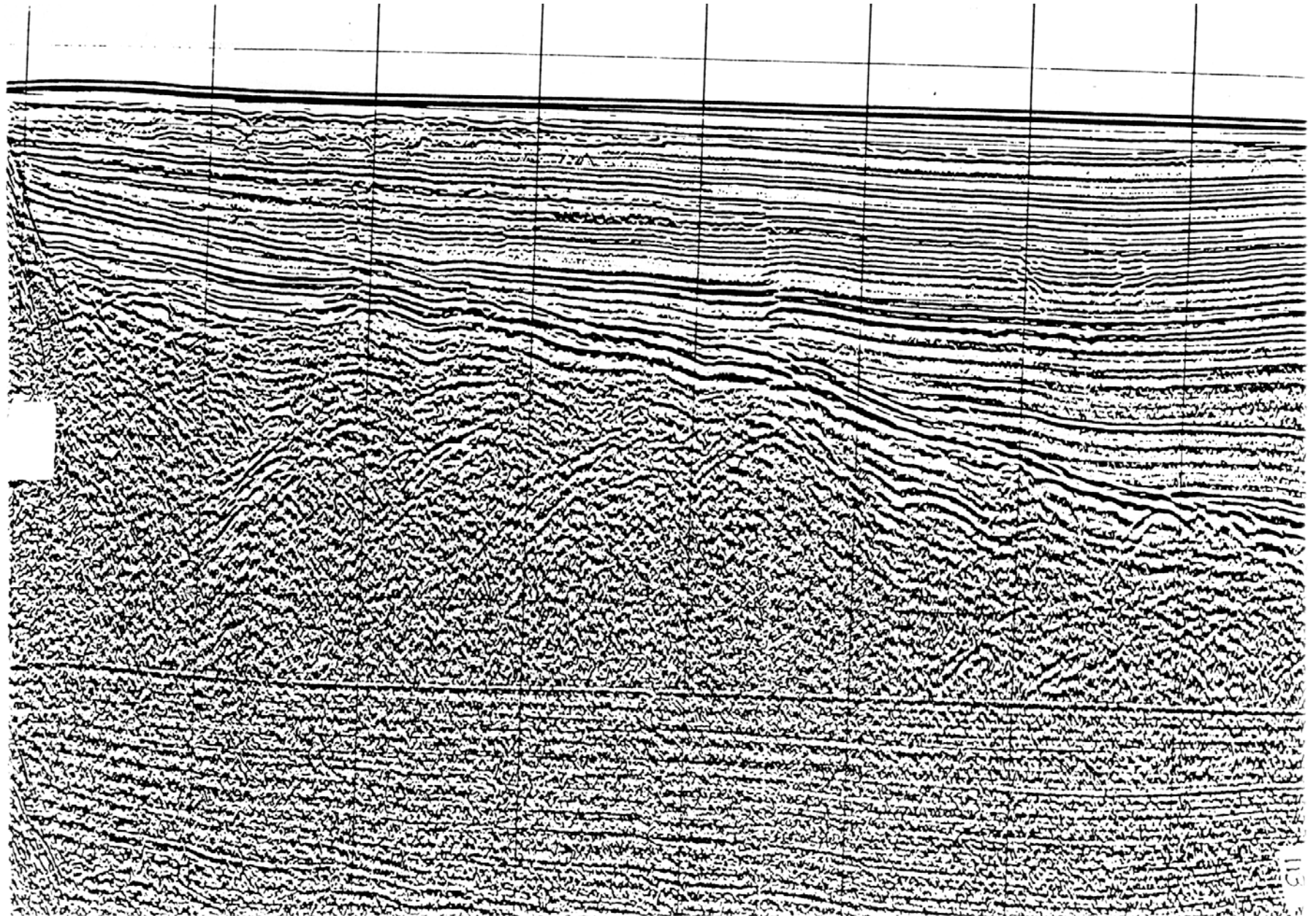
# Unconformities

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Sequences are terminated by unconformities or a concordant

# Onlap





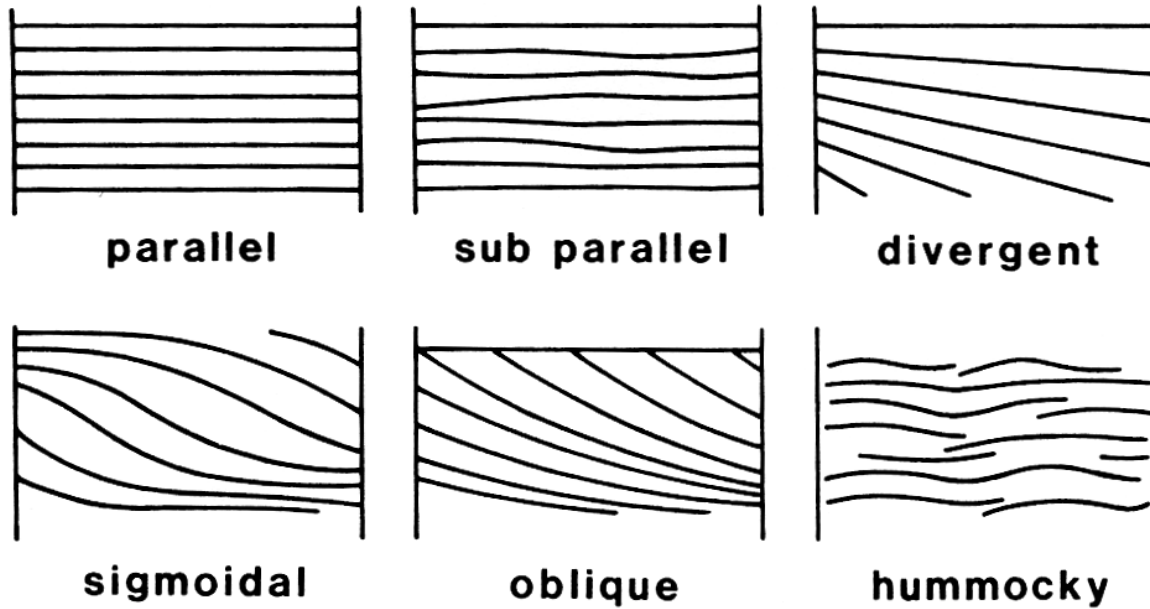
# Seismic Facies-Analysis

## **Aim:**

**Analysis of the character of the reflections  
(amplitude, continuity, continuity and configuration)  
inside a seismic sequence  
to  
predict the depositional environment**

# Reflection patterns on seismic sections

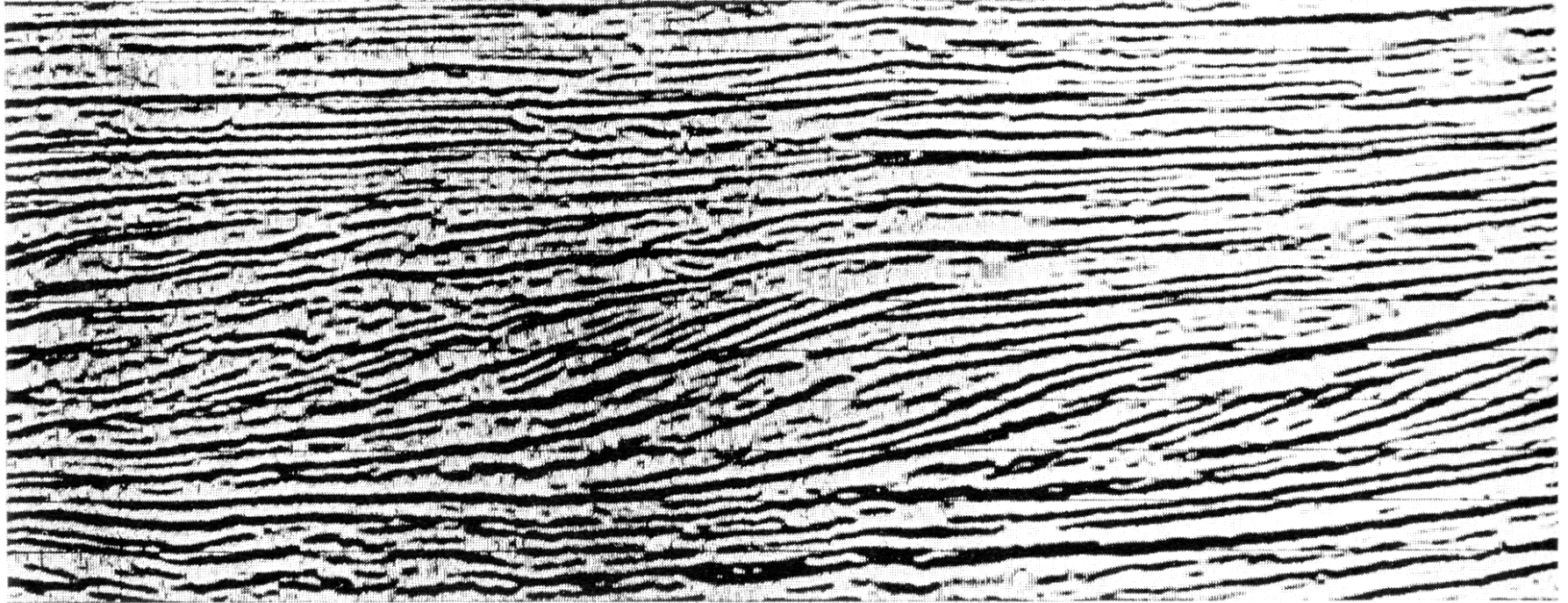
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Internal Structures

# Sigmoidal sequence

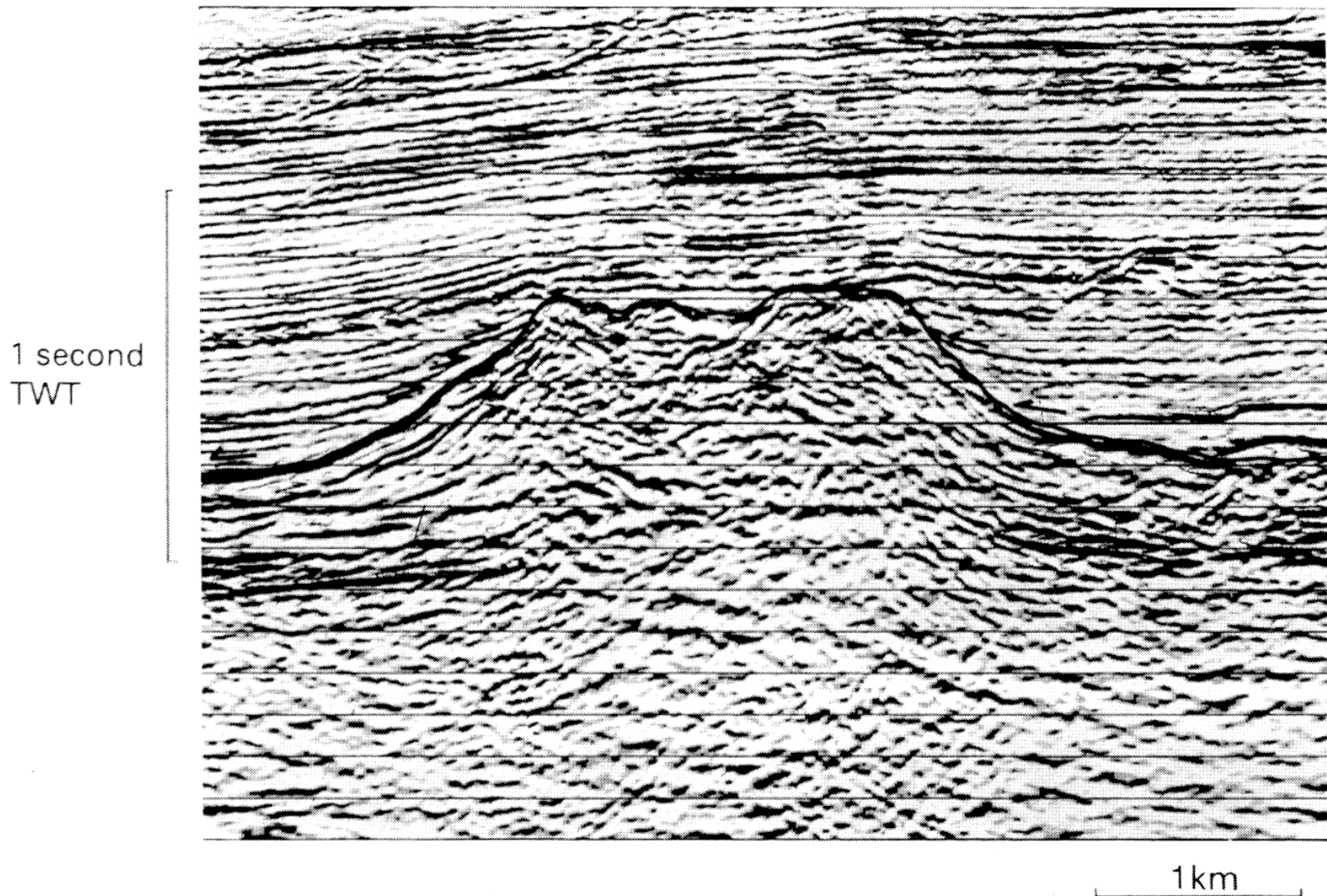
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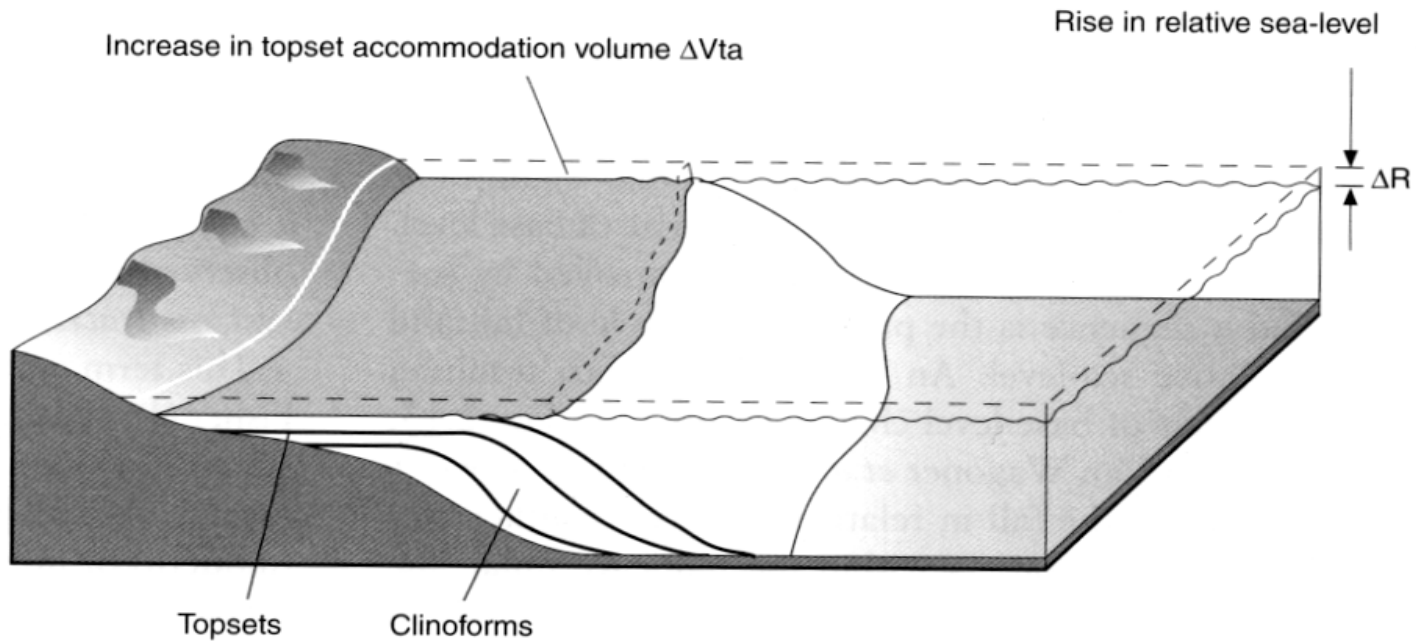
0 1 2 3 4 5 km

# Hummocky sequence

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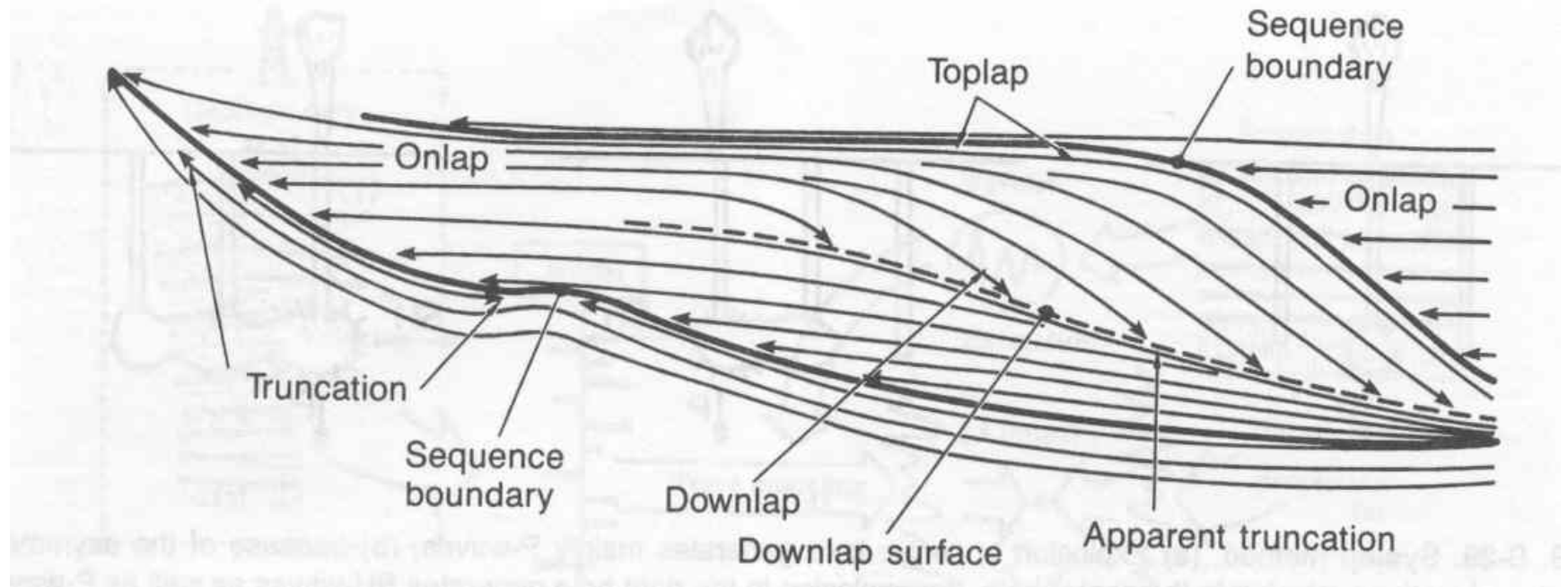


# Transgression

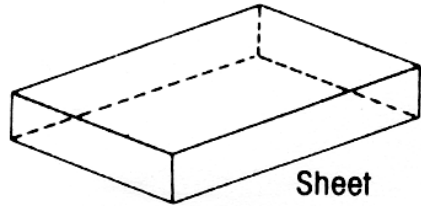


The increment of topset accommodation volume  $\Delta V_{ta}$  caused by a rise in relative sea-level  $\Delta R$  is equal to the product of  $\Delta R$  and the topset area

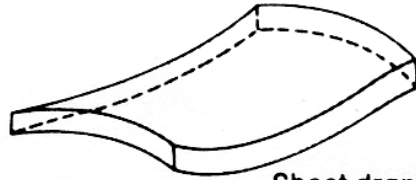
# Seismic patterns that indicate sealevel changes



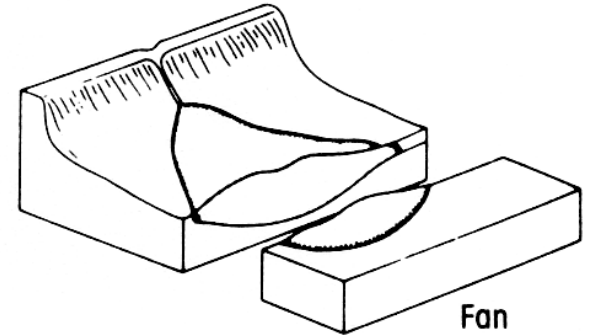
# Three-dimensional shapes of seismic facies units



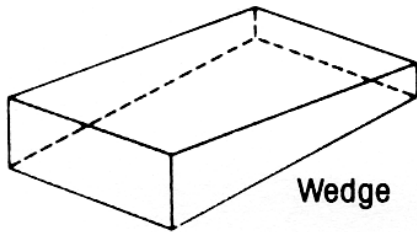
Sheet



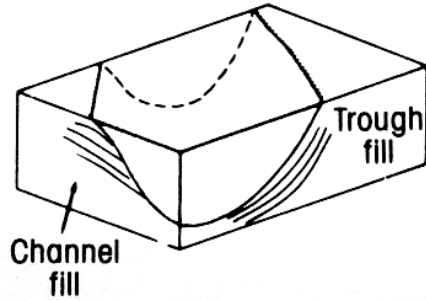
Sheet drape



Fan

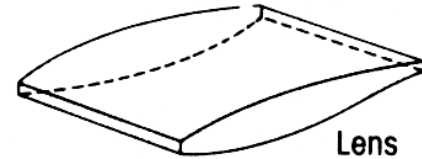


Wedge

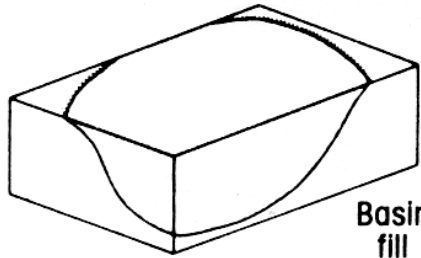


Trough fill

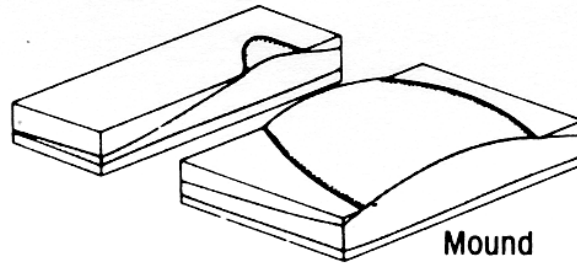
Channel fill



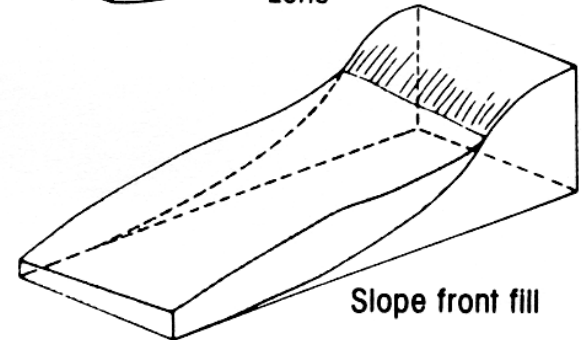
Lens



Basin fill

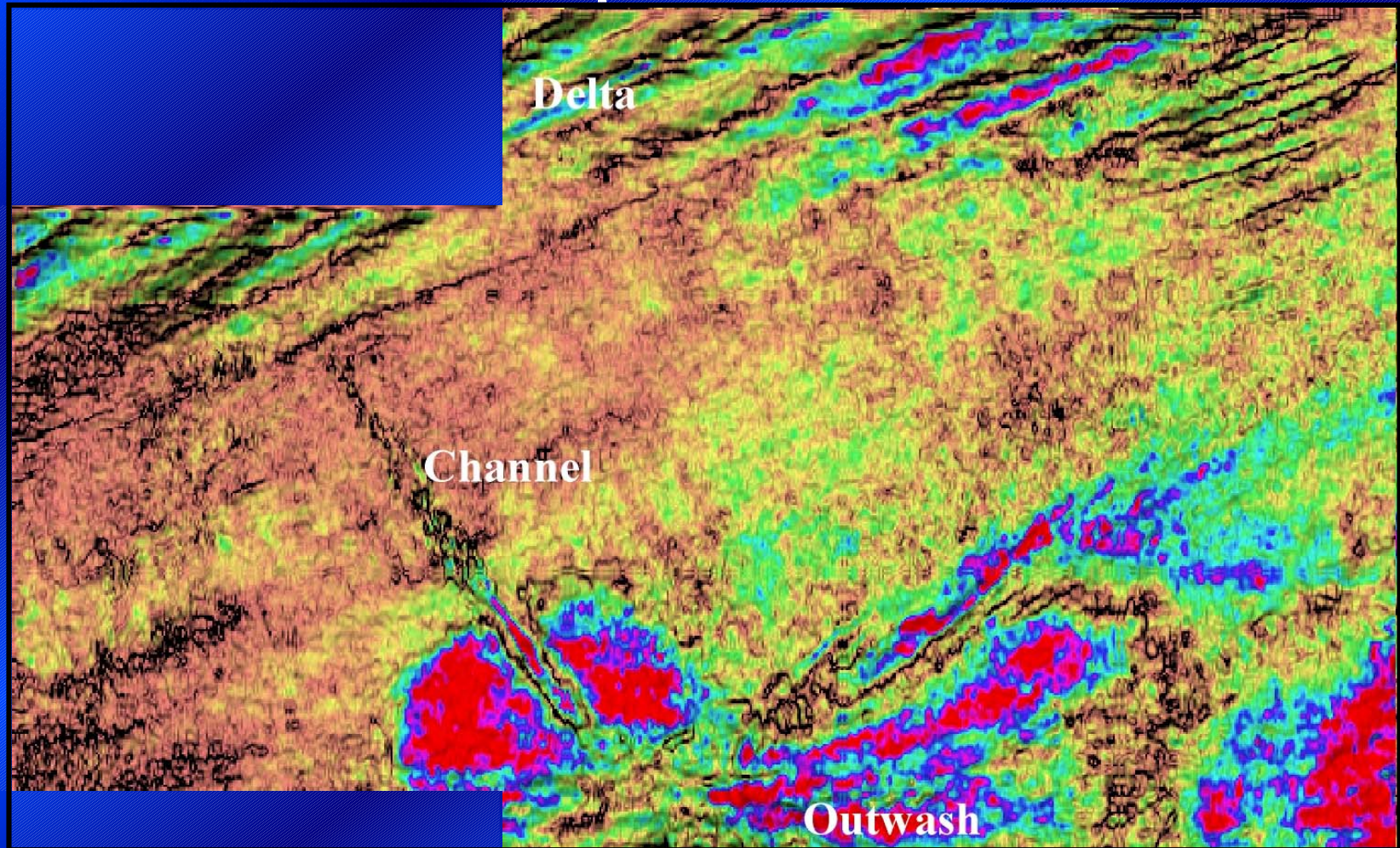


Mound



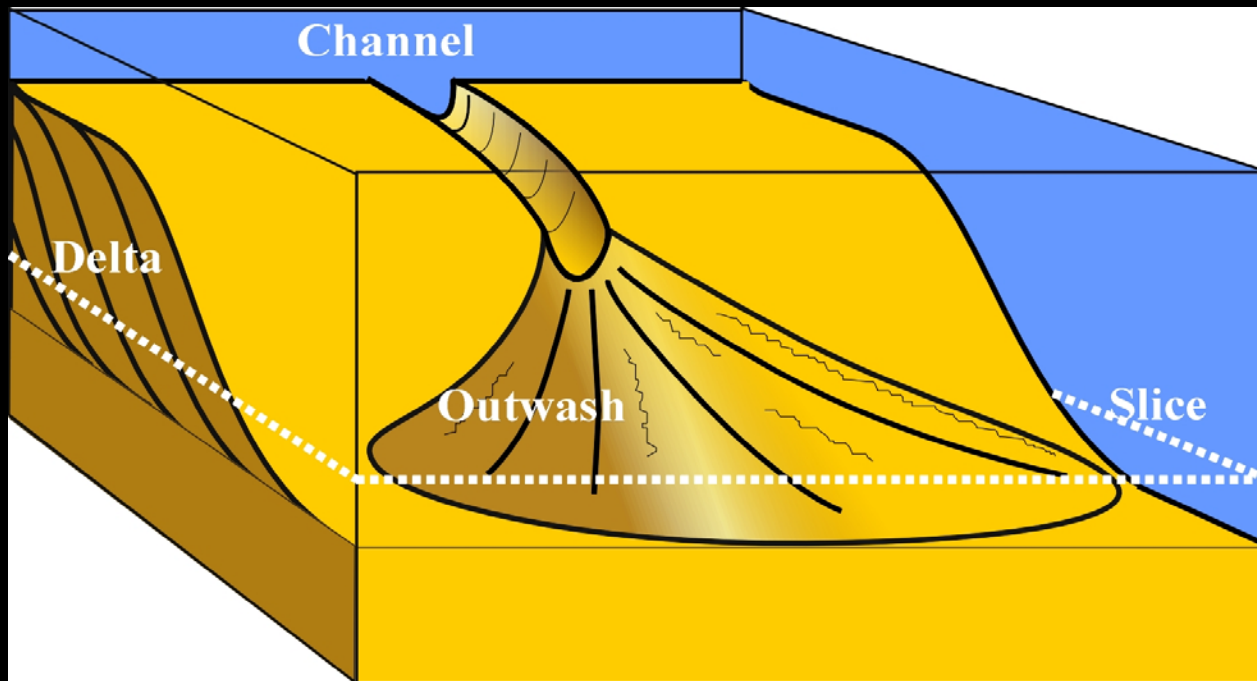
Slope front fill

# Depth slice

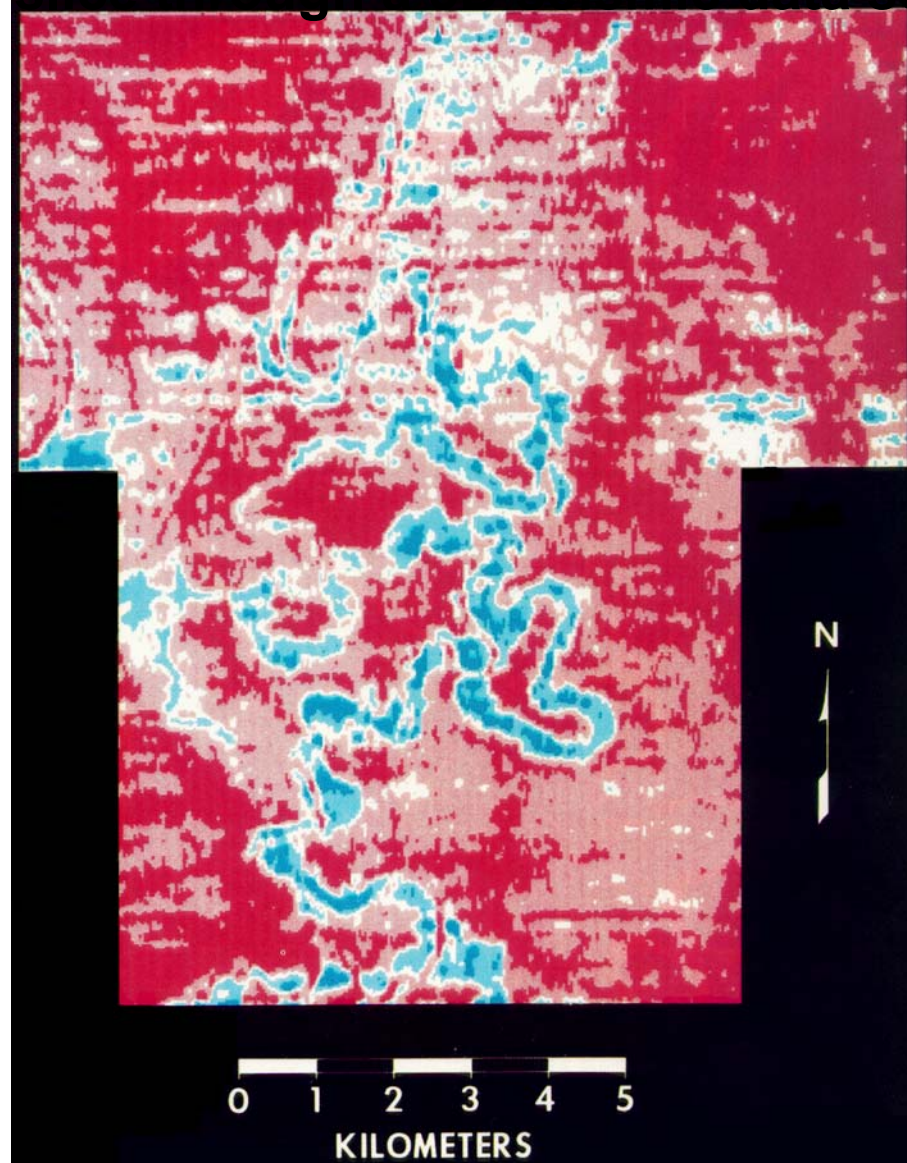




# Geological interpretation

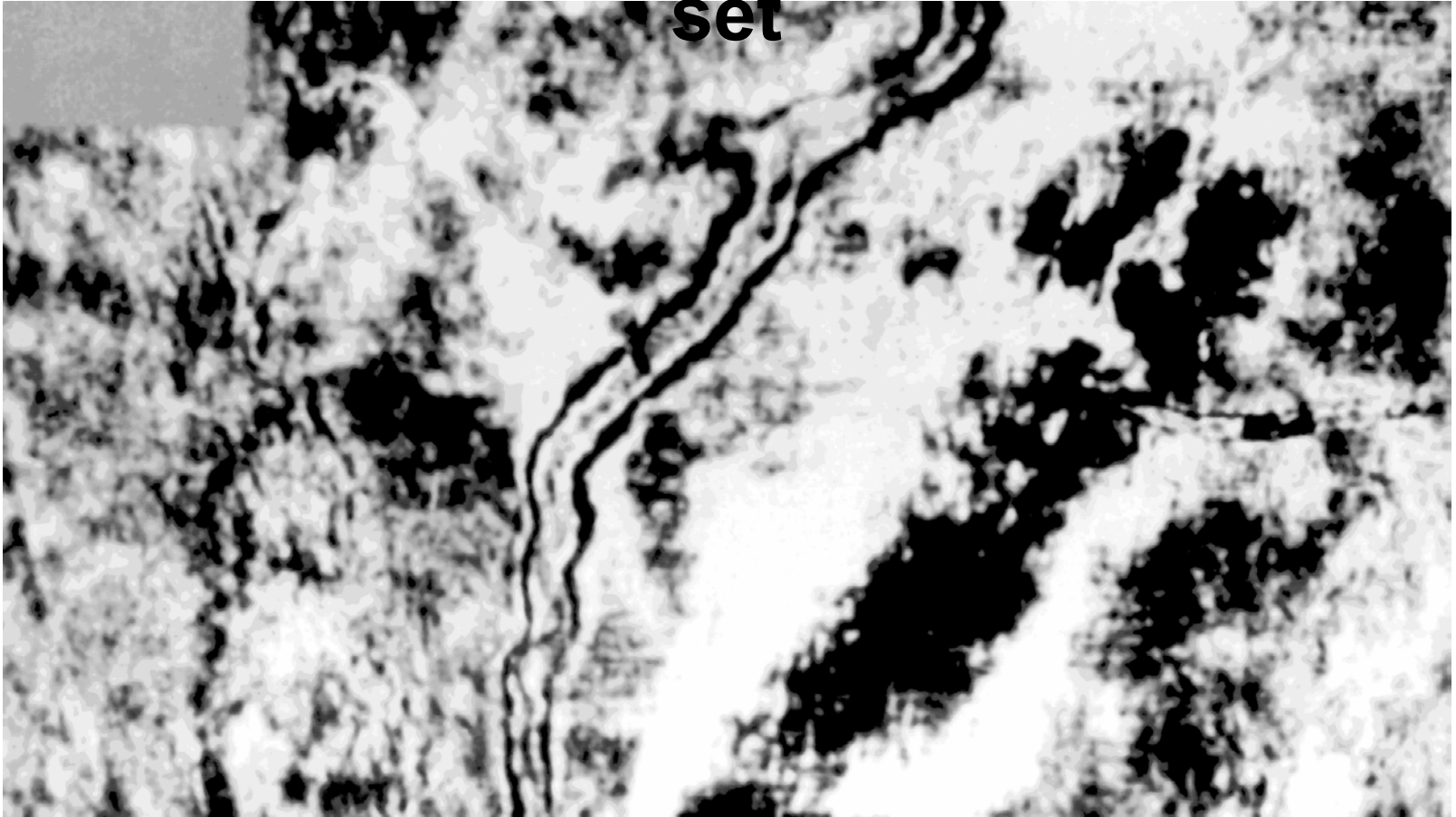


## Time slice through a 3D seismic data set



(from Kearey and Brooks, 1991)

# Time slice through a 3D seismic data set



(from Brown, 1991)

