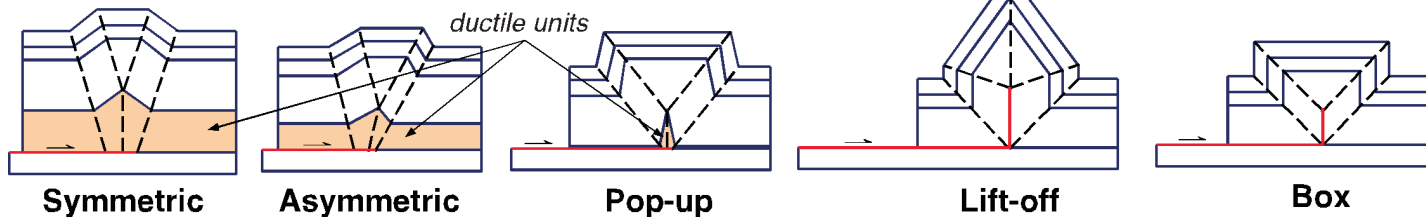


# Styles of Detachment Folds

## *Kinematic models of detachment folds*



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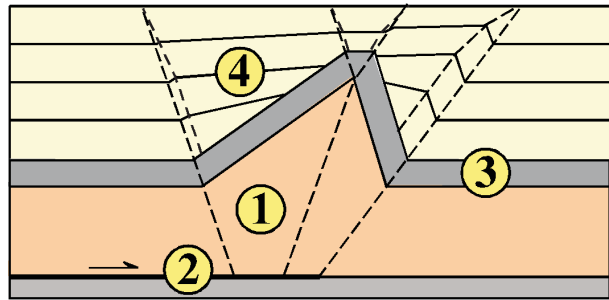
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# Styles of Detachment Folds



## ***Common characteristics***

Detachment folds generally share the following characteristics:

- 1) An incompetent, ductile basal unit thickened in core of fold, with no visible thrust ramp.
- 2) A detachment that defines the downward termination of the fold.
- 3) Competent pregrowth units that, if present, generally maintain layer thickness.
- 4) Growth units, if present, that thin onto the fold crest and exhibit a fanning of limb dips.

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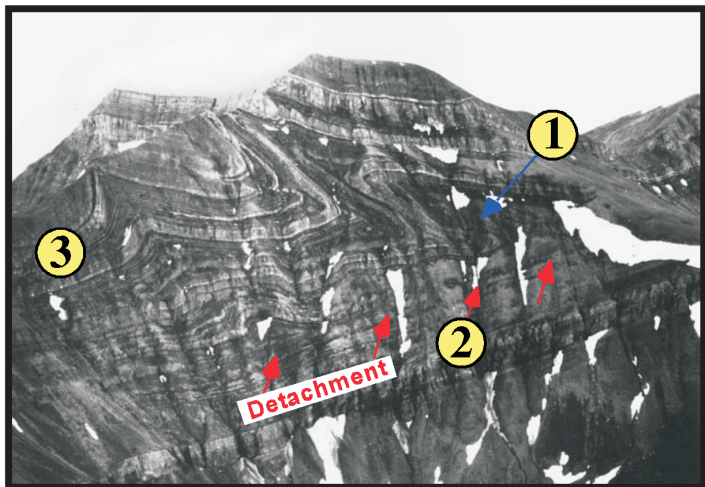
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# Styles of Detachment Folds

## *Field Example: Canadian Rockies*



*modified from Poblet and McClay (1996)*

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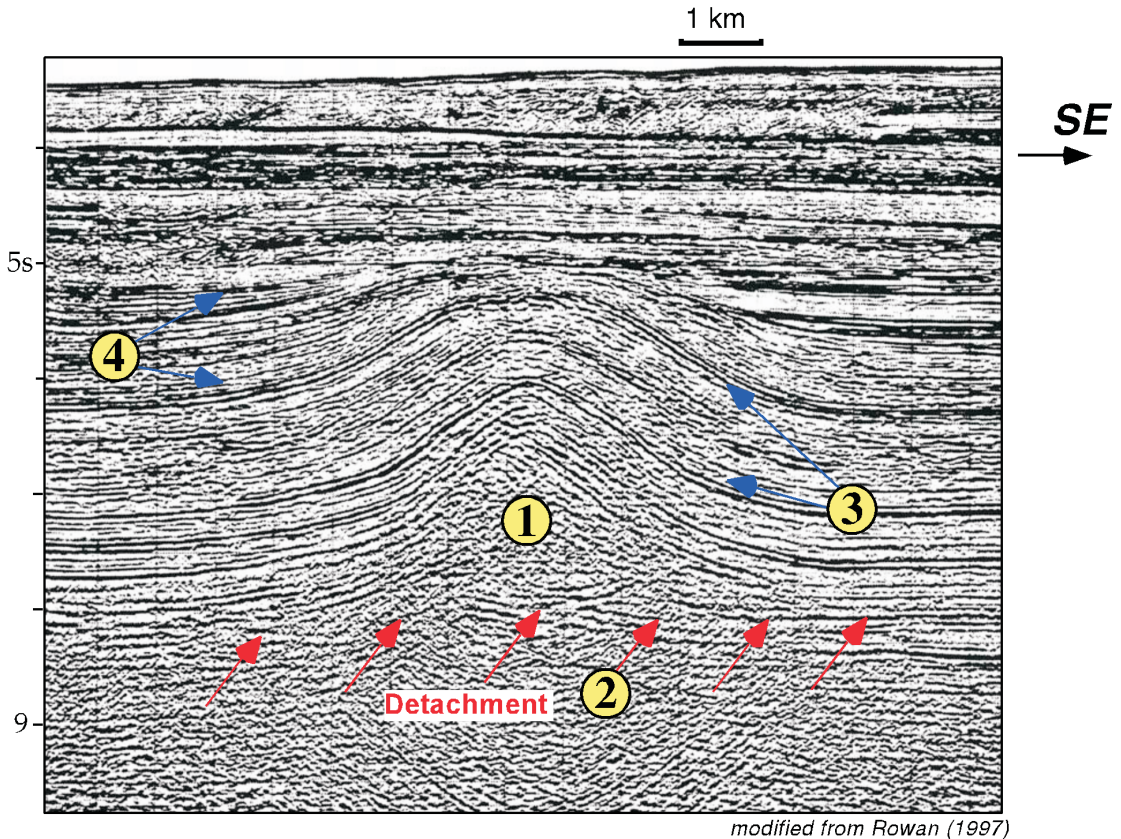
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# Styles of Detachment Folds

## *Seismic Example: Gulf of Mexico*



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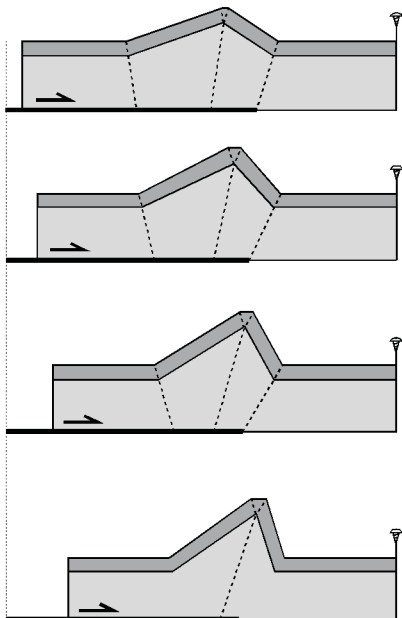
# Geometry and kinematics of detachment folds

## ***Kinematic models of detachment folds***

### **1) Primarily limb rotation**

*variable limb dip*

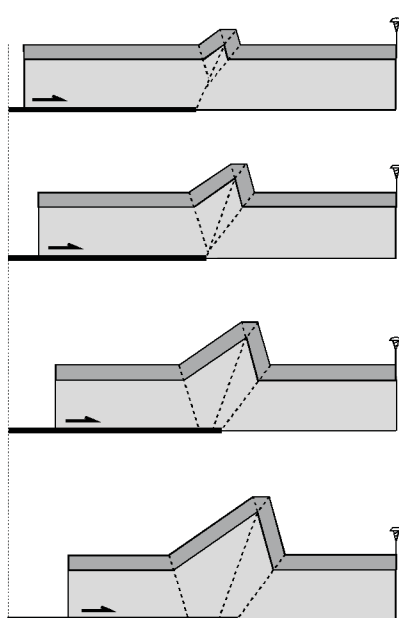
*constant limb length*



### **2) Kink-band migration**

*constant limb dip*

*variable limb length*

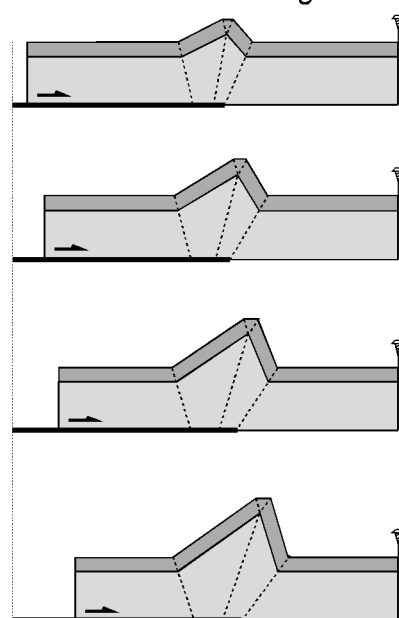


### **3) Limb rotation and**

***Kink-band migration***

*variable limb dip*

*variable limb length*



*modified from Poblet and McClay (1996)*

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# Geometry and kinematics of detachment folds

## ***Detachment fold terminology***

$L_f$  = Front limb length

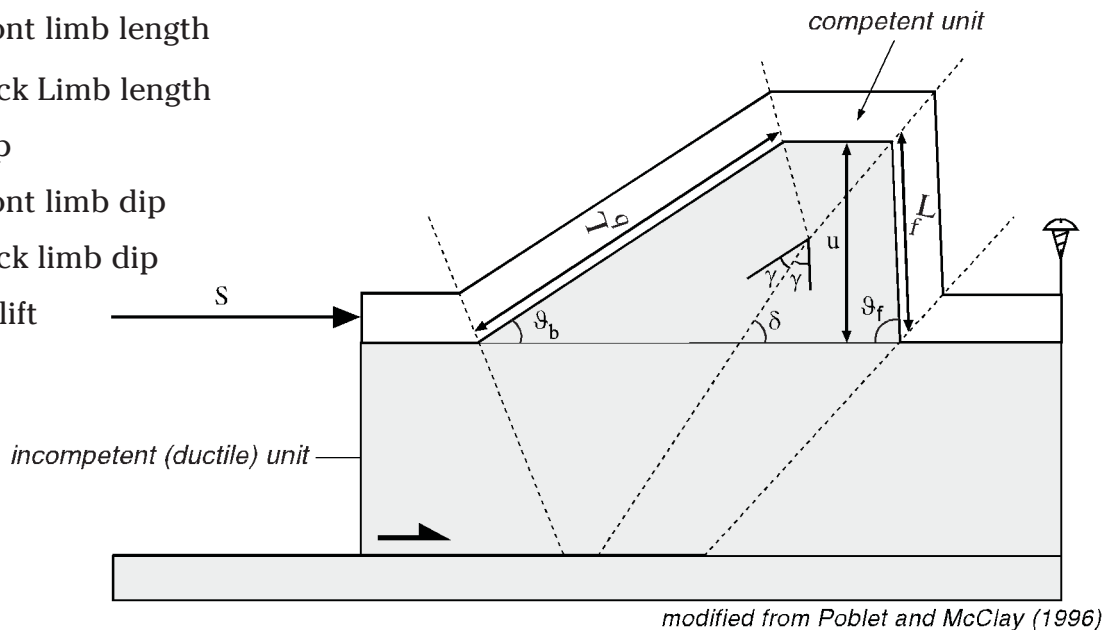
$L_b$  = Back Limb length

$S$  = Slip

$\vartheta_f$  = Front limb dip

$\vartheta_b$  = Back limb dip

$u$  = Uplift



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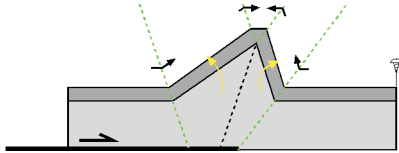
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# Growth strata associated with detachment folds

## ***Axial Surface Activity***

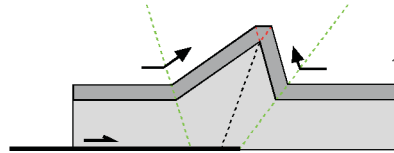
### **1) Primarily limb rotation**

*Limited-activity Synclinal A.S.  
Limited-activity Anticlinal A.S.*



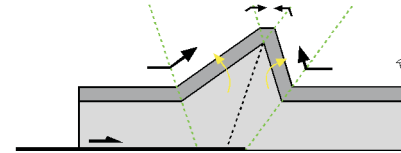
### **2) Kink-band migration**

*Active Synclinal A.S.  
Inactive Anticlinal A.S.*



### **3) Limb rotation and Kink-band migration**

*Active Synclinal A.S.  
Limited-activity A.S.*



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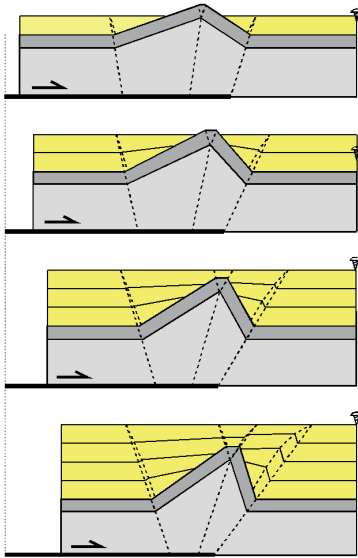
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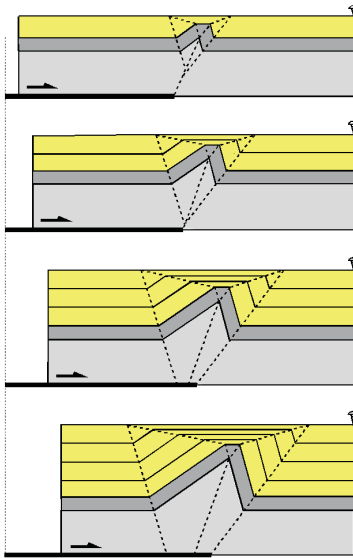
# Growth strata associated with detachment folds

## *Kinematic models of growth detachment folds*

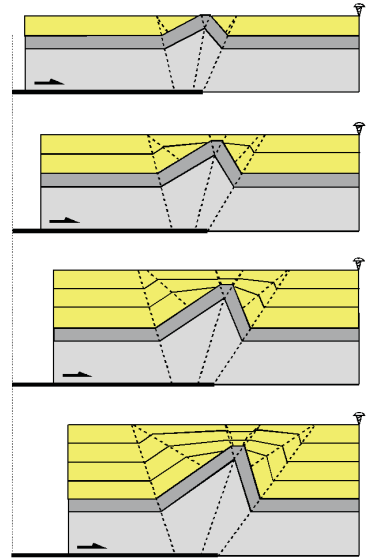
**1) Primarily limb rotation**  
growth strata display fanning of dip with minor growth triangles



**2) Kink-band migration**  
constant limb dip  
variable limb length



**3) Limb rotation and Kink-band migration**  
variable limb dip  
variable limb length



*modified from Poblet and McClay (1996)*

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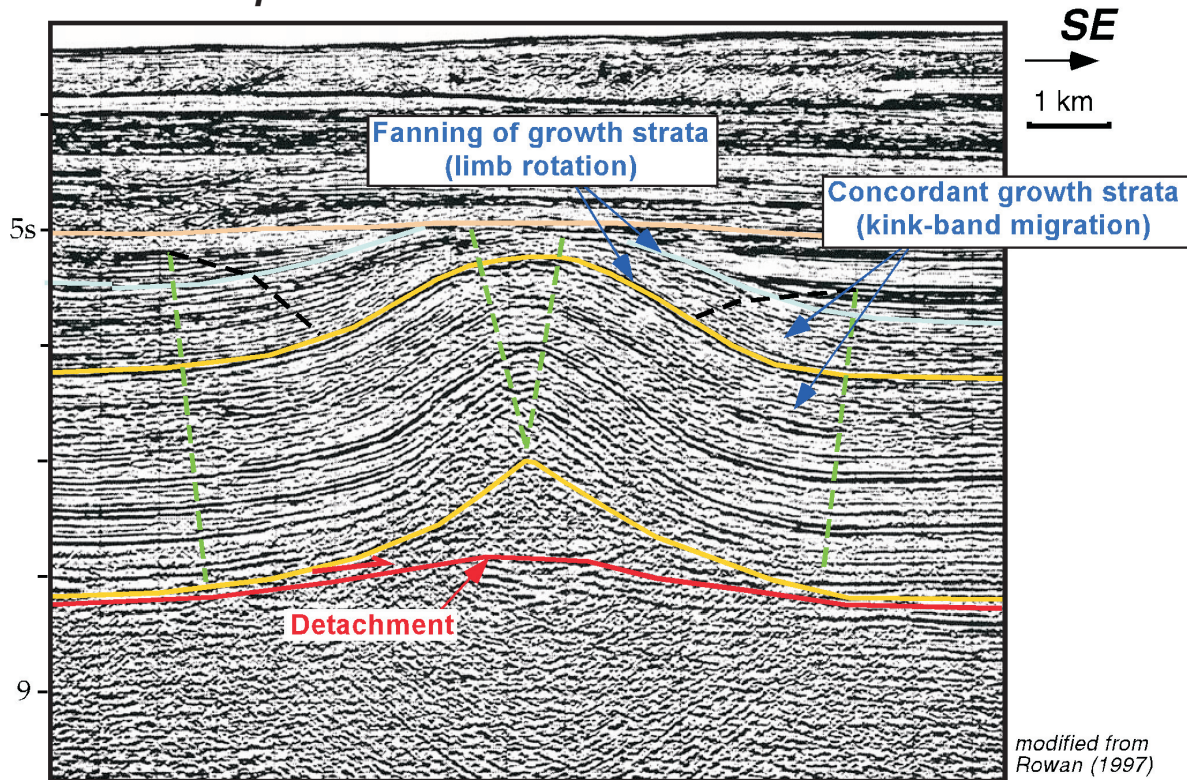
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# Growth strata associated with detachment folds

## Seismic Example: Gulf of Mexico



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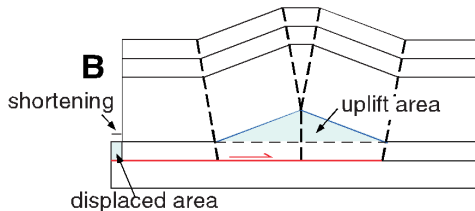
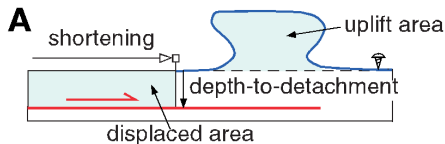
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# Seismic interpretation of a detachment fold: Angola continental slope

## *Depth-to-detachment calculations*



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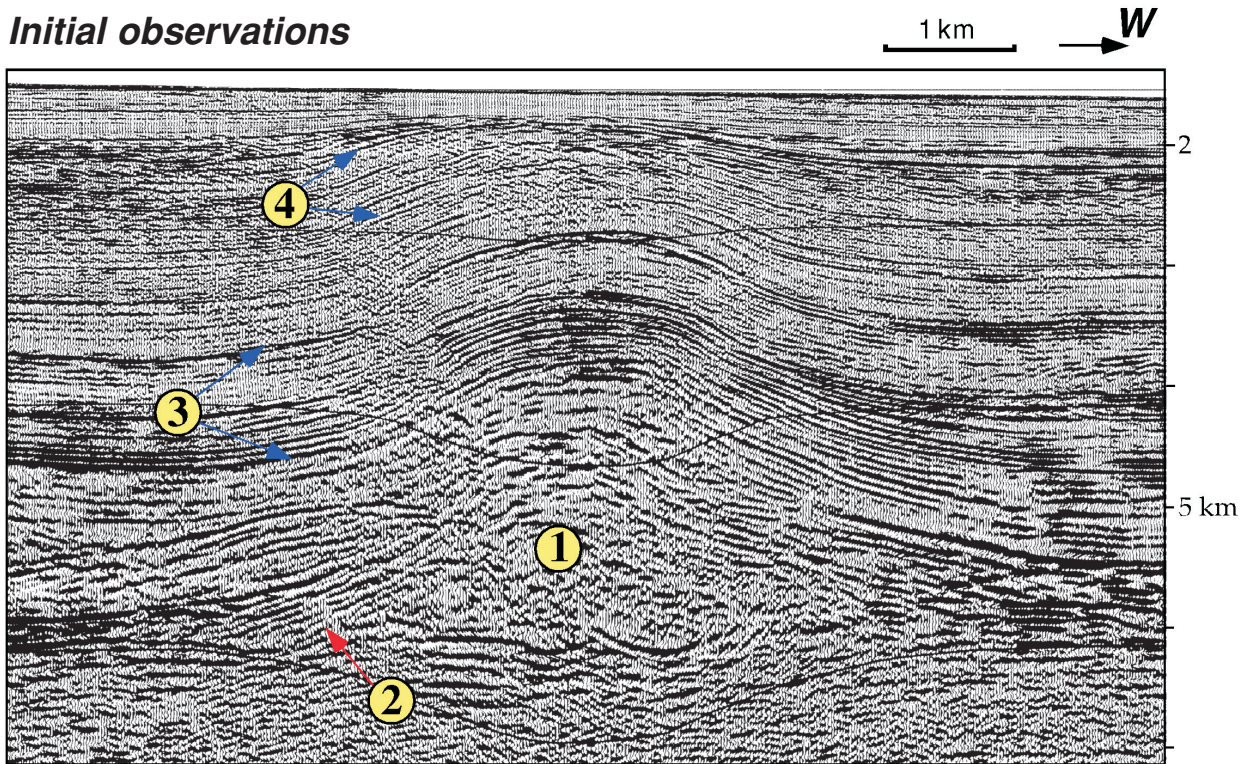
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# Seismic interpretation of a detachment fold: Angola continental slope

## *Initial observations*



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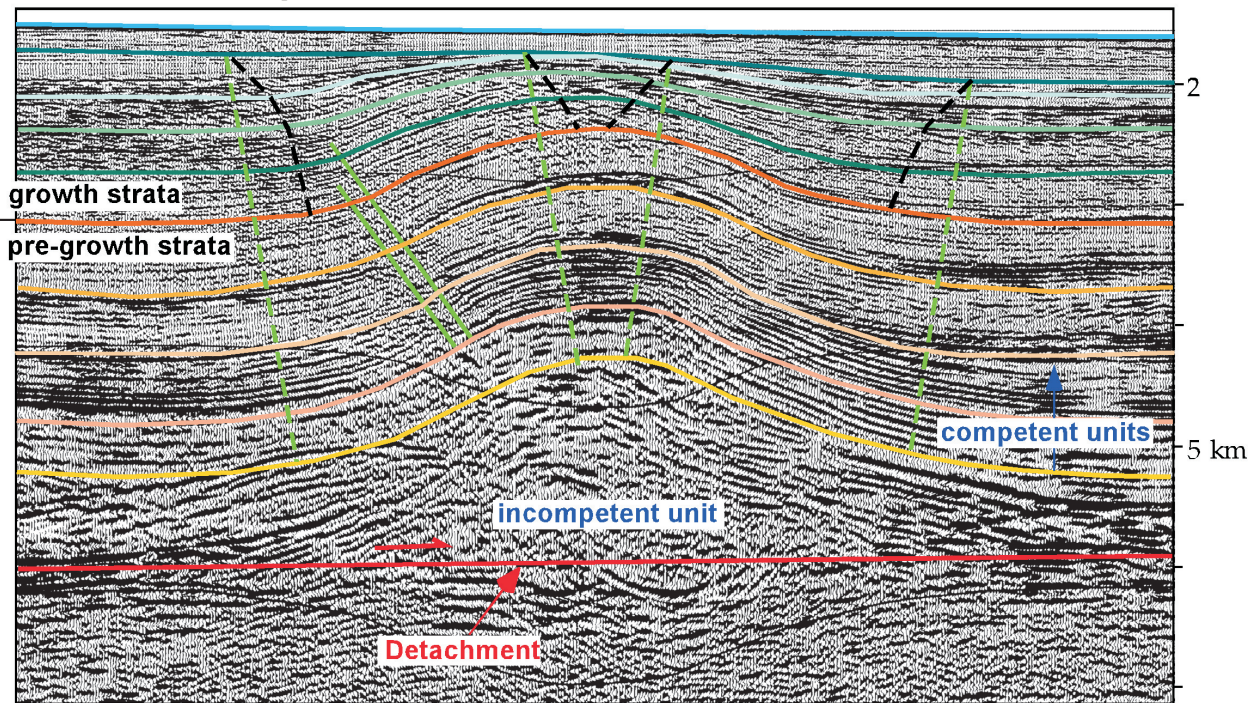
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# Seismic interpretation of a detachment fold: Angola continental slope

## *Structural interpretation*



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