

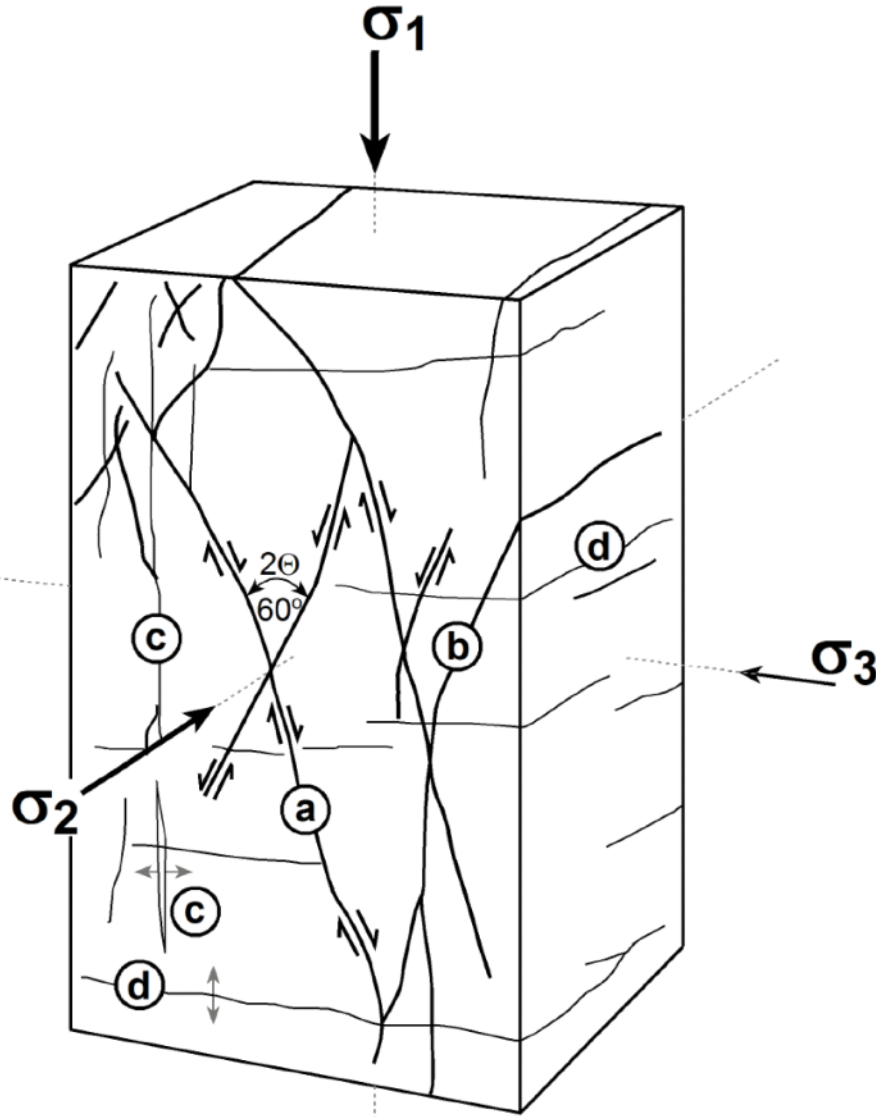
# FAY MEKANİĞİ

Yerkabuęu içinde blokları birbirlerine göre hareketli olan kırık yüzeyi veya kırık zonlarına fay denir.

Hareket kırık zonu veya kırık yüzeyine koştuttur.



# FAYLARIN ANA GERİLME EKSENLERİYLE GEOMETRİK İLİŞKİSİ



Asal Gerilme Eksenleri

$$\sigma_1 > \sigma_2 > \sigma_3$$

ve birbirine diktir

a, b: makaslama kırıkları

c: açılma kırıkları

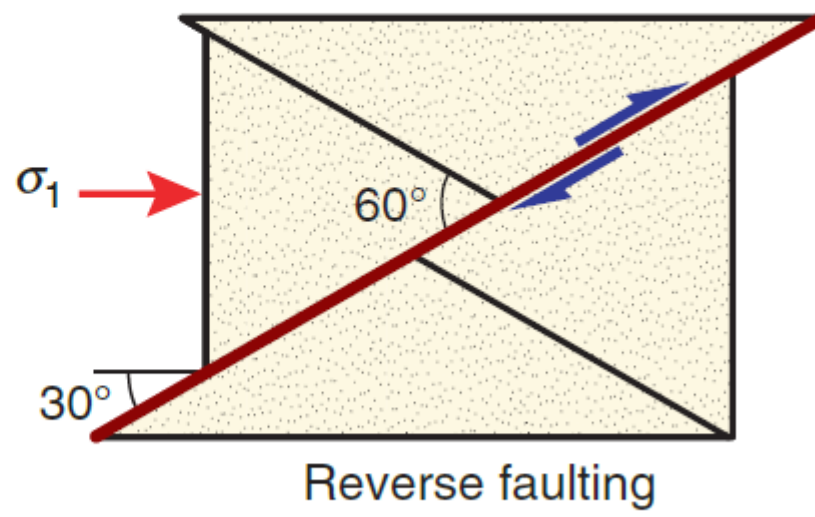
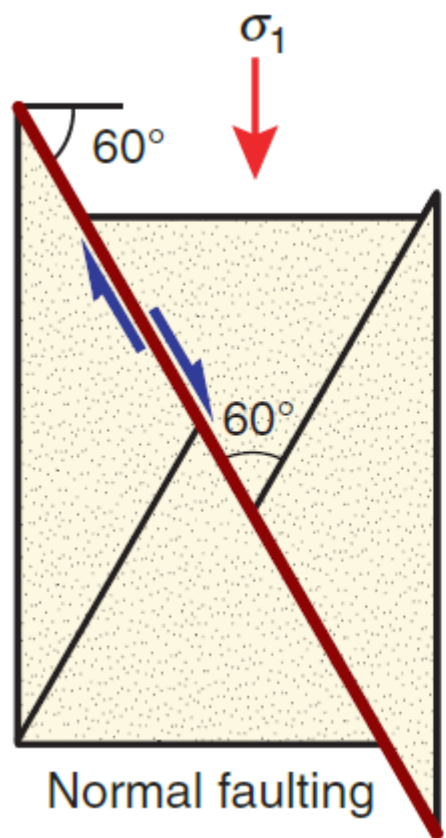
d: serbestleme kırıkları

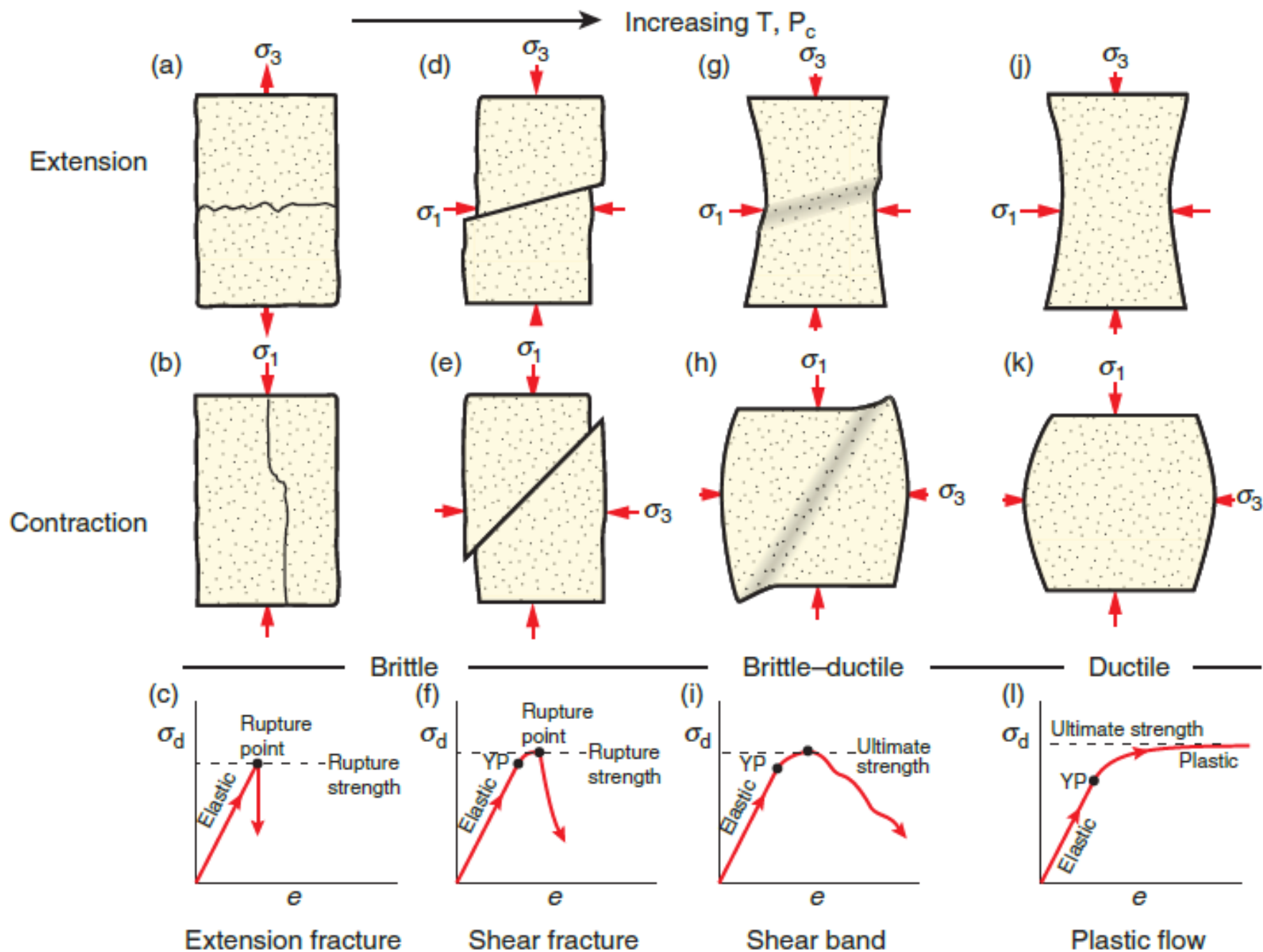
Makaslama kırıkları arasındaki dar açı  $2\theta$  yaklaşık  $60^\circ$  dir.

$\sigma_1$  bu kırıkların açı ortayında yer alır.

$\sigma_2$  makaslama kırıklarının arakesitine koşuttur.

$\sigma_3$  açılma kırıklarına diktir.







# ANDERSON'UN FAY MODELİ

## Varsayımlar

Yerkabuğu parçalanmamıştır ve bütün haldedir.

Ana gerilme eksenlerinden biri düşey, diğer ikisi yataydır.

Kaya kütlelerine etki eden kuvvetler denge halindedir.

## Kuvvet

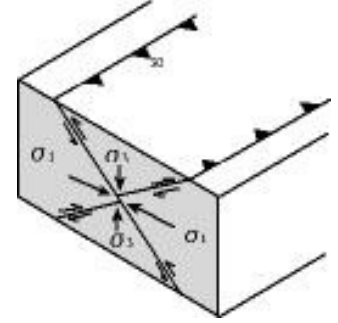
Yerçekimi

Litostatik basınç

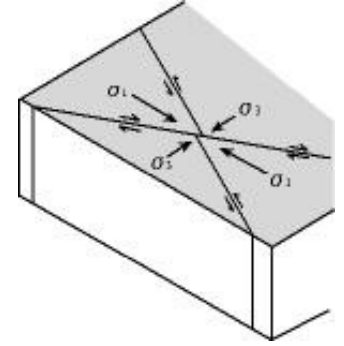
$$\sigma_1 > \sigma_2 > \sigma_3$$

**Varsayıma göre yerkabuğunda 3 farklı gerilme durumu ortaya çıkar**

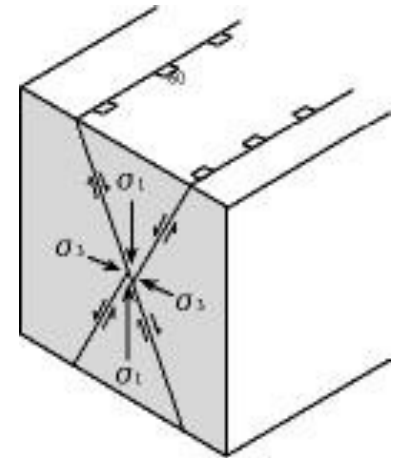
1. En büyük ( $\sigma_1$ ) ve ortanca ( $\sigma_2$ ) gerilme eksenleri yatay, en küçük gerilme eksenini ( $\sigma_3$ ) düşeyse, fay yüzeyinin eğimi  $45^\circ - f/2$  ( $\sim 30^\circ$ )



2. En büyük ( $\sigma_1$ ) ve en küçük gerilme ( $\sigma_3$ ) eksenleri yatay ve ortanca gerilme eksenini ( $\sigma_2$ ) düşeyse, fay düzlemi düşeydir.

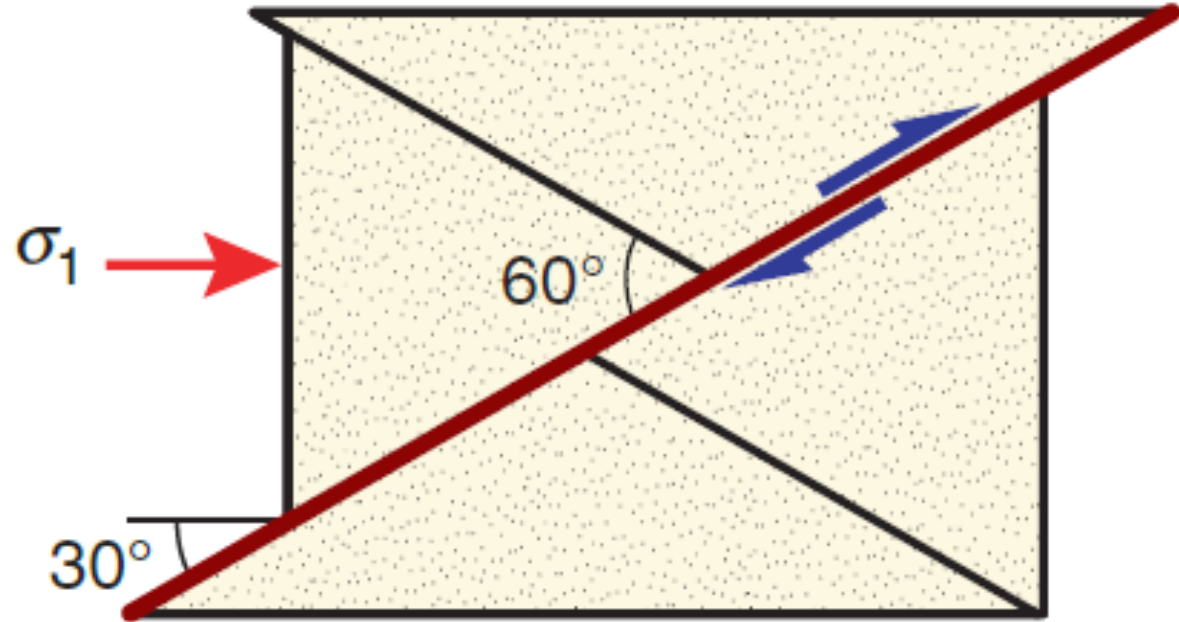
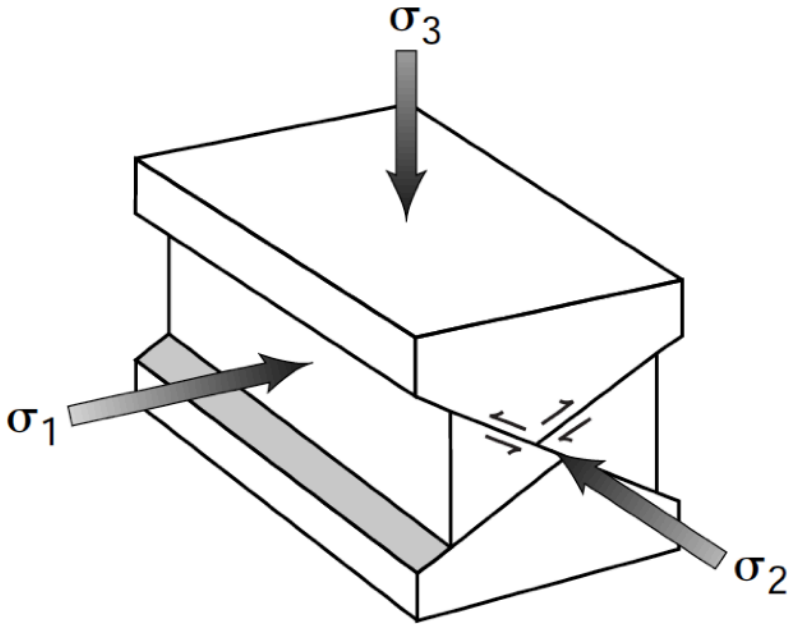


3. En büyük ( $\sigma_1$ ) gerilme eksenini düşey, ortanca ( $\sigma_2$ ) ve en küçük gerilme ( $\sigma_3$ ) eksenleri yataysa, Fay düzleminin eğimi  $45^\circ + f/2$  ( $\sim 60^\circ$ )



# TERS FAYLAR

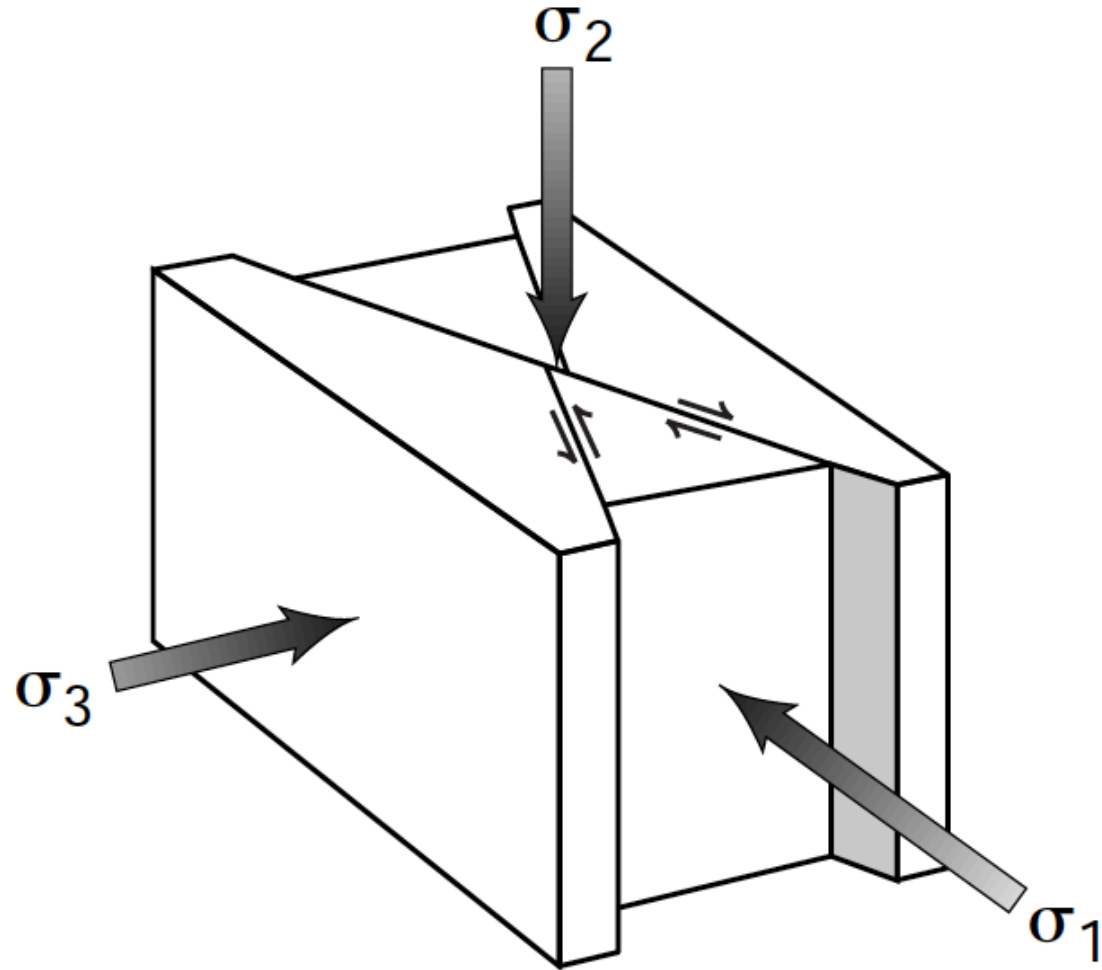
$\sigma_3$  düşeyse  $\sigma_1$  ve  $\sigma_2$  yataydır,  
fay düzleminin eğimi  $45^\circ - f/2$  ( $\sim 30^\circ$ )



Ters Faylanma

# DOĞRULTU ATIMLI FAYLAR

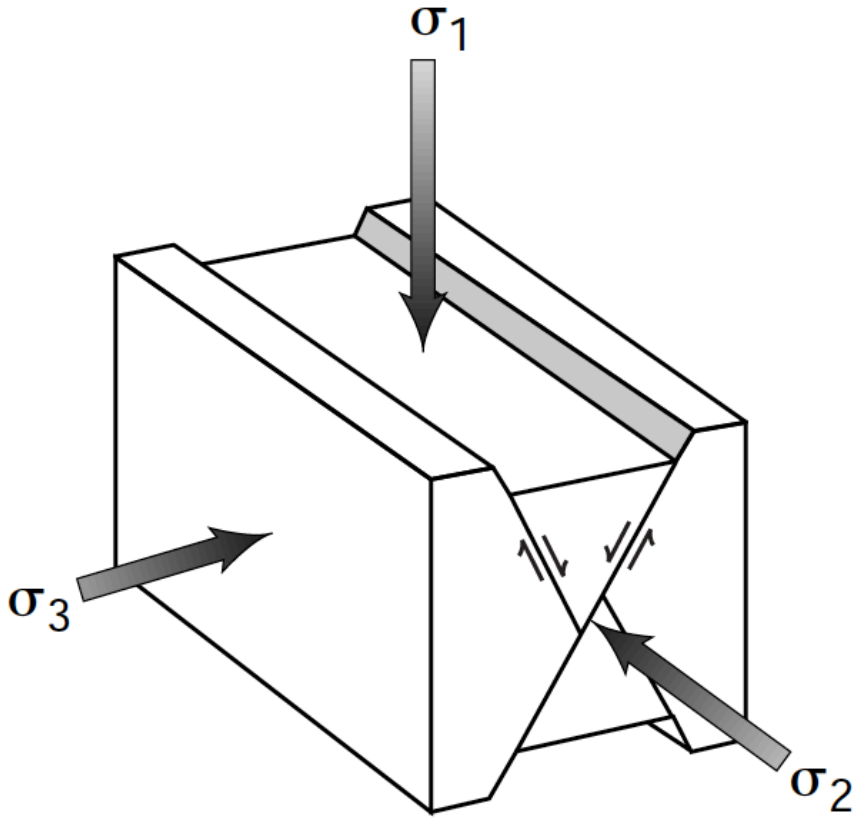
$\sigma_2$  düşey  $\sigma_1$  ve  $\sigma_3$  yataydır,  
fay düzleminin eğimi  $90^\circ$  (yaklaşık düşey)



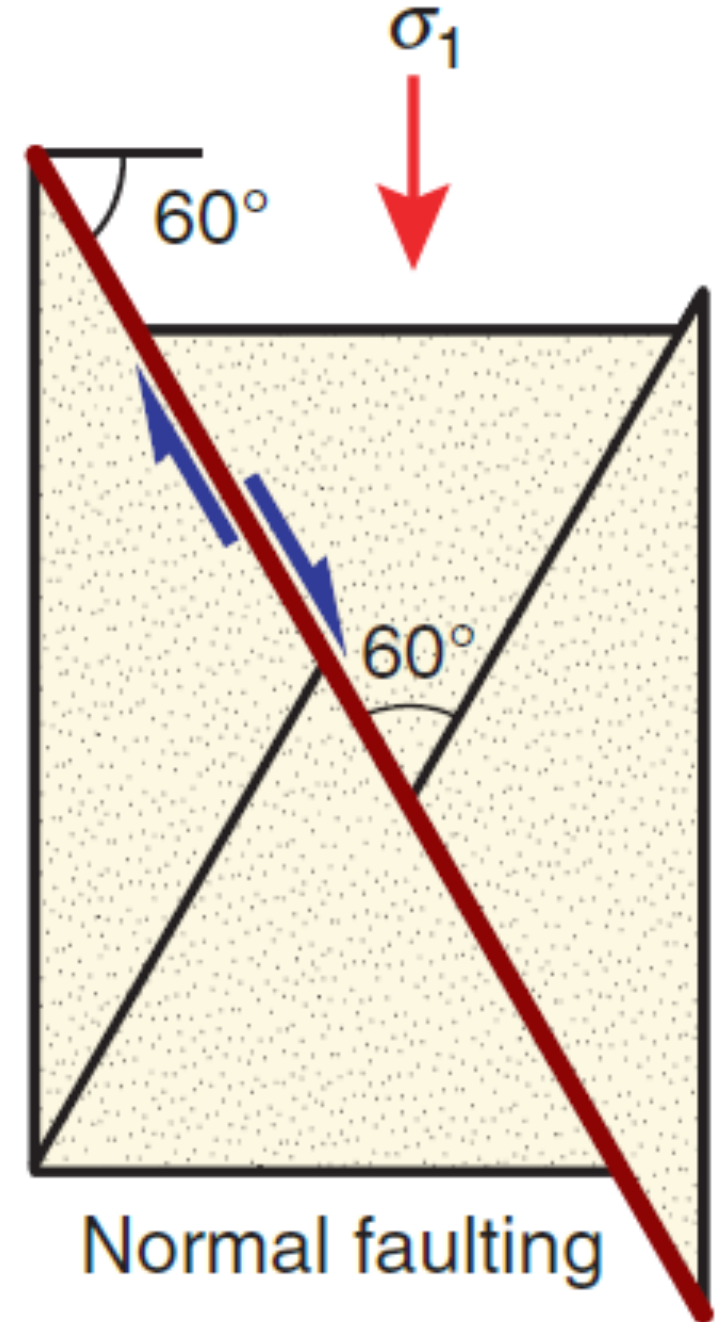


# NORMAL FAYLAR

$\sigma_1$  düşey  $\sigma_2$  ve  $\sigma_3$  yataydır,  
fay düzleminin eğimi  $45^\circ - f/2$  ( $\sim 60^\circ$ )



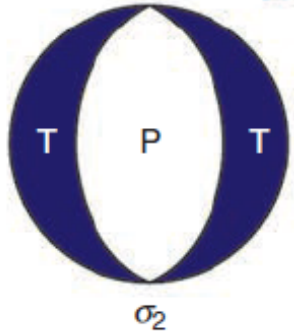
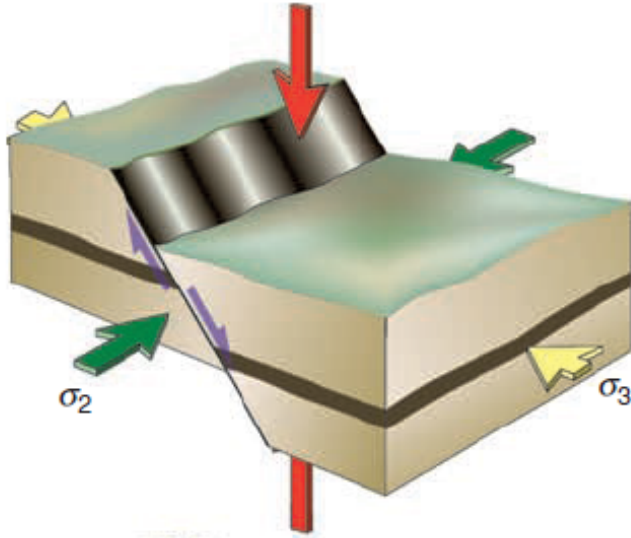
Normal Faylanma



# FAYLARIN ANA GERİLME EKSENLERİYLE GEOMETRİK İLİŞKİSİ

## NORMAL FAY:

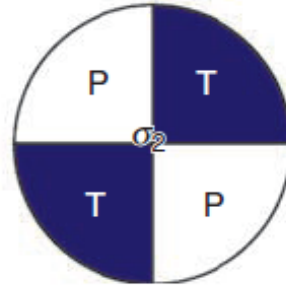
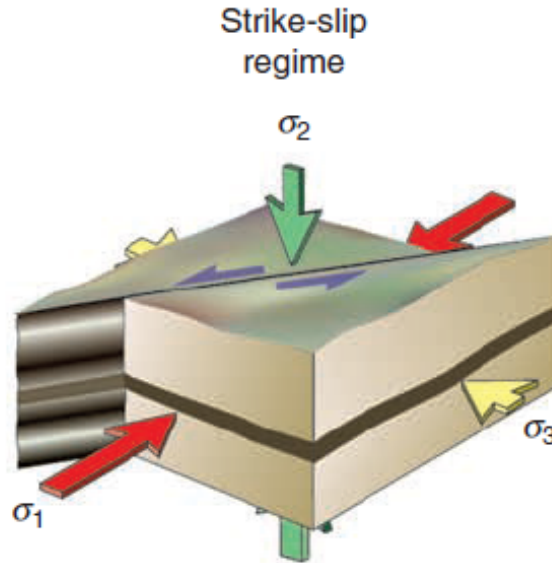
$\sigma_1$  düşey,  
 $\sigma_2$  ve  $\sigma_3$  yatay



Normal-fault regime

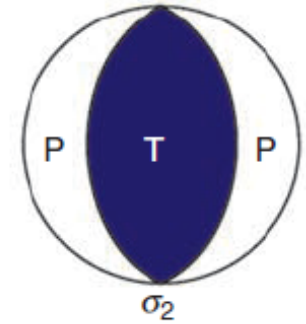
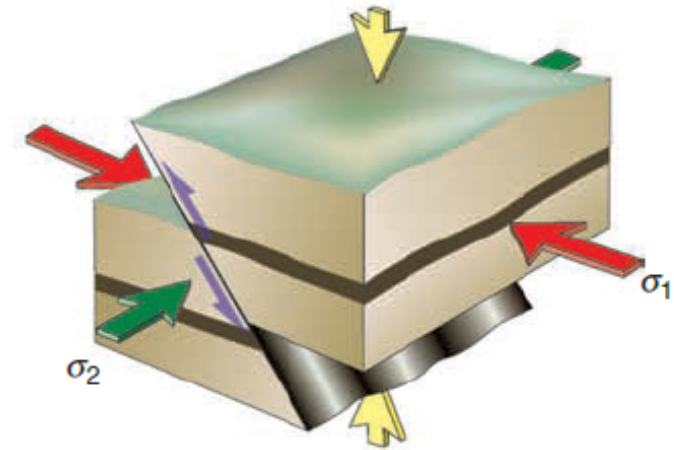
## DOĞRULTU ATIMLI FAY:

$\sigma_2$  düşey  
 $\sigma_1$  ve  $\sigma_3$  yatay

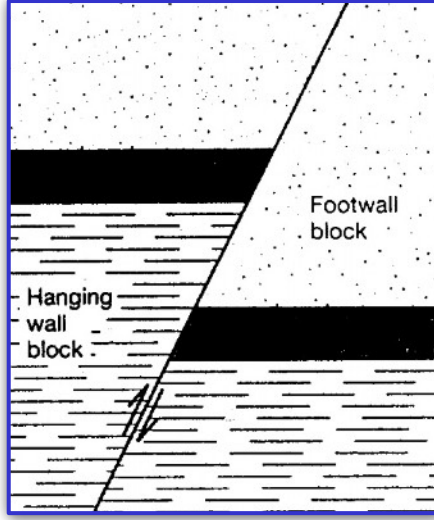


## TERS FAY:

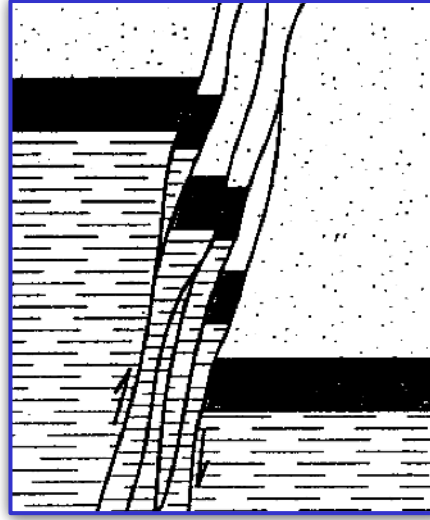
$\sigma_3$  düşey  
 $\sigma_1$  ve  $\sigma_2$  yatay



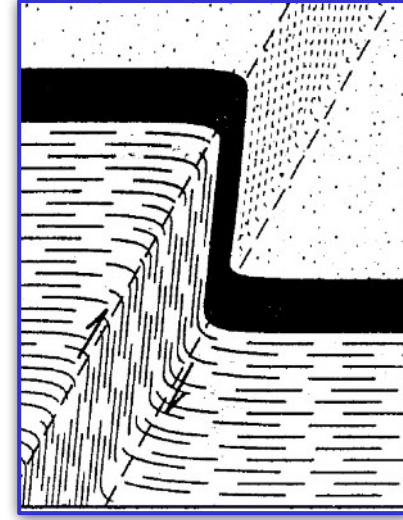
Thrust-fault regime



Fay yüzeyi



Kırılğan Fay zonu



Sünümlü Fay zonu

## Fayların Hareket Mekanizmaları

### Aralıklı Ani Hareket

#### Stick Slip

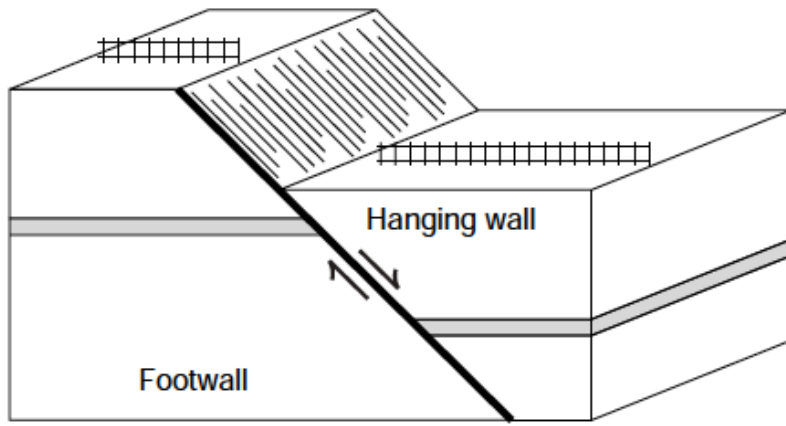
Fay yüzeyi veya zonu boyunca uzun süreli stres birikiminden sonra ani elastik enerji boşalması

### Sürekli Kayma

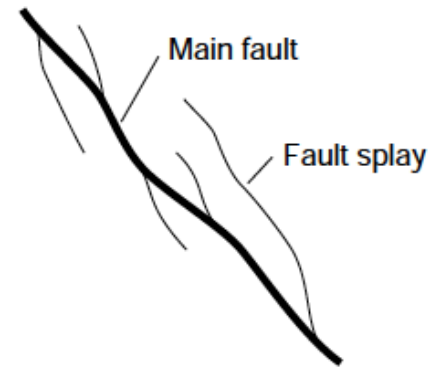
#### Stable Sliding

Fay yüzeyi veya zonu boyunca kesiksiz çok yavaş kayma hareketi meydana gelir

Depremler



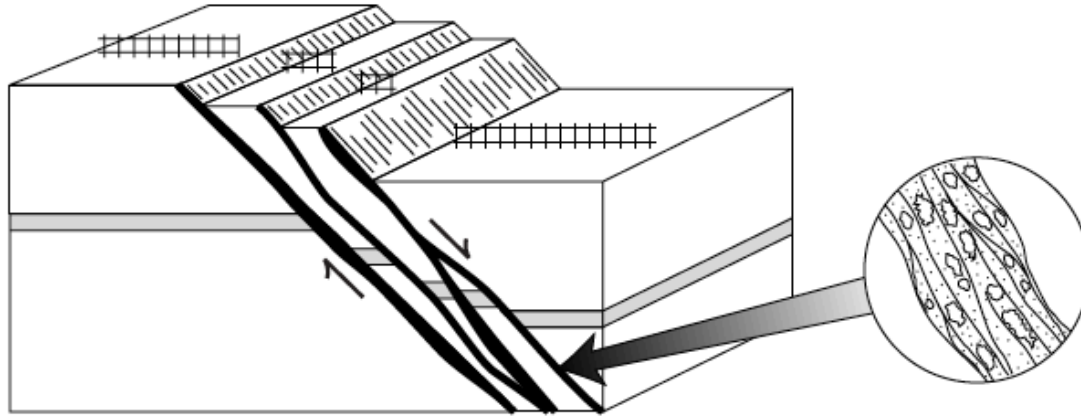
(a)



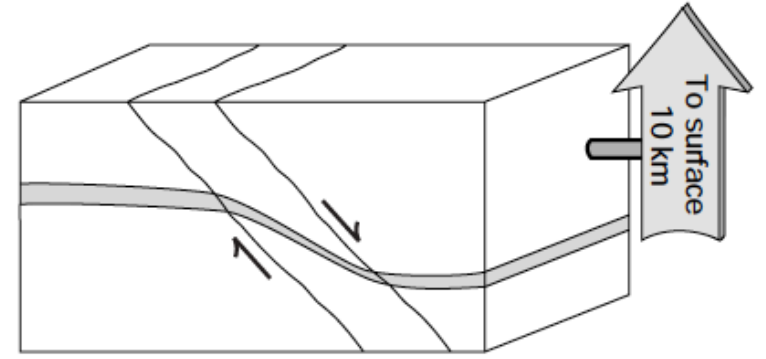
(c)



(d)



(b)



(e)

Fay düzlemi, kırılğan fay zonu ve sünümlü fay zonu (shear zone) arasındaki farkları gösteren şematik kesit.

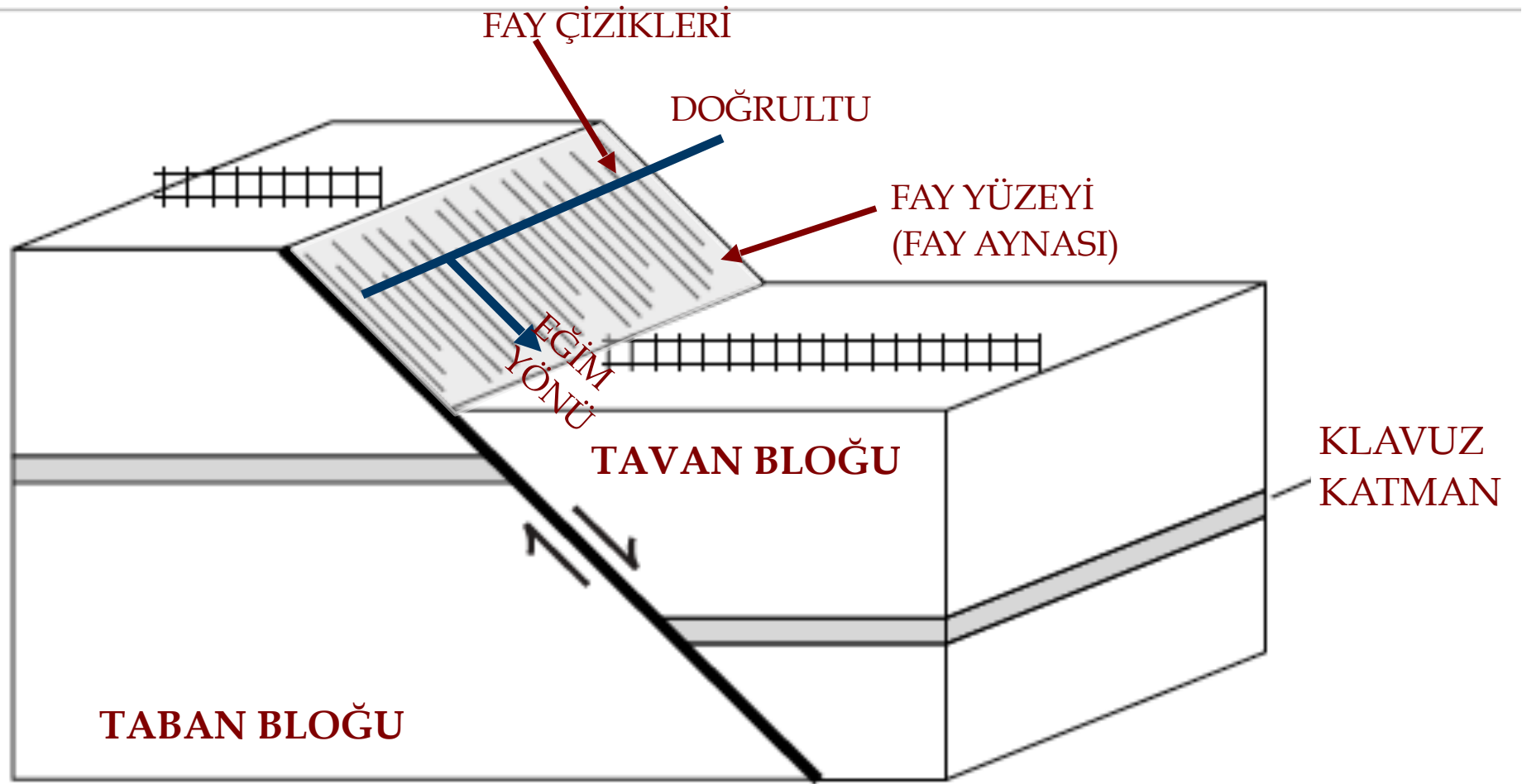
a. Fay (fay düzlemi),

b. Kırılğan fay zonu (fay zonu), daire içinde fay zonunda kataklastik deformasyon gösterilmiştir.

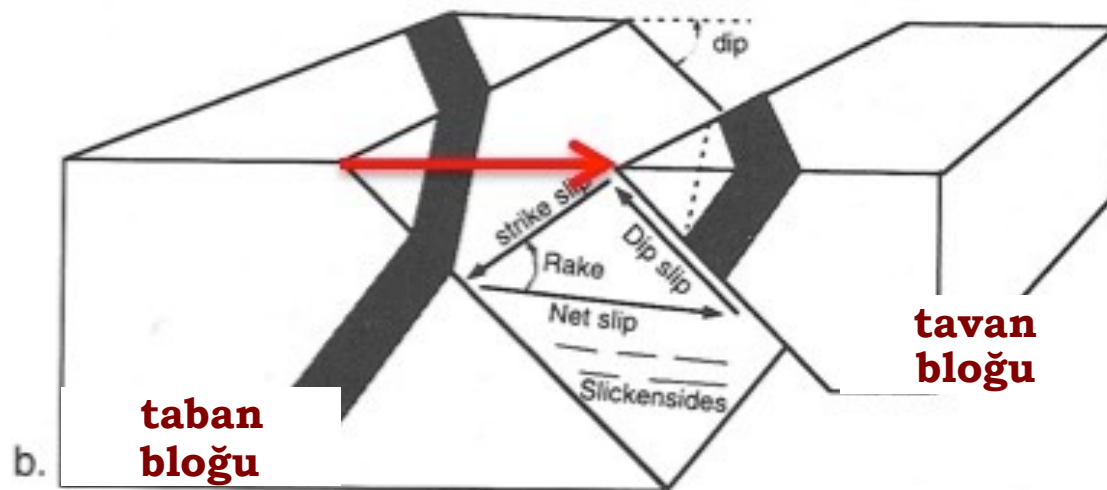
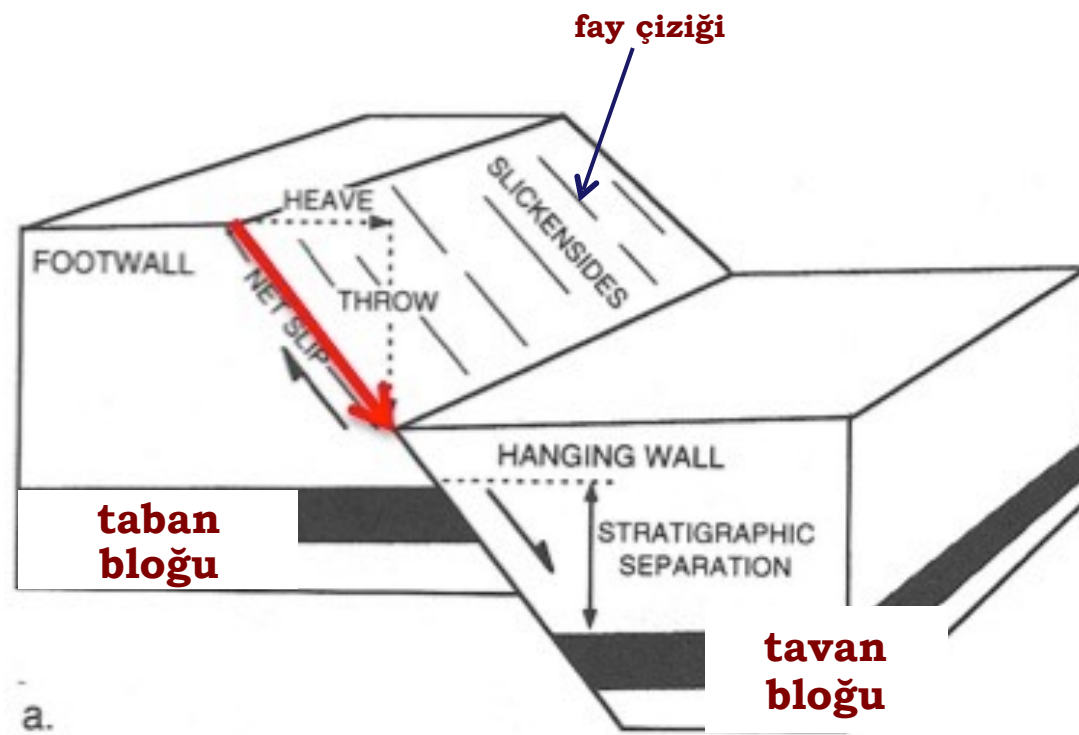
c. Ana fayla, fay saçakları arasındaki ilişkiyi gösteren şematik şekil.

d. Fay zonunda ağsı yapı.

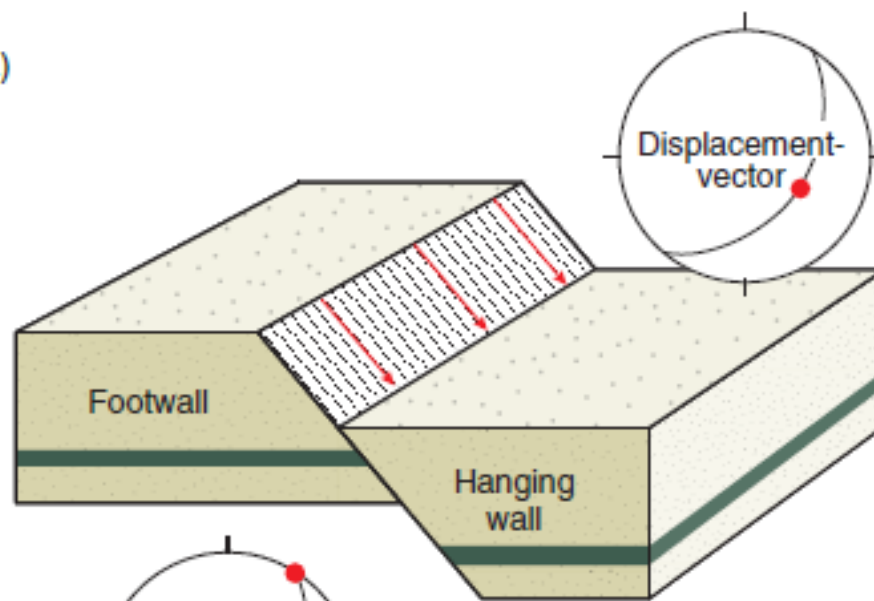
e. Sünümlü fay zonunda (shear zone) kaya zon içinde sürekliliğini korur. Shear zone kabuğun derin bölümlerinde oluşsa da yüzeyde yer değiştirme gözlenir.



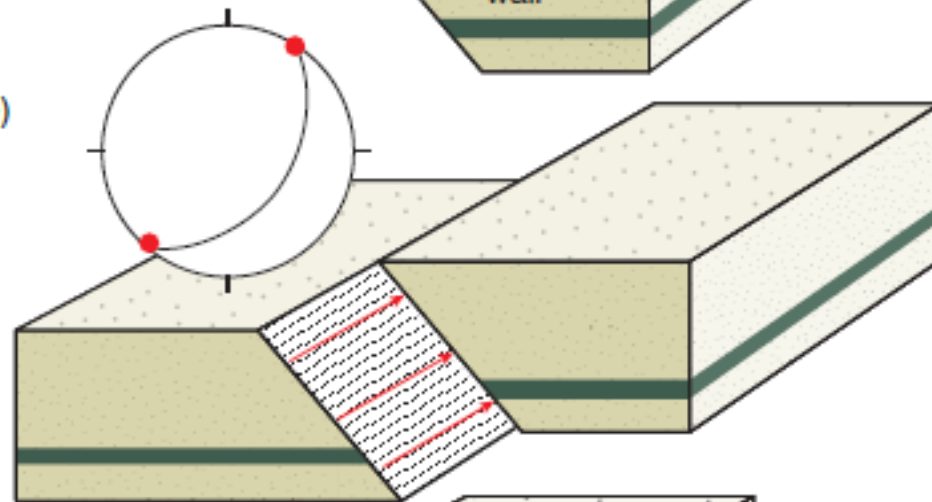




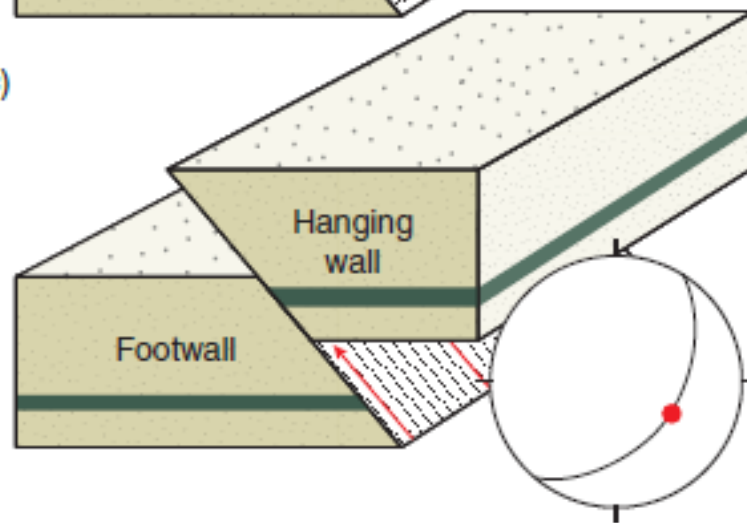
(a)



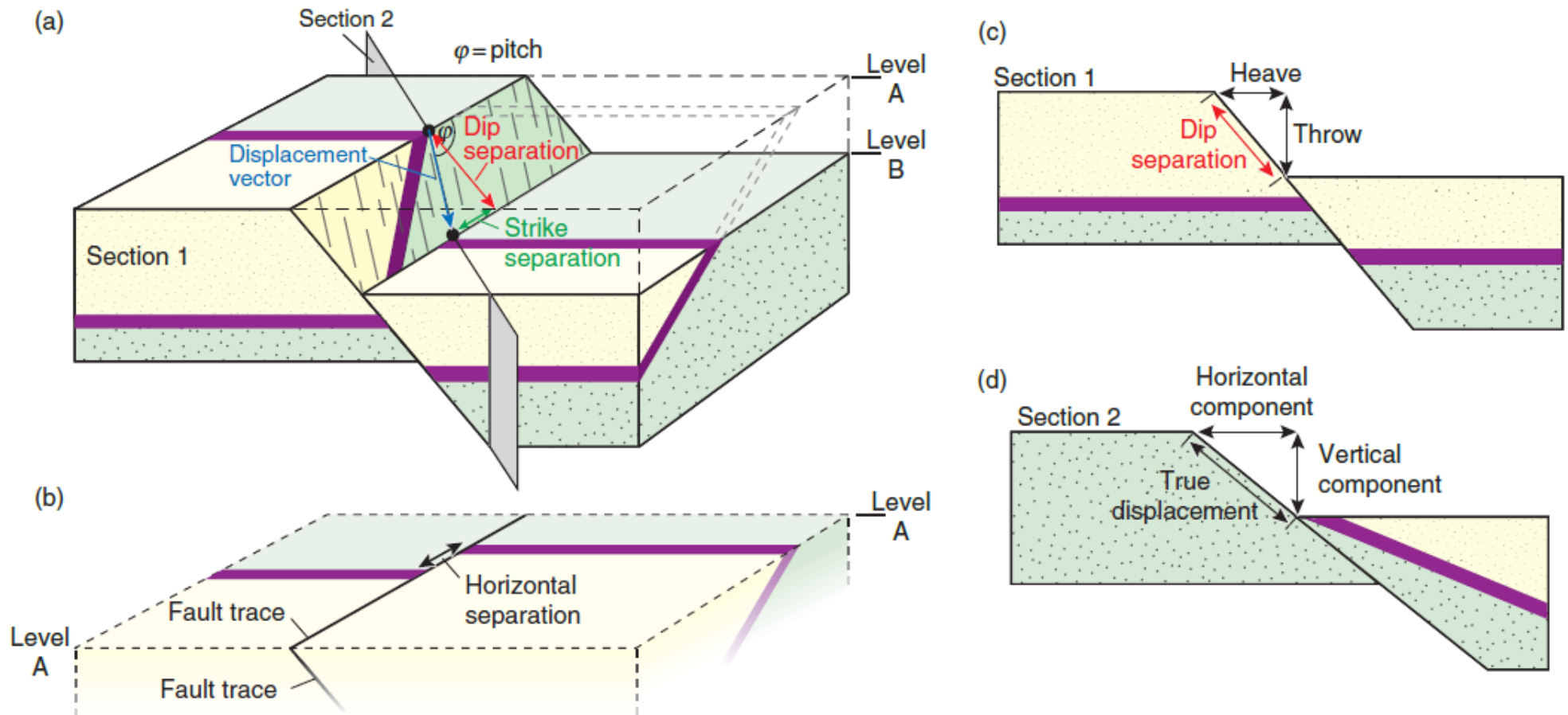
(b)

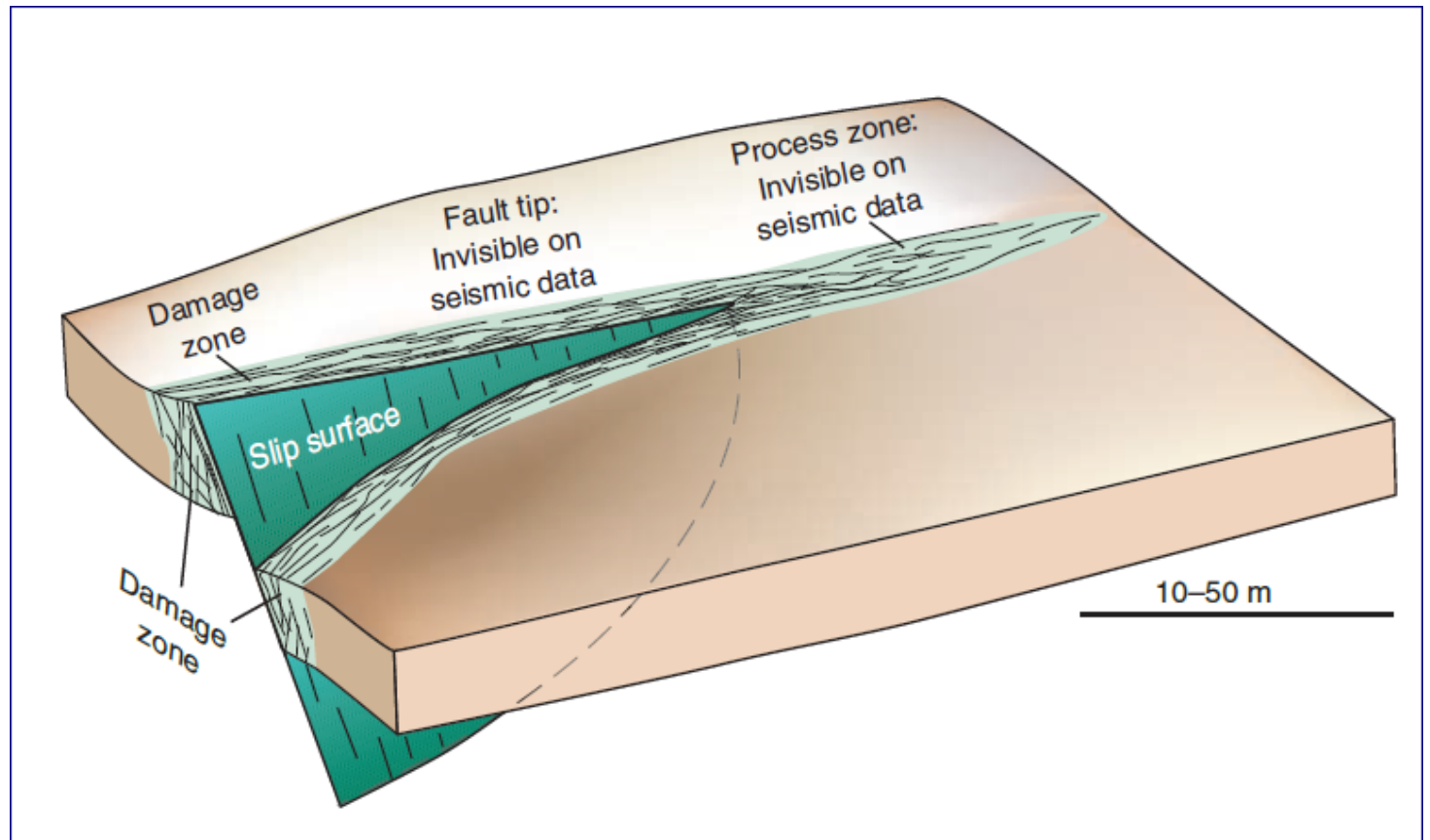
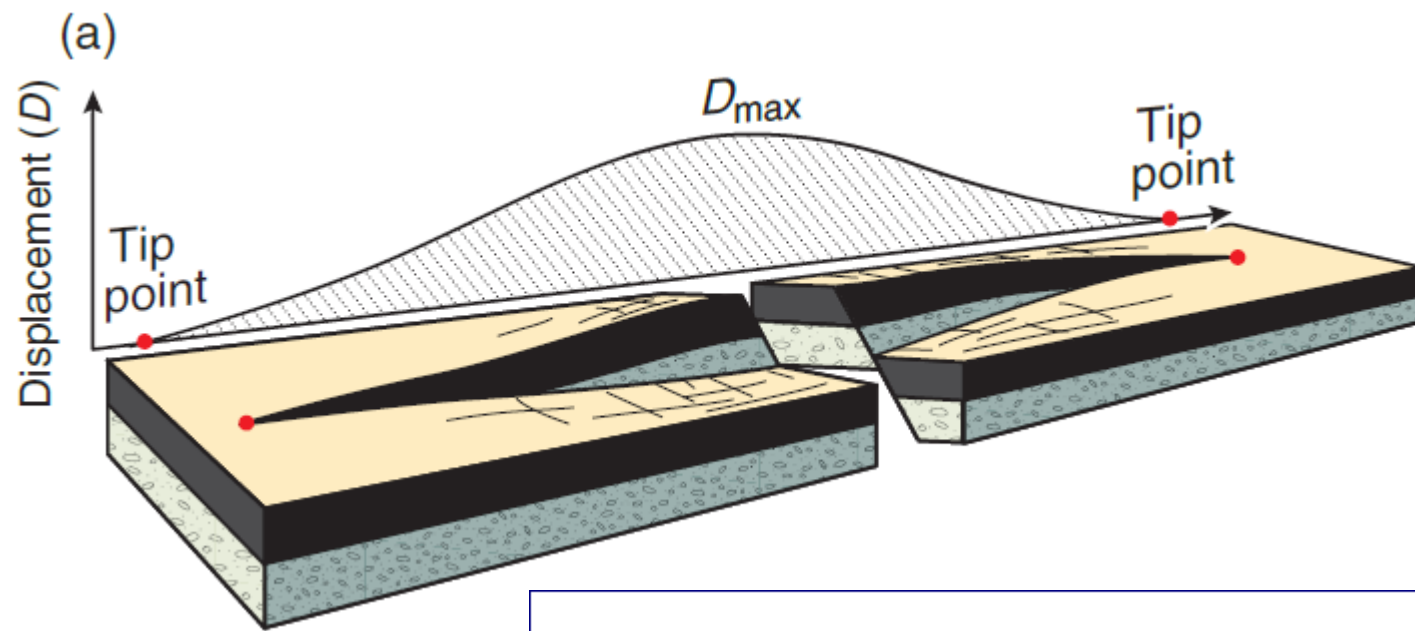


(c)

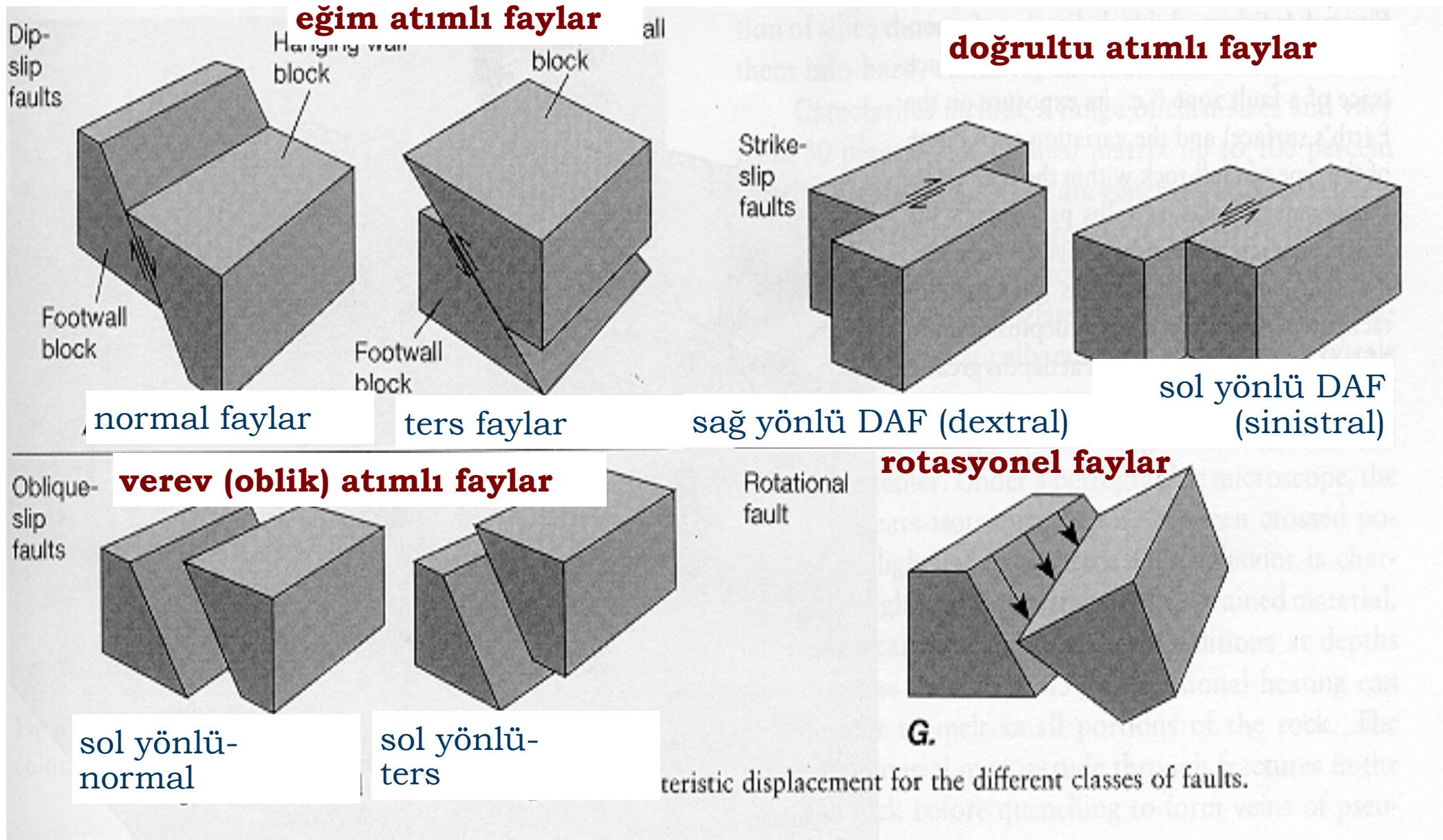


# ATIM - AYRILIM





# FAY TÜRLERİ (blokların hareket yönüne göre)





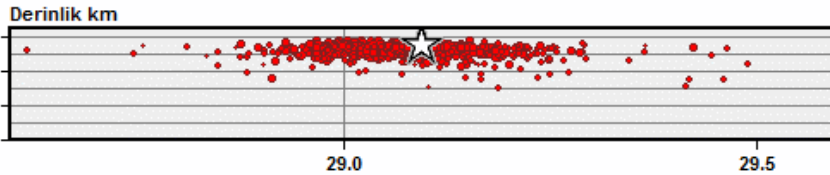
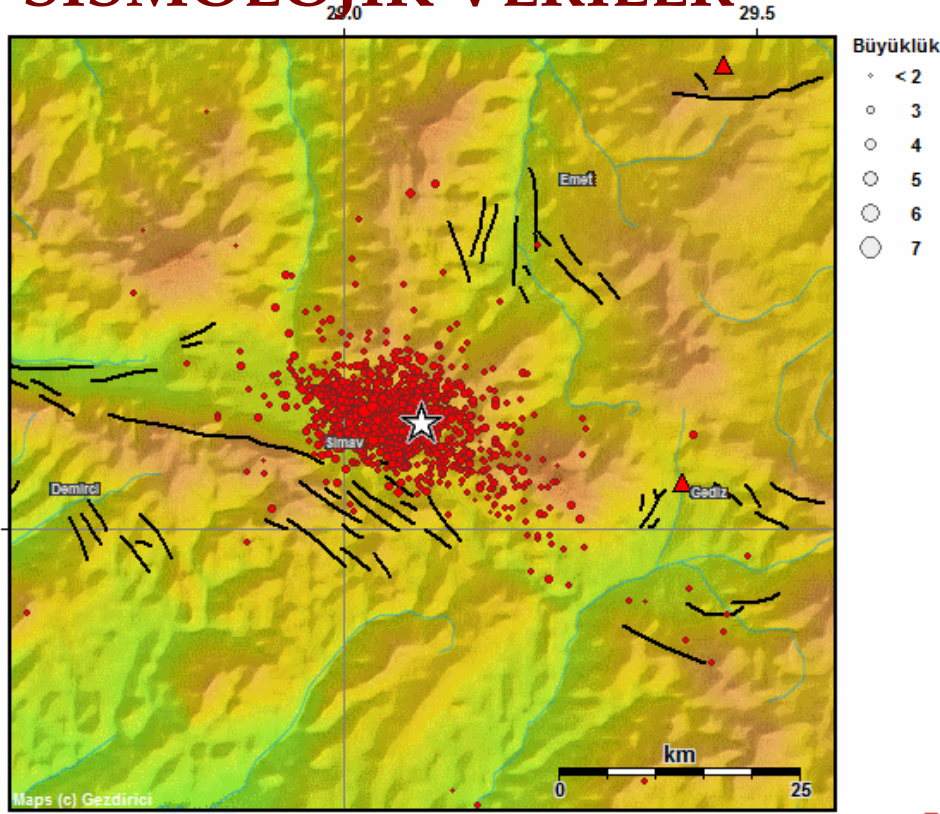
# FAYLARIN TANINMASI



SİSMOLOJİK/SİSMİK VERİLER  
FAY YÜZEYİ VE FAY ZONU ÖZELLİKLERİ  
JEOLojİK VEYA STRATİGRAFİK BİRİMLERE ETKİSİ  
MORFOLOJİK VERİLER



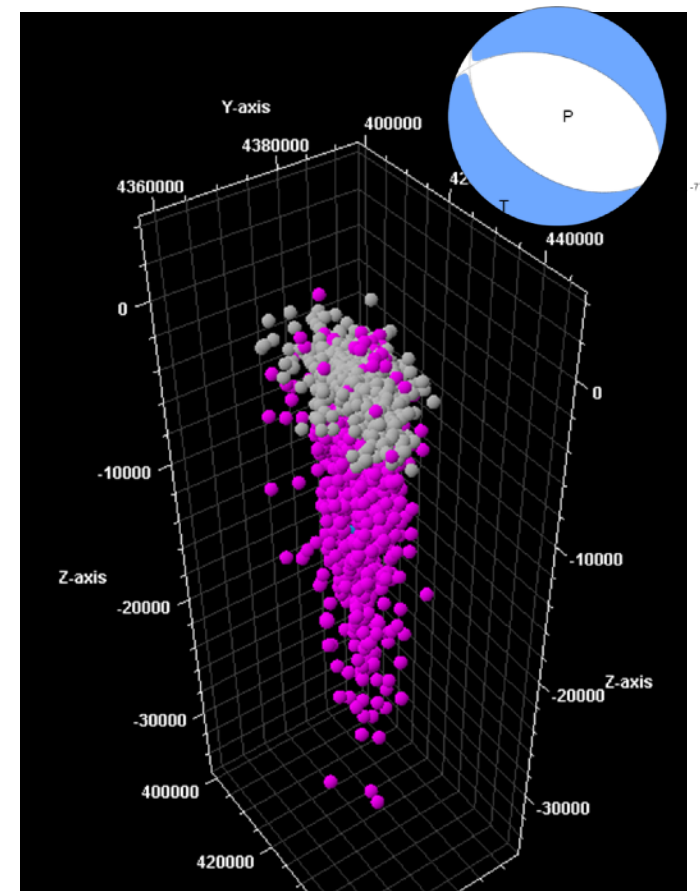
# SİSMOLOJİK VERİLER



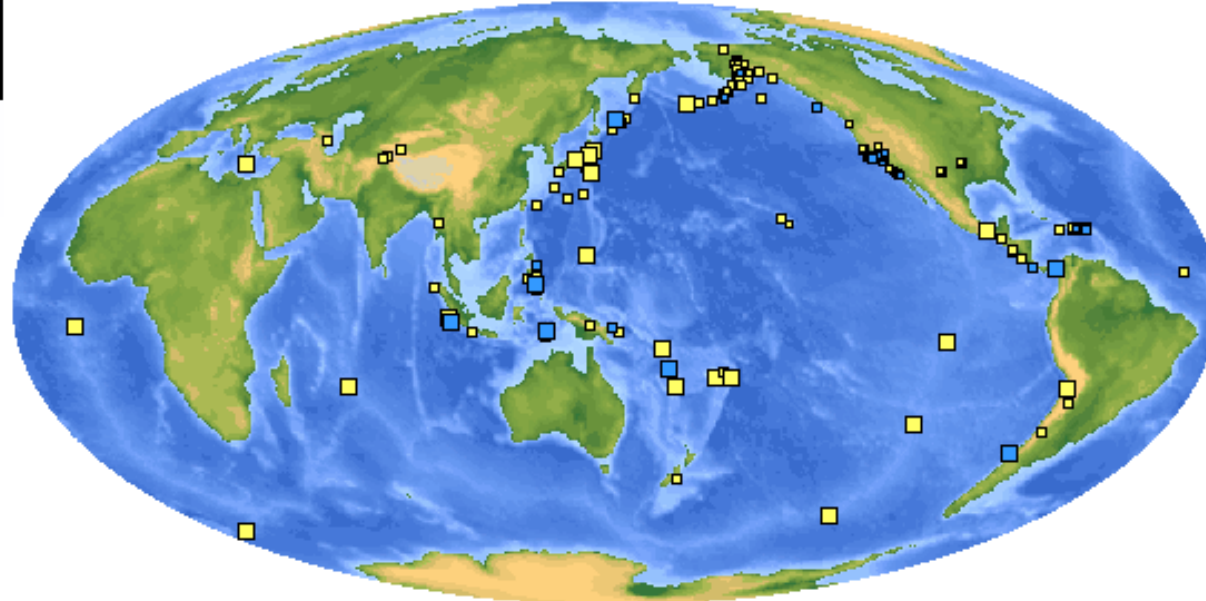
## SİMAV (KÜTAHYA)

05.07.2011 19:57:42 39.102K 29.098D Derinlik:5.0km Büyüklük:3.0  
Son 1 yıllık depremsellik.

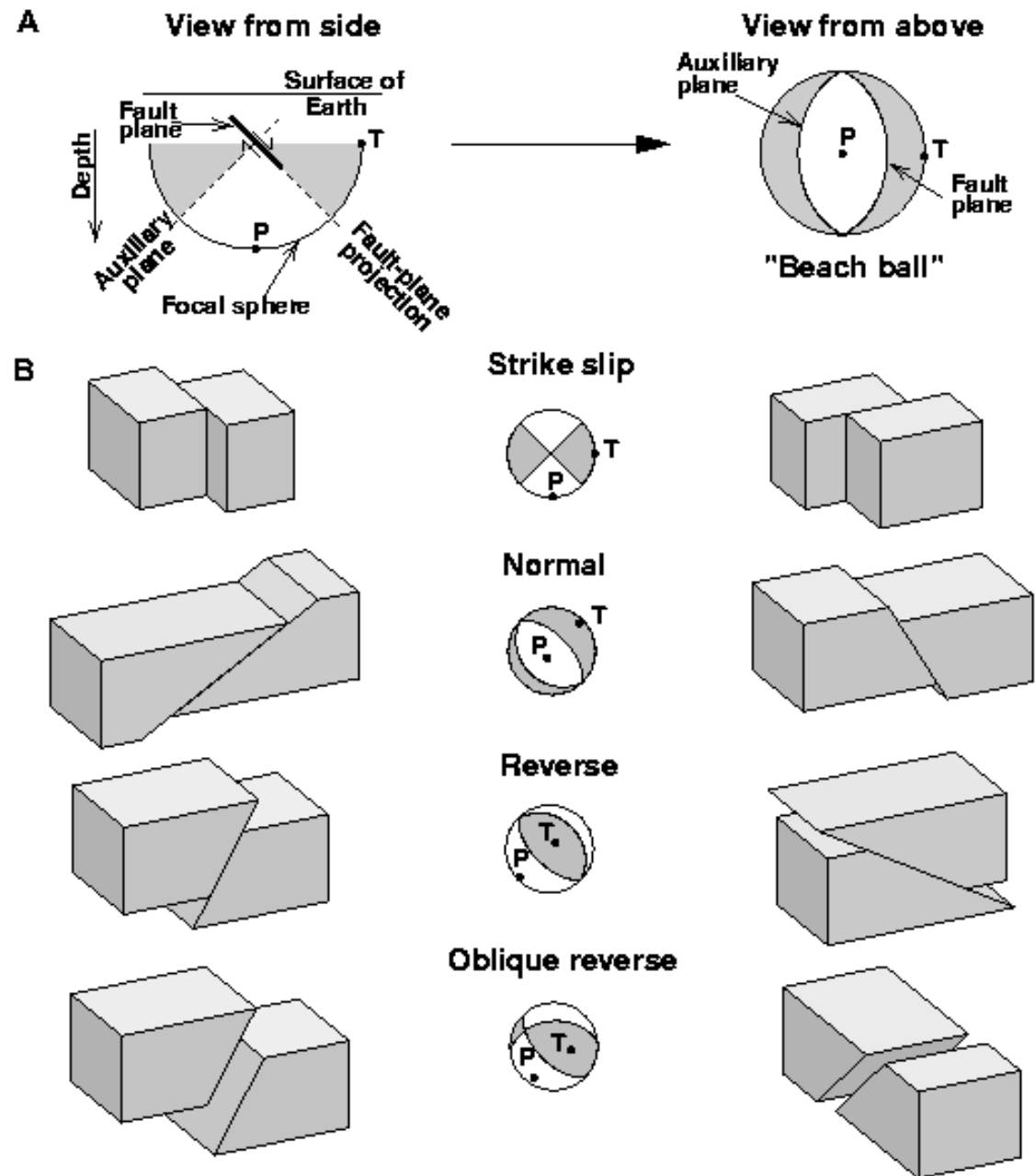
## DEPREMLER



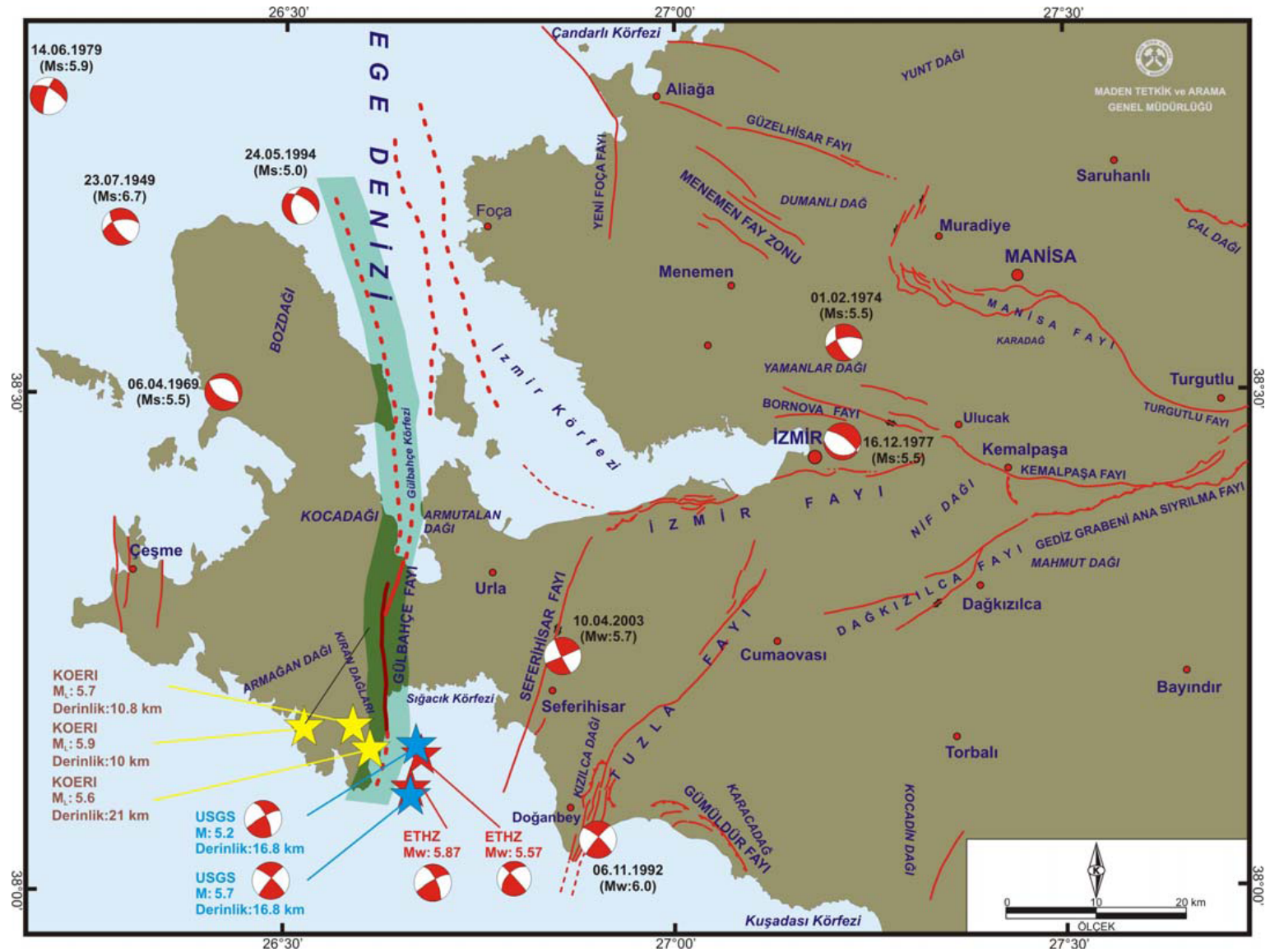
Thu Mar 3 14:00:03 UTC 2011 192 earthquakes on this map



# Schematic diagram of a focal mechanism

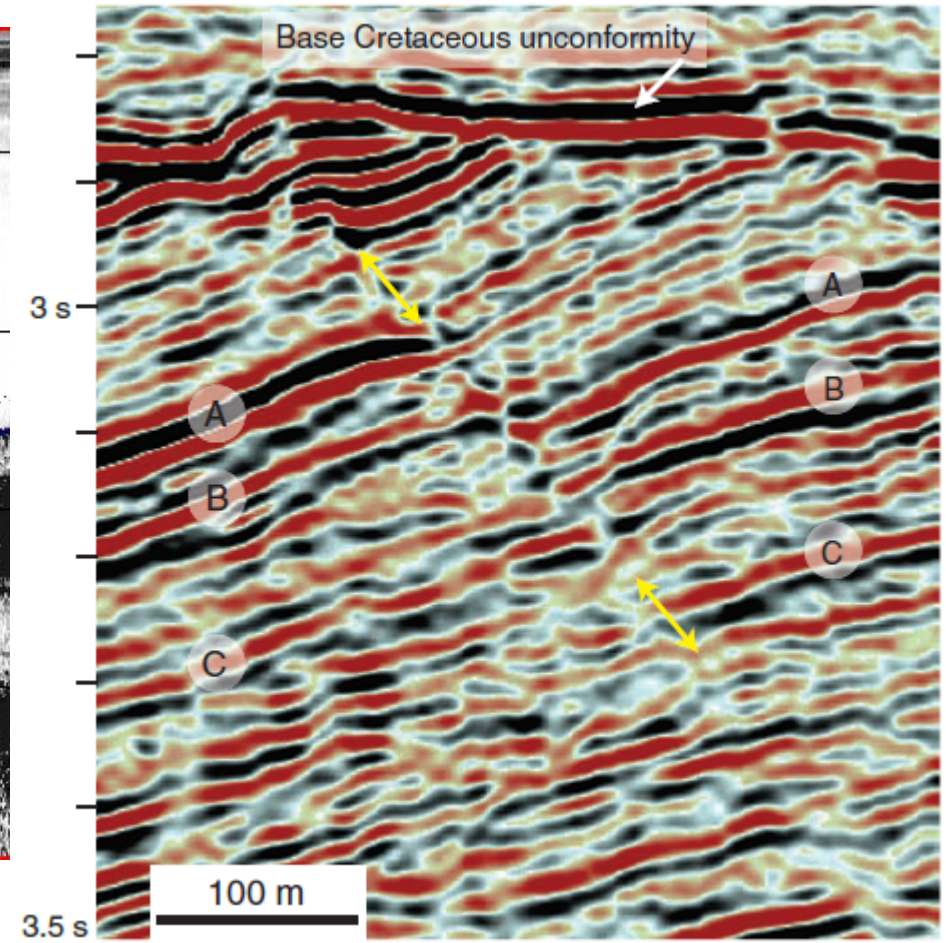
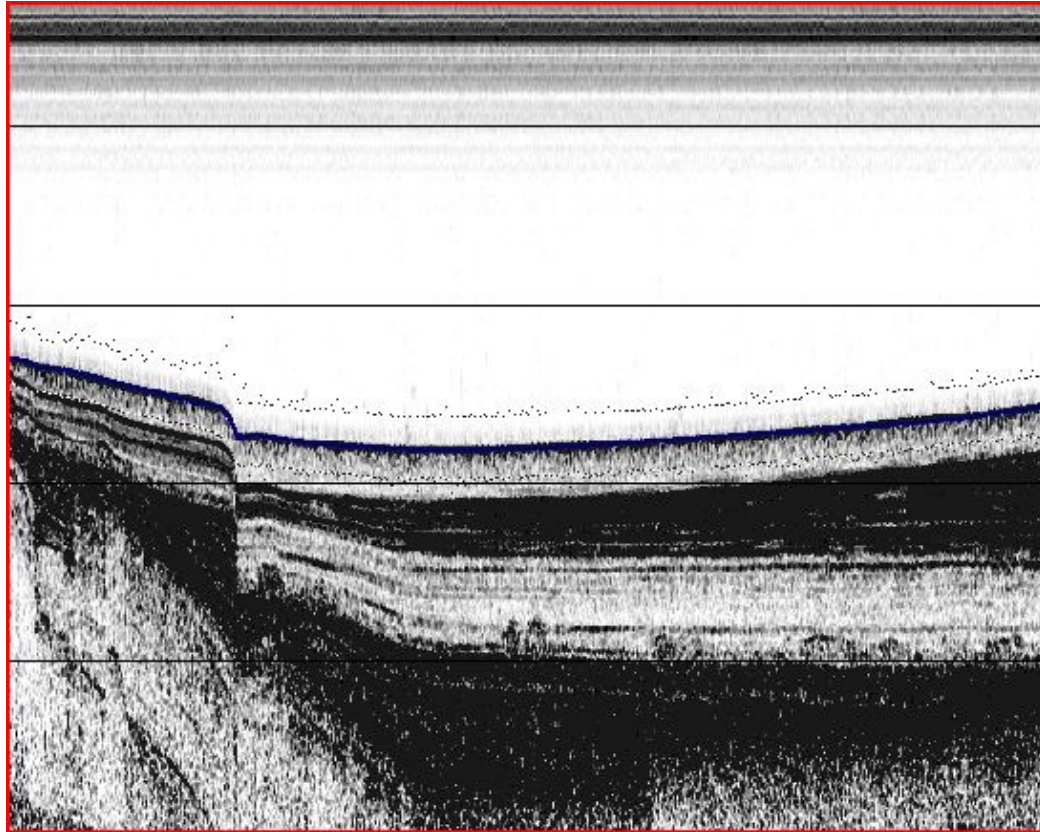


# SİSMOLOJİK VERİLER





# SİSMİK VERİLER





# FAY YÜZEYİ VE FAY ZONU ÖZELLİKLERİ



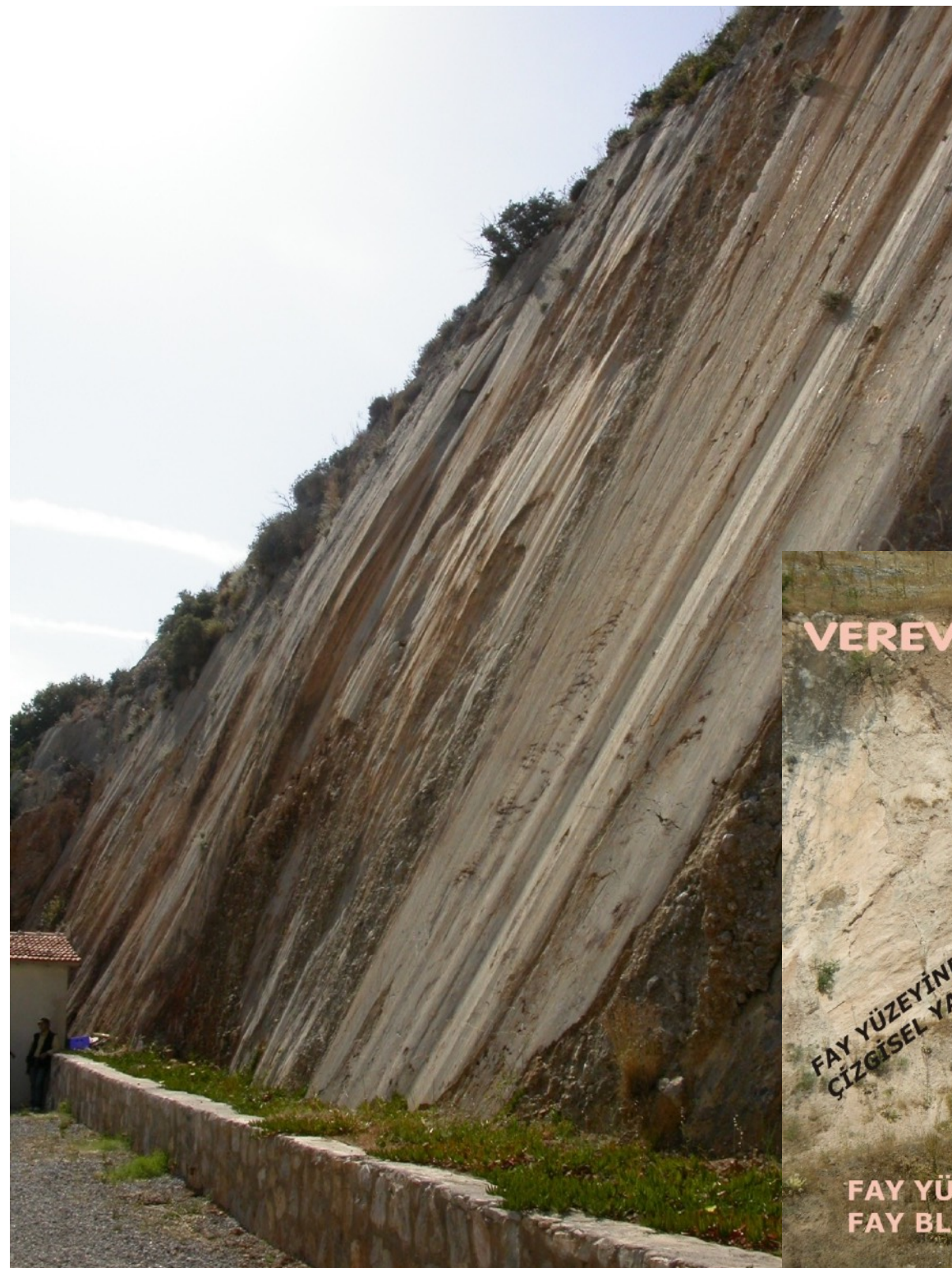
FAY DÜZLEMİ VE FAY BREŞİ



PSEUDOTACHYLITE



# FAY YÜZEYİ VE FAY ZONU ÖZELLİKLERİ





# FAY YÜZEYİ VE FAY ZONU ÖZELLİKLERİ



FAY DÜZLEMİ VE FAY BREŞİ



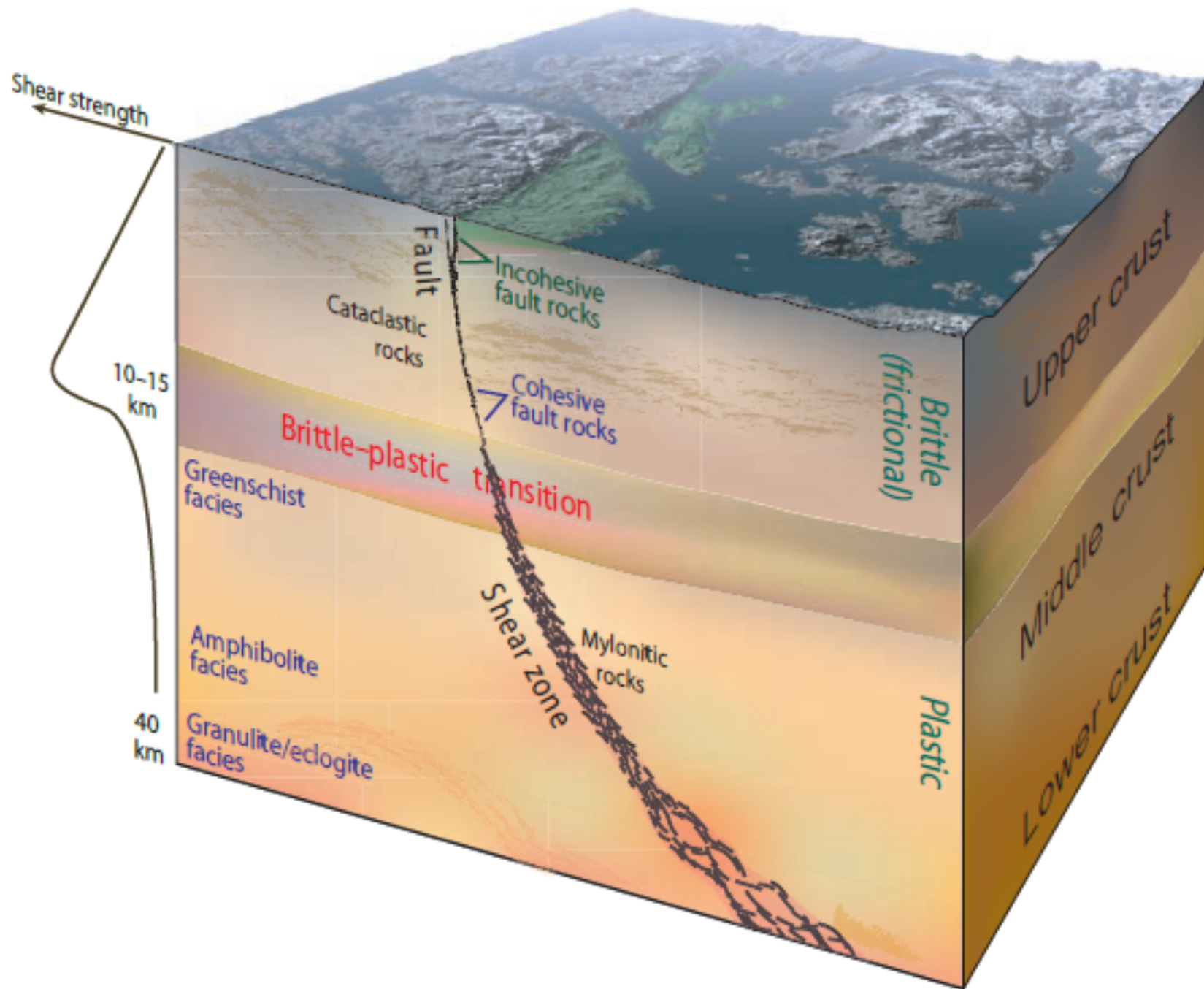
FAY BREŞİ



PSEUDOTACHYLITE



# FAY KAYALARI



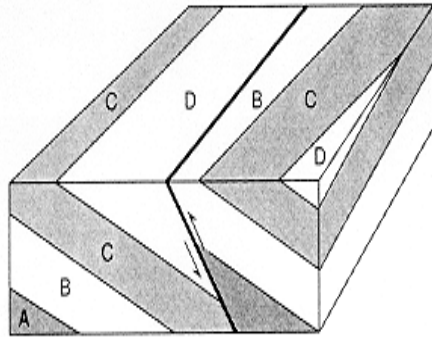


# FAY KAYALARI

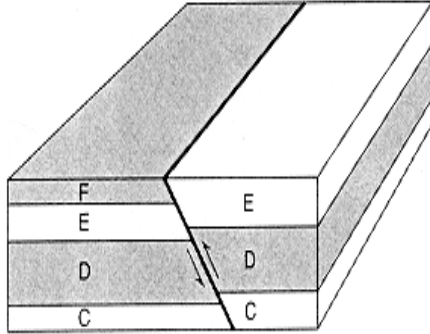
| KATAKLASTİK KAYALAR                 |                                                     |               |                               |                             |                     |
|-------------------------------------|-----------------------------------------------------|---------------|-------------------------------|-----------------------------|---------------------|
| YAPI                                | DOKU                                                | ADI           |                               | TANE BOYU                   | MATRİKS             |
| genellikle<br>yönlenme<br>gözlenmez | kataklastik<br>doku:<br>keskin köşeli<br>kırıntılar | breş serisi   | megabreş<br>breş<br>mikrobreş | >0.5 m<br>1-500 mm<br><1 mm | < %30               |
|                                     |                                                     | fay kili      |                               | < 0.1 mm                    |                     |
|                                     |                                                     | kataklasit    |                               | genellikle<br><10 mm        | > %30               |
|                                     |                                                     | pseudotakilit |                               |                             | cam ya da<br>< 1 µm |

| MİLONİTİK KAYALAR                     |                                                                                         |                 |              |                   |         |
|---------------------------------------|-----------------------------------------------------------------------------------------|-----------------|--------------|-------------------|---------|
| YAPI                                  | DOKU                                                                                    | ADI             |              | MATRİKS-TANE BOYU | MATRİKS |
| foliasyon ve<br>lineasyon<br>sunarlar | metamorfik<br>doku:<br>birbirlerine<br>girik tane<br>sınırları,<br>granoblastik<br>doku | milonitik gnays |              | > 50 µm           |         |
|                                       |                                                                                         |                 | protomilonit | < 50 µm           | < %50   |
|                                       |                                                                                         | milonit serisi  | milonit      | < 50 µm           | %50-%90 |
|                                       |                                                                                         |                 | ultramilonit | < 10 µm           | >%90    |

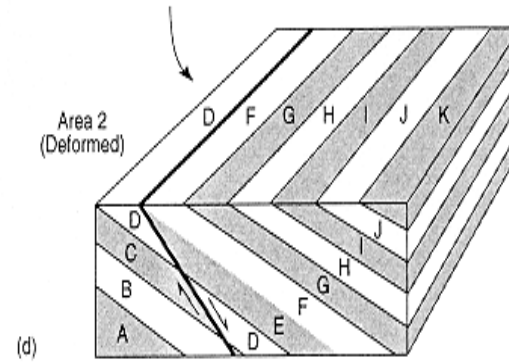
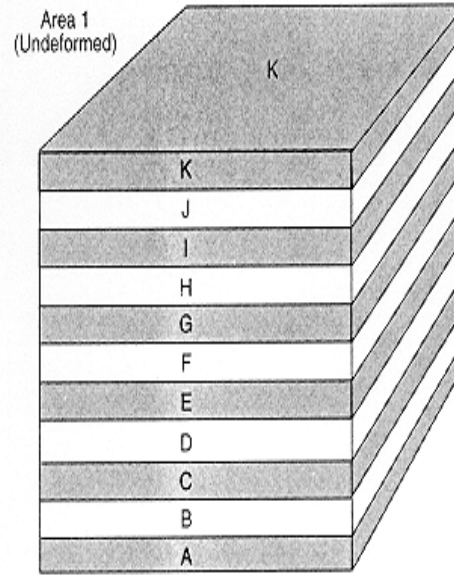
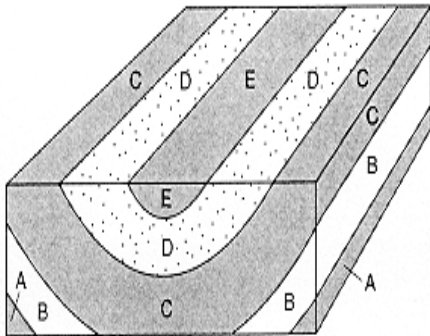
# JEOLJİK VEYA STRATİGRAFİK BİRİMLERE ETKİSİ



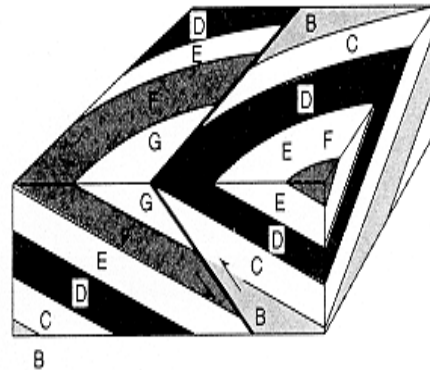
(a)



(b)



(d)



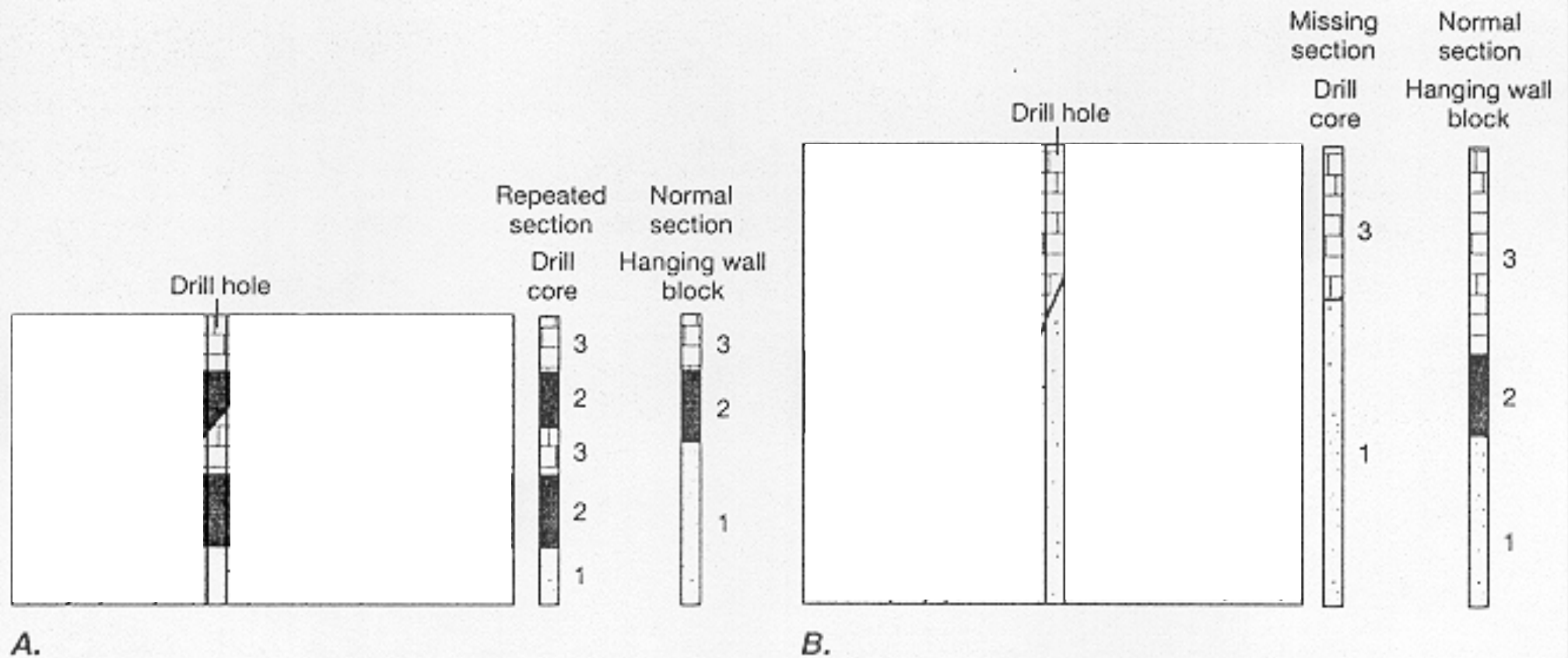
**Fayların tanınması ve bağıl hareketin saptanması**

Kaya birimlerinde eksiklik ya da tekrarlanmalar

Referans yapılarıdaki atımlar

Yapıların, tabakaların ya da kaya birimlerinin kesilmesi

## SONDAJ VERİLERİ

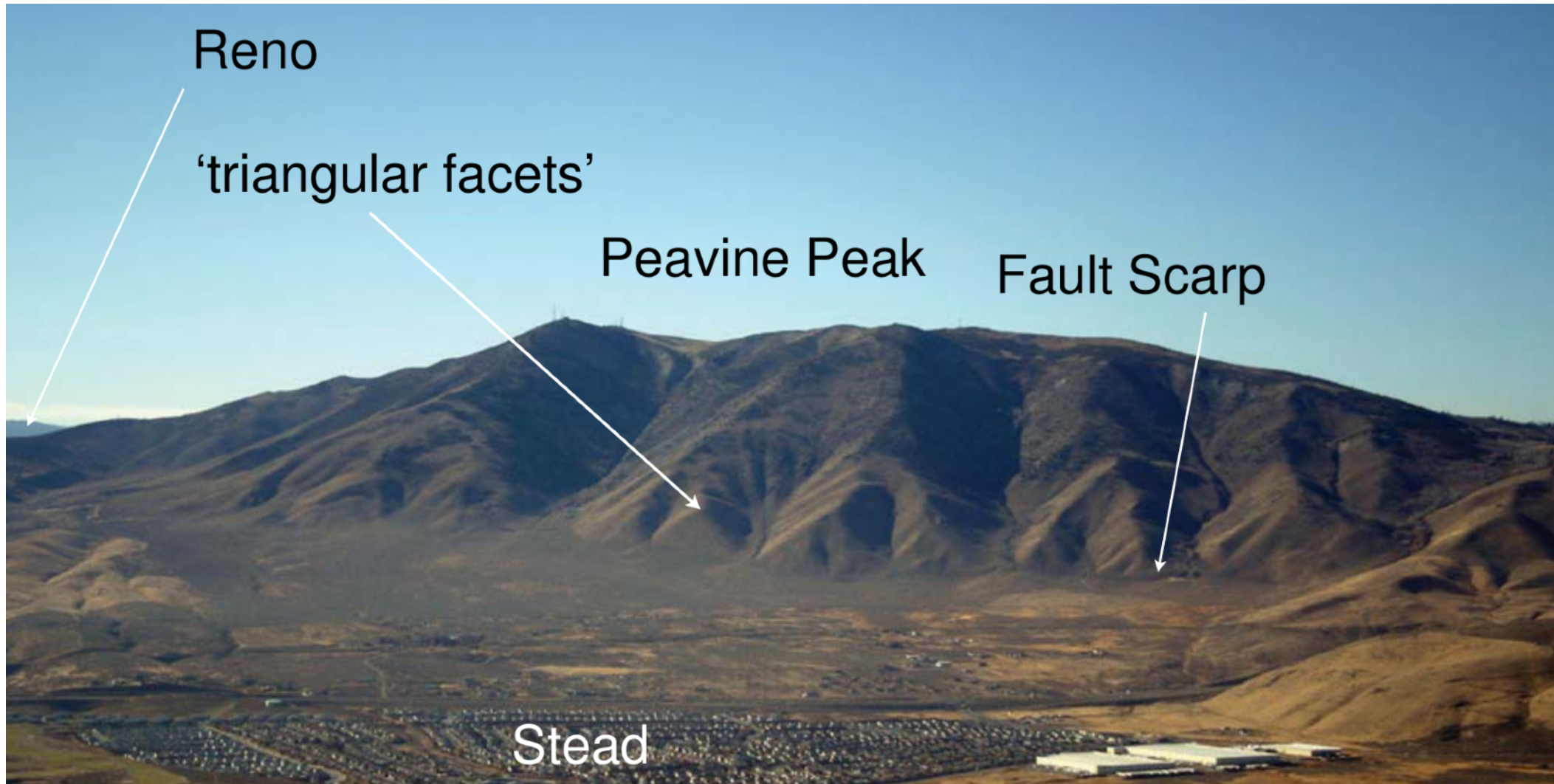




# MORFOLOJİK VERİLER



# MORFOLOJİK VERİLER



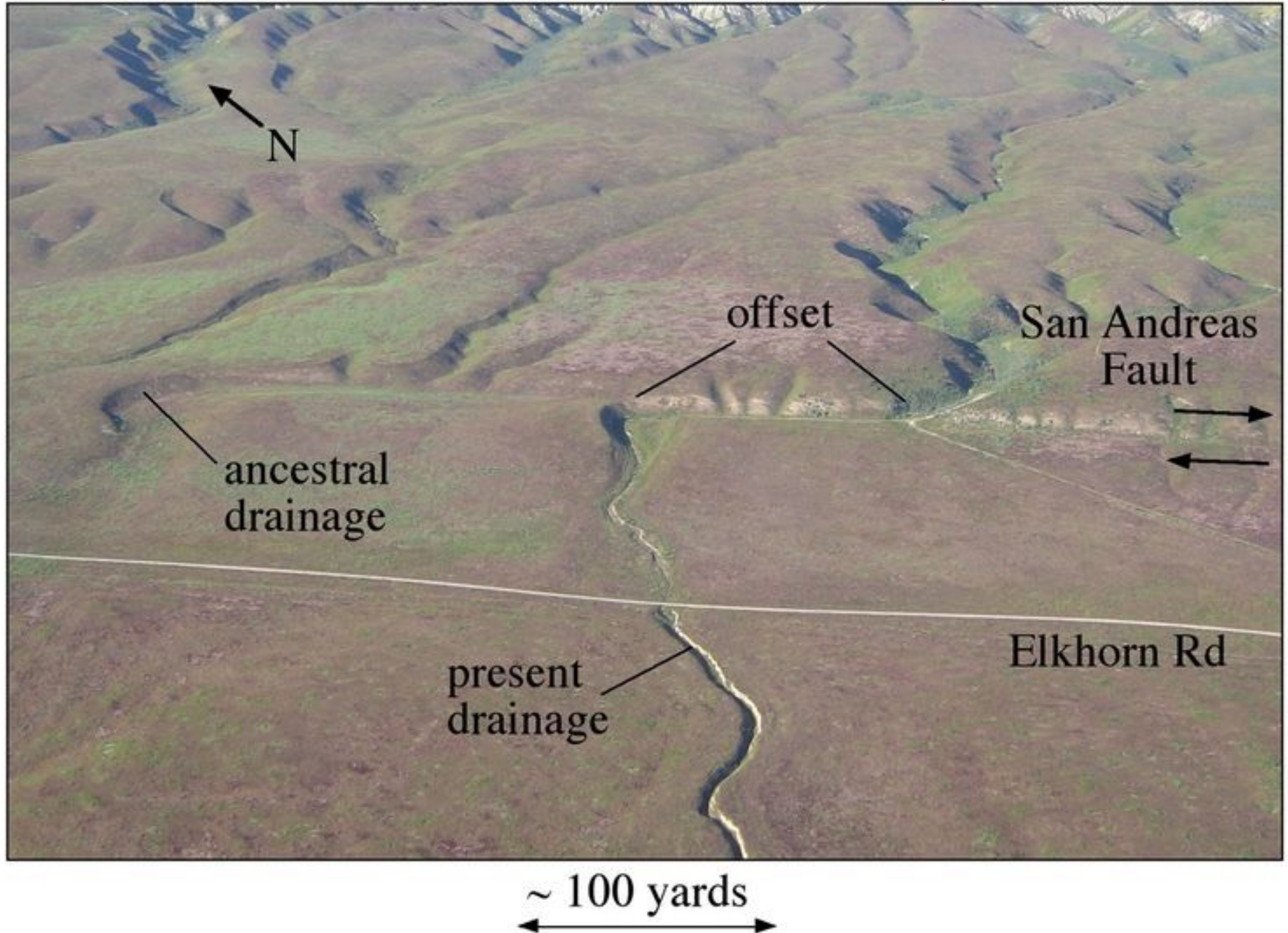


# MORFOLOJİK VERİLER





# MORFOLOJİK VERİLER



# MORFOLOJİK VERİLER





# MORFOLOJİK VERİLER

