

SİSMİK KESİTLERDE BURULMA FAYLARIN TANIMLANMASI RECOGNITION OF WRENCH FAULTS ON SEISMIC SECTIONS

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ABSTRACT

In this study, importance of structures formed by strike-slip movement in hydrocarbon exploration is emphasized. Seismic data is the main tool to enlighten underground geology in hydrocarbon exploration. Therefore, recognition of strike-slip faults on seismic sections is of prime importance. Interpreter should think that he is probably dealing with strike-slip fault if the faults: interpreted from seismic section, is vertical or near vertical and cut through the basement, if the thickness of horizons on both sides of the fault changes, if throw of the fault changes from one line to other, if seismic reflections wedge and sudden unconformities seen, and if there exist positive and negative flower structures on seismic section. If the above conditions above exist, mapped horizon should show structural displacement along the fault.

Key Words: Strike-slip fault, Wrench fault, seismic section, hydrocarbon exploration

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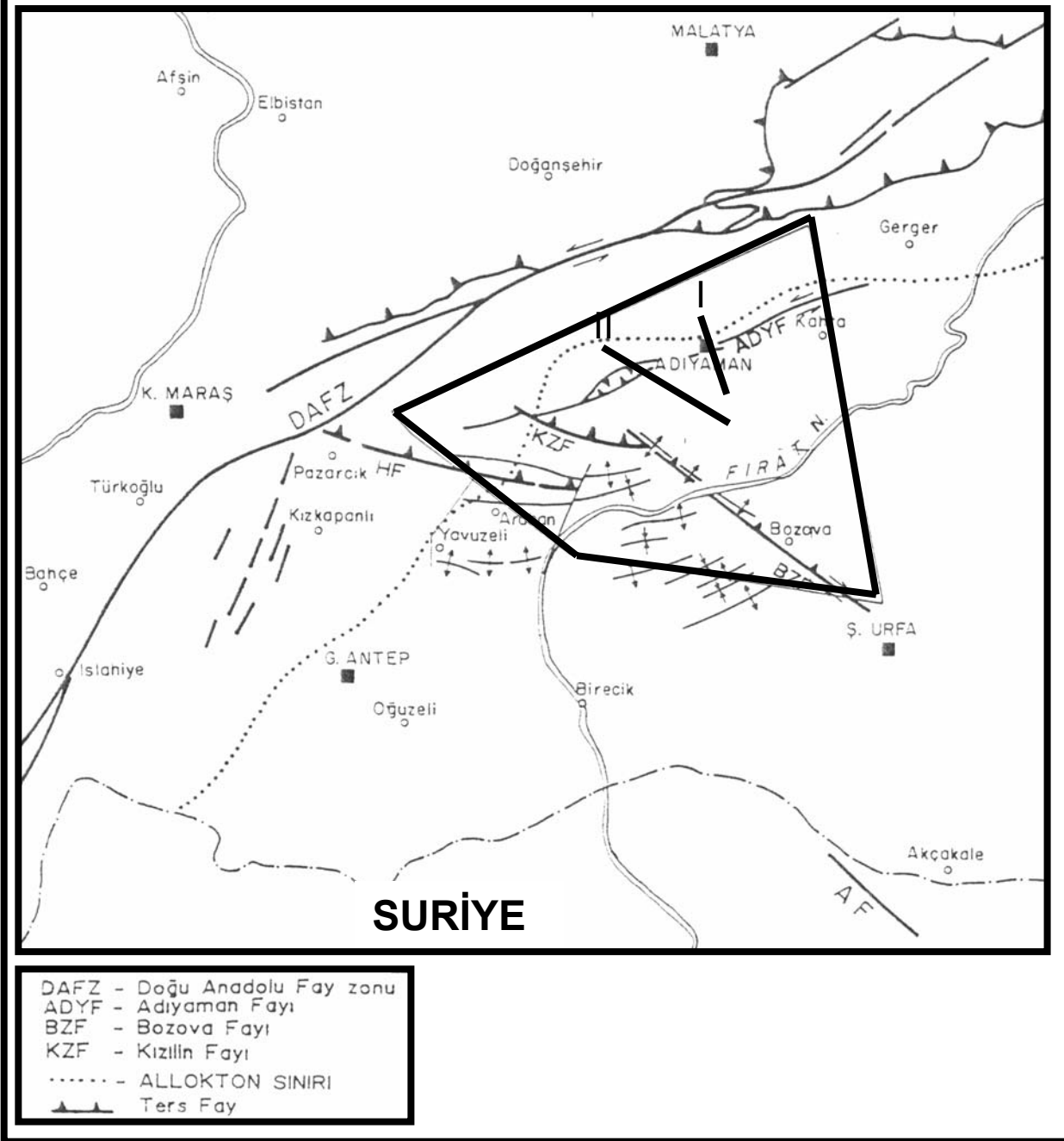
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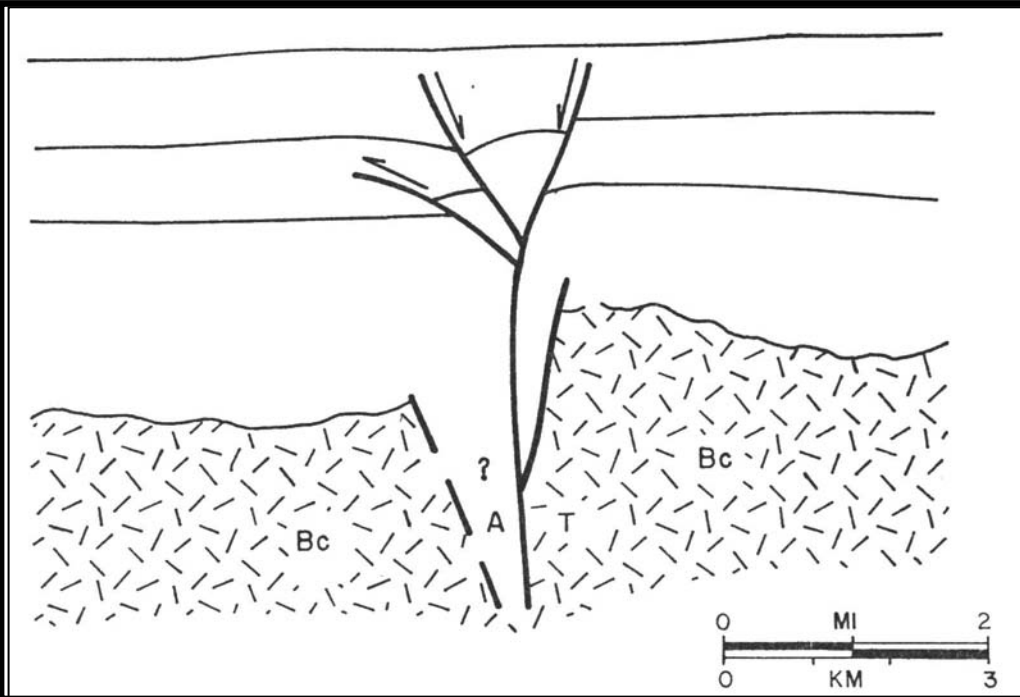
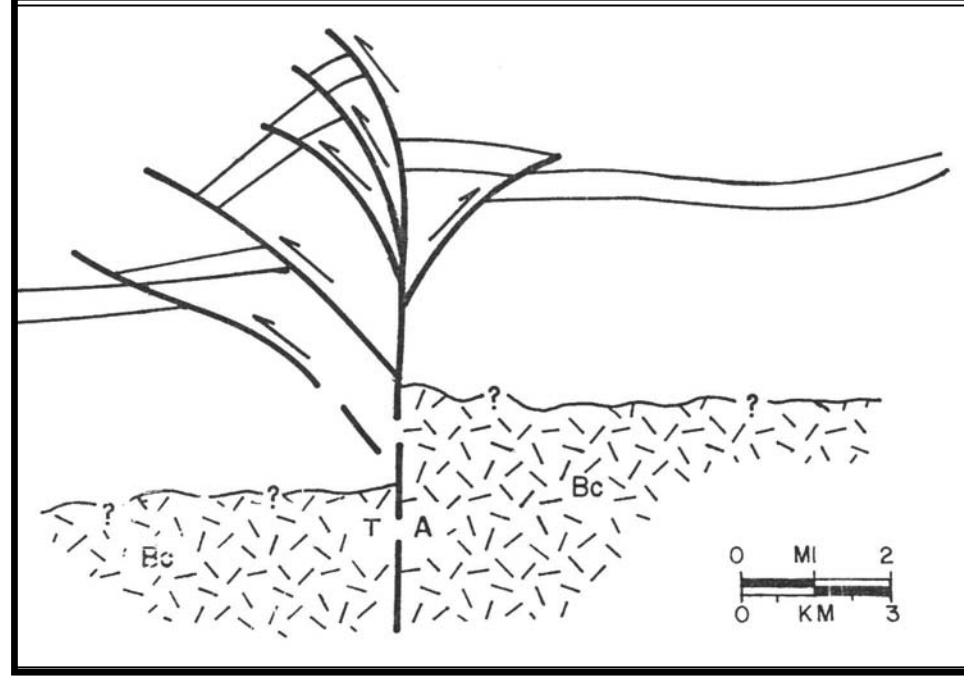
Şekil 1: Perinçek ve diğ.'den (1984) alınan tektonik harita üzerine sismik kesitlerden saptanan yapısal formlar eklenmiştir (Sefünç, 2004)

Figure 1: Structural forms detected from seismic sections are added to the tectonic map produced by Perinçek et.al. (1984) (Sefünç, 2004)



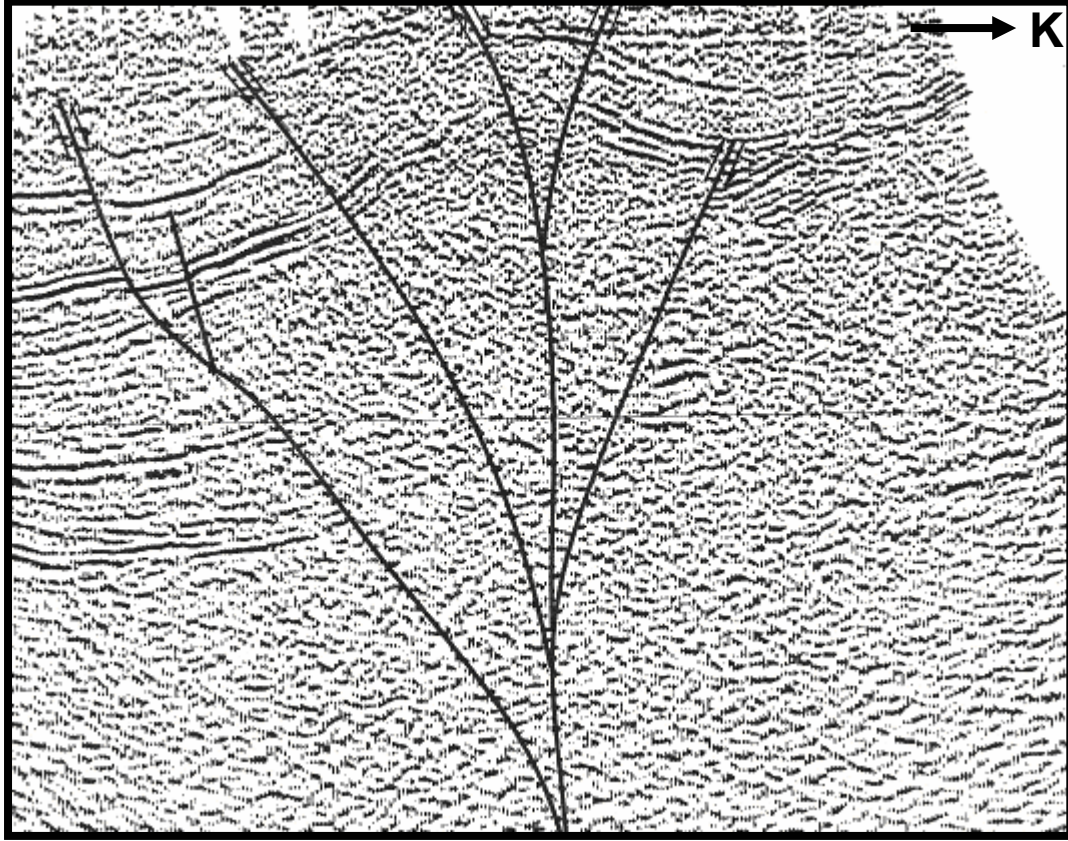
Şekil 2a: Pozitif çiçek yapısı (Harding,1985)

Figure 2a: Positive flower structure(Harding,1985)



Şekil 2b: Negatif çiçek yapısı(Harding,1985)

Figure 2b: Negative flower structure(Harding,1985)

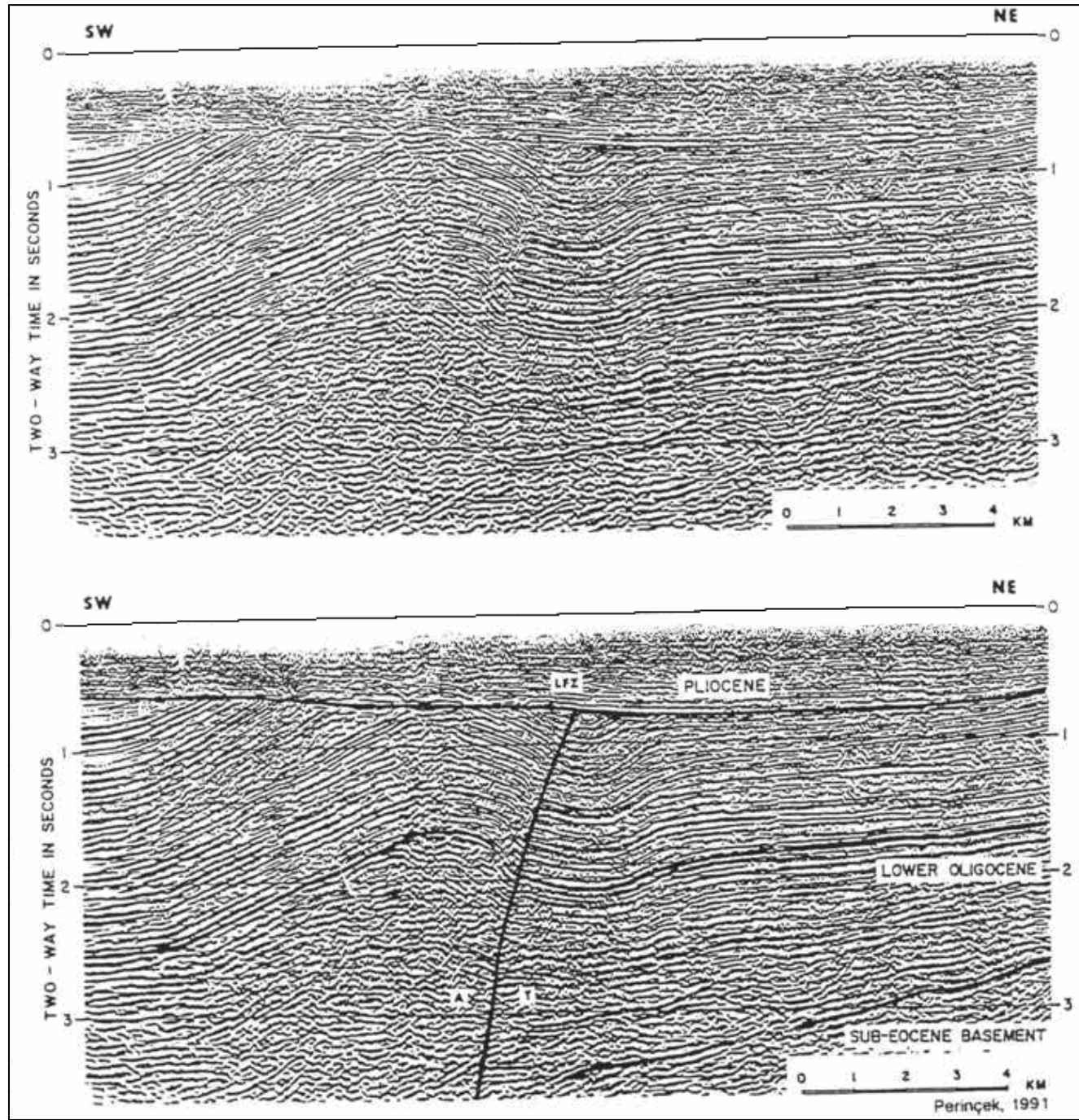


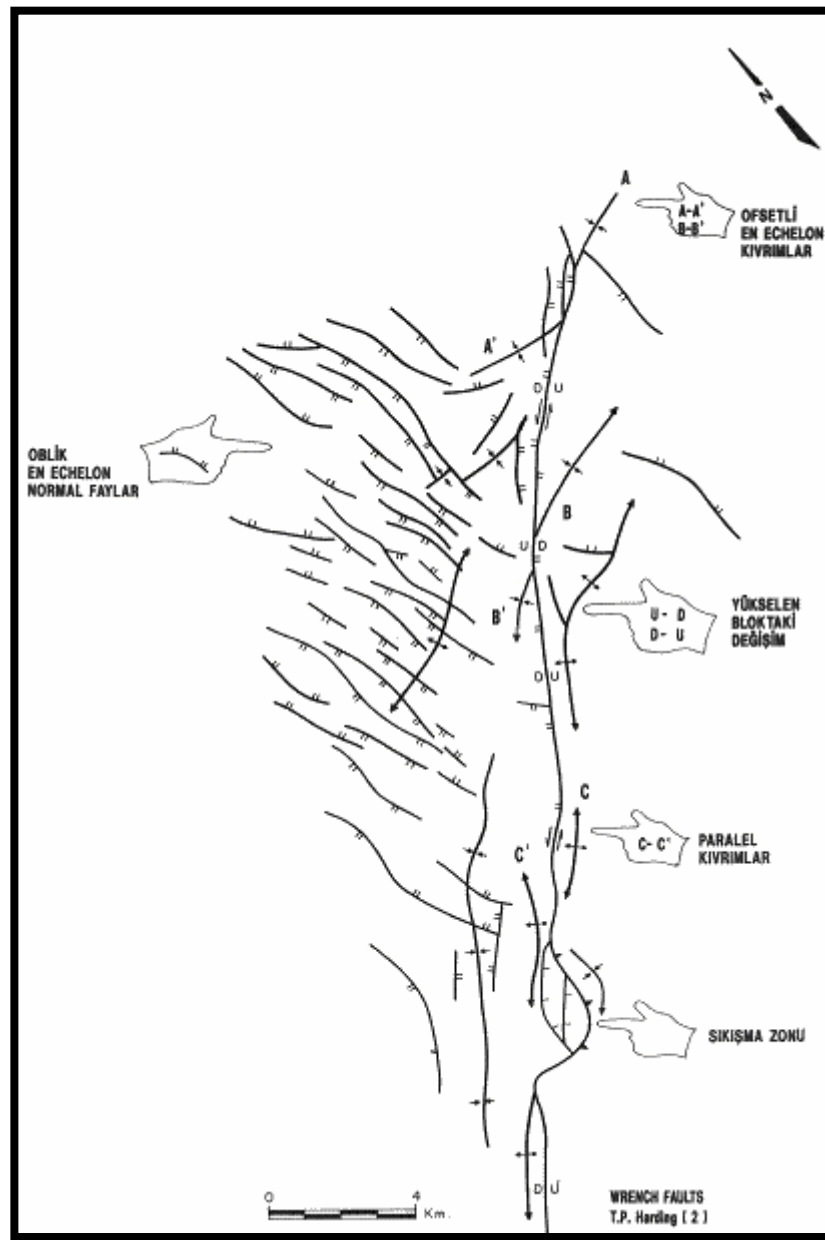
Şekil 3: (Sefünç.,2003).Adıyaman fay zonunun kateden migrasyonlu sismik kesit pozitif çiçek yapısına örnek olarak verilebilir.

Figure 3:(Sefünç.,2003).Migrated seismic section across Adıyaman fault zone can be given as an example to the positive flower structure.

Şekil 4:Lüleburgaz fay zonunu kesen migrasyonlu sismik kesit,yorumsuz (üstte), yorumlu (altta) , (Perinçek,1991)

Figure 4:Migrated seismic section across Lüleburgaz fault zone, uninterpreted (top) and interpreted (bottom), (Perinçek, 1991).



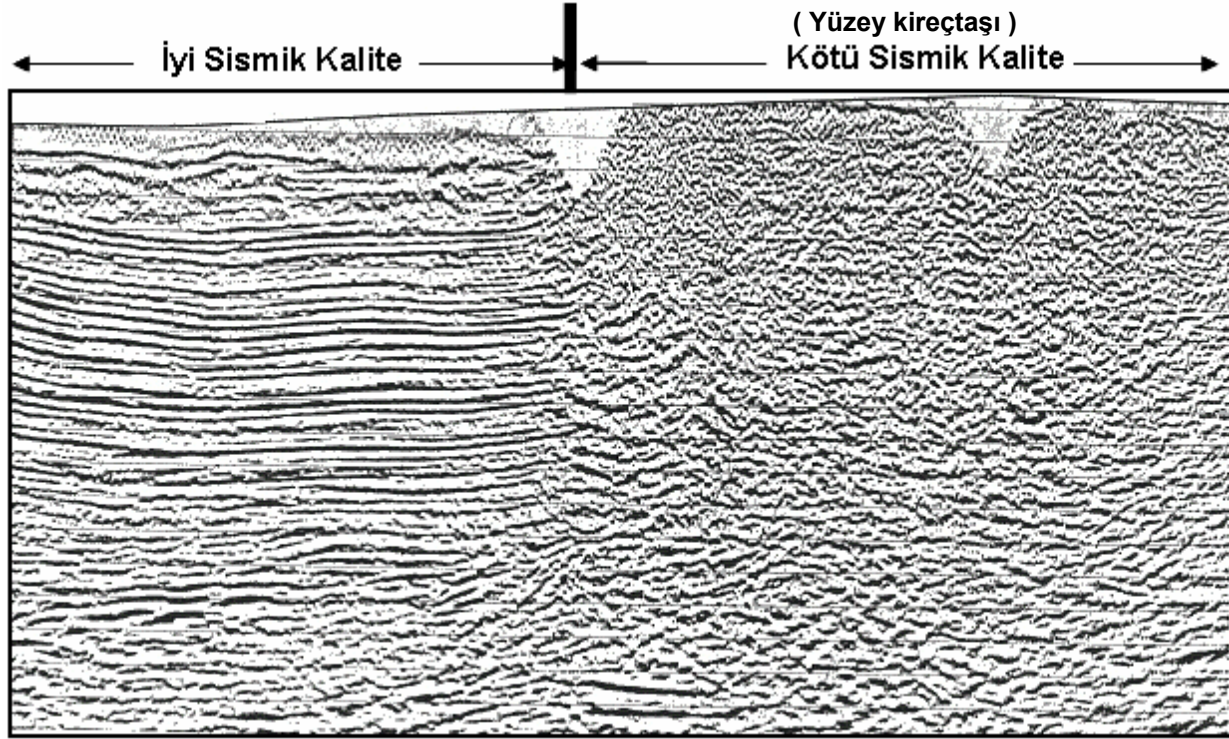


Şekil 5 : Doğrultu atımlı fay sistemi ve onunla ilişkili yapısal elementler (Harding, 1985).
Figure 5 :Generalized illustrations of strike-slip fault system (Harding,1985).



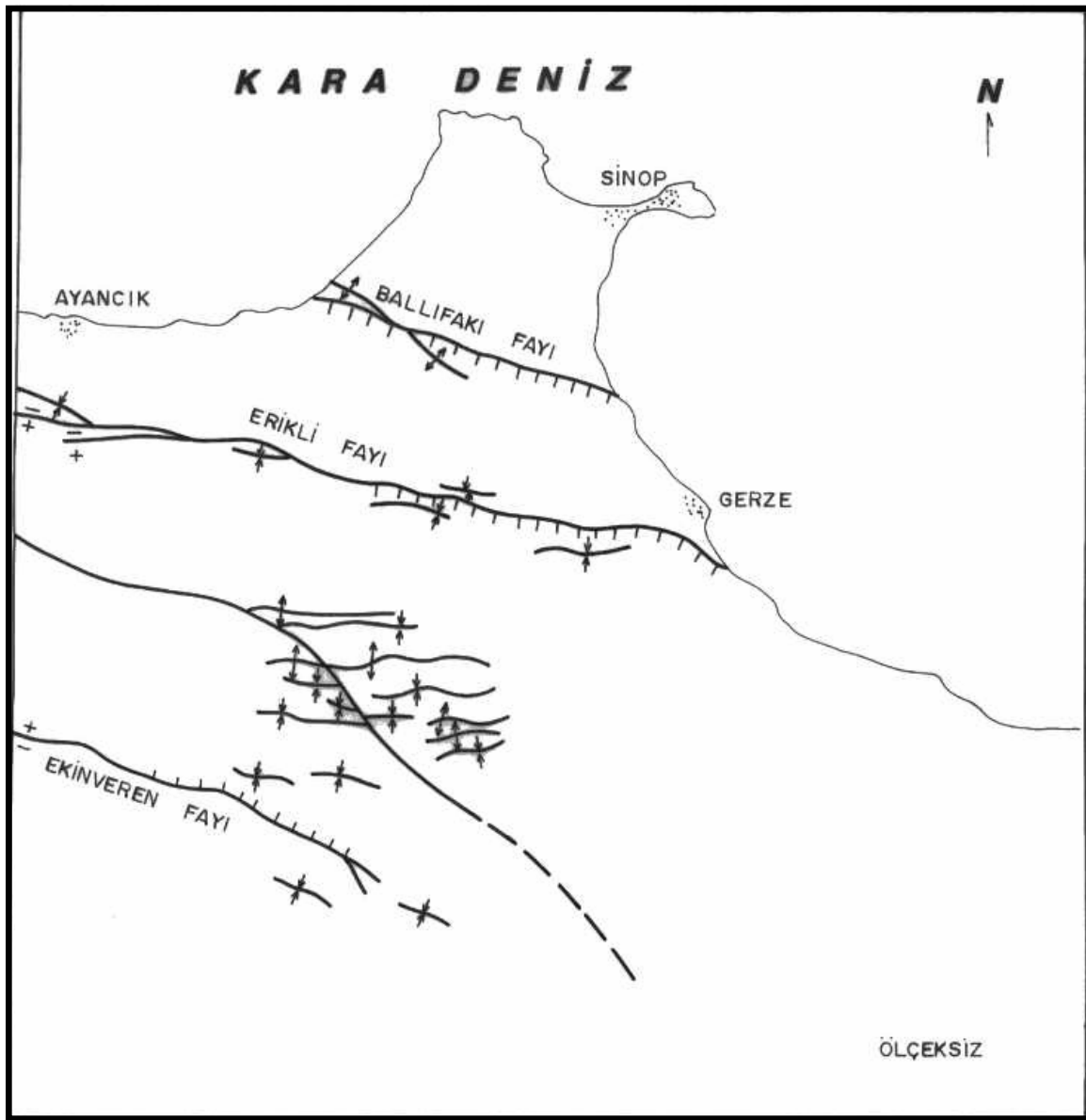
Şekil 7 : Sismik kesitte fay zonu tanımı (TPAO)

Figure 7 : Fault zone description from seismic section



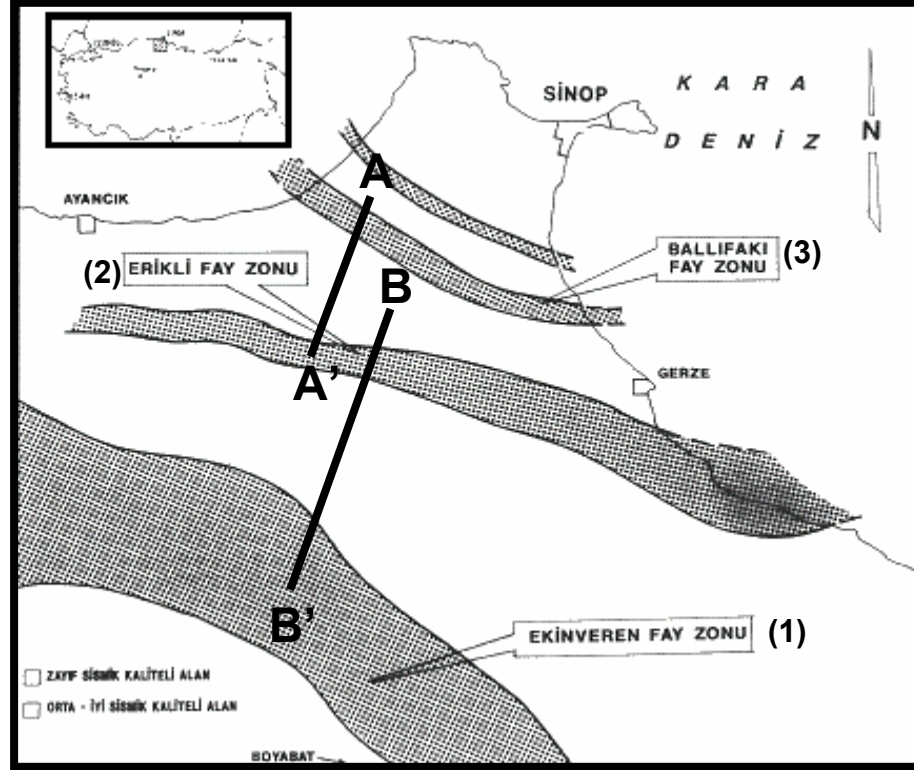
Şekil 6 : Yüzeyde yer alan yüzey formasyonlarının Sinyal/Gürültü oranının düşük olması sonucu oluşan zonun fay zonu ile karıştırılmaması gerekir (TPAO)

Figure 6: Low data quality zone formed due to low Signal/Noise ratio of surface layers should not be confused with fault zone (TPAO)



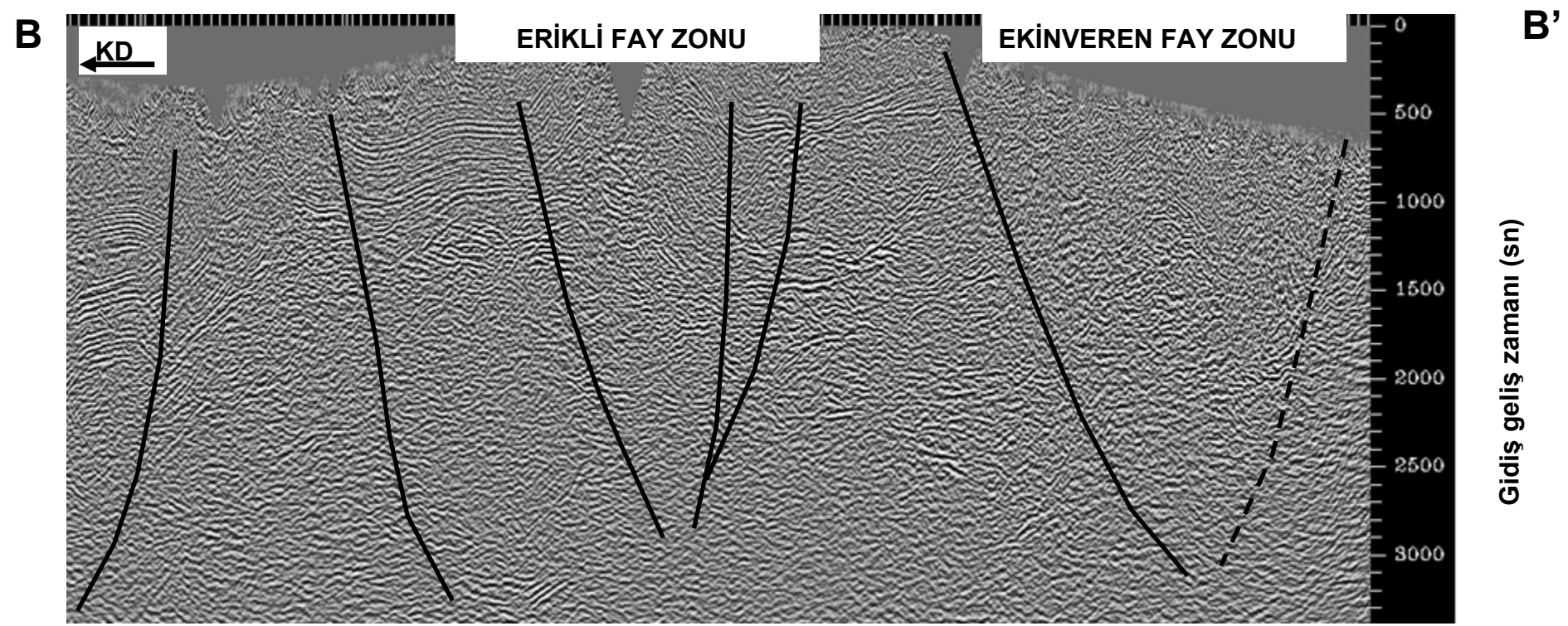
Şekil 8 : Sinop-Boyabat sahası yüzey tektonik haritası (TPAO)

Figure 8 : Surface tectonic map of Sinop-Boyabat field (TPAO)



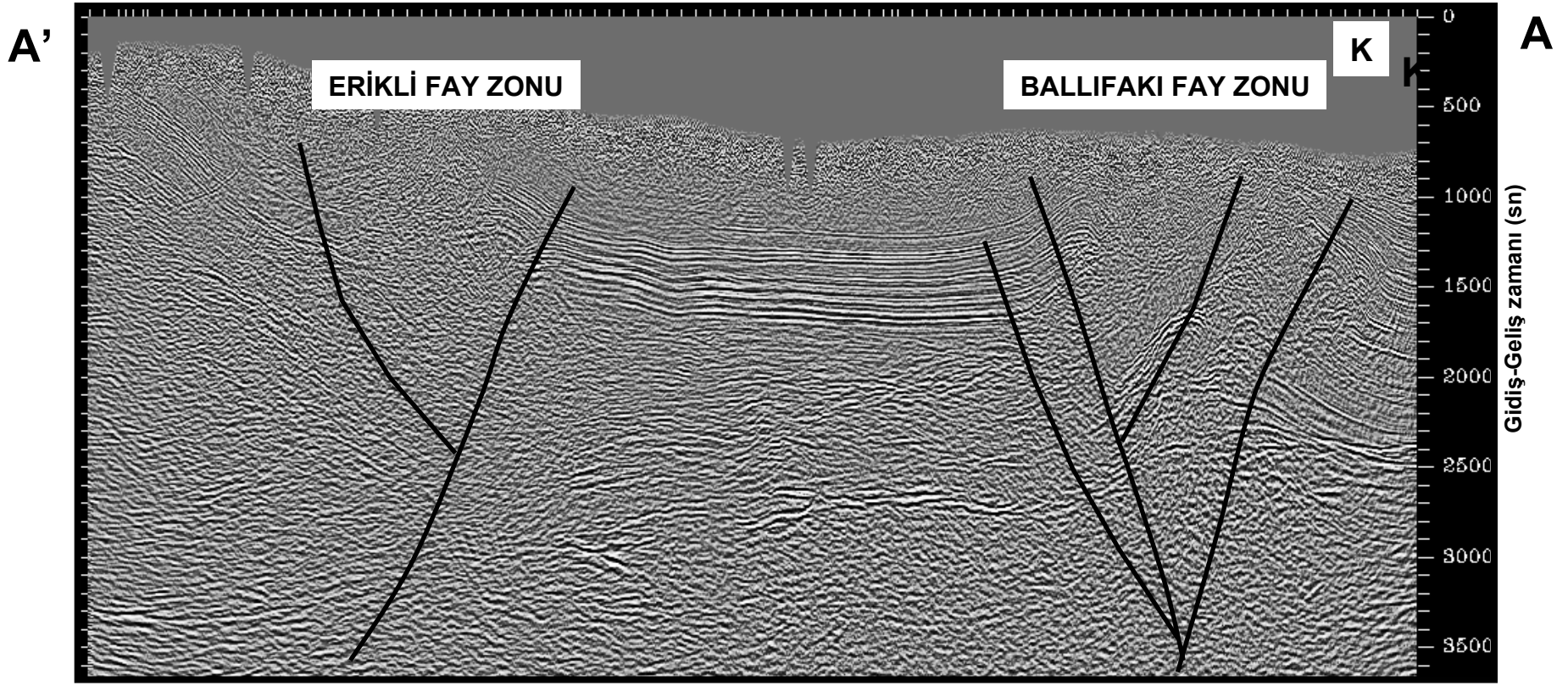
Şekil 9 : Batı karadeniz Sinop –Boyabat arası sismik kalite haritası (Sefünc, 1995).

Figure 9 : Seismic quality map of Western Black Sea region (Sinop- Boyabat) (Sefünc,1995).



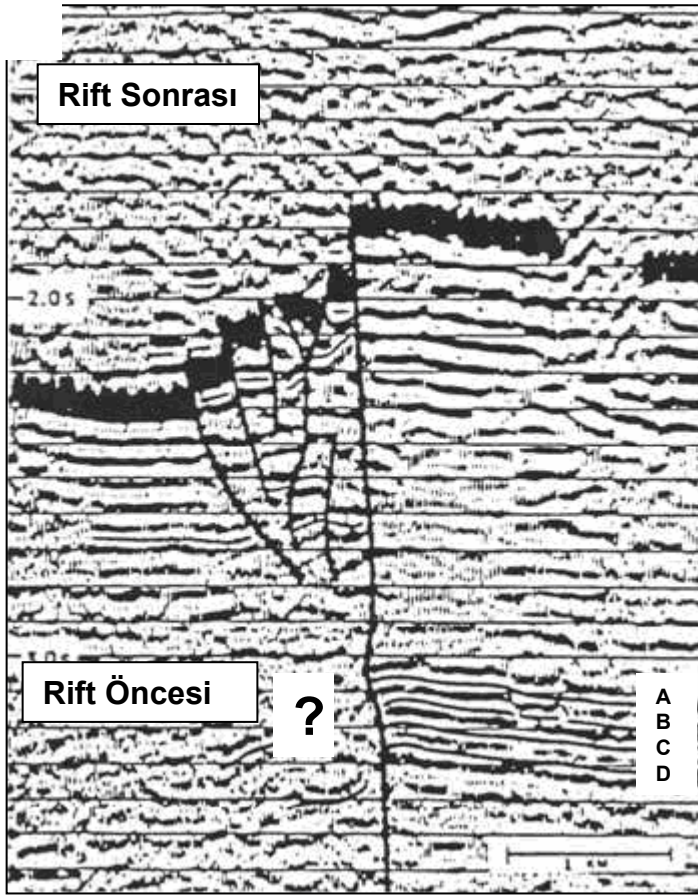
Şekil 11: Sinop-Boyabat baseninde Erikli-Ekinveren fay zonlarınının üzerinden geçen sismik kesit (Şekil 9'deki BB' hattı).

Figure 11: Seismic section passing through Erikli-Ekinveren fault zones (Line BB' in figure 9) in Sinop-Boyabat Basin.



Şekil 10 : Sinop-Boyabat baseninde Ballıfakı-Erikli fay zonlarının üzerinden geçen sismik kesit (Şekil 6b'deki AA' hattı).

Figure 10 : Seismic section passing through Ballıfakı-Erikli fault zones (Line AA' in figure 6b) in Sinop- Boyabat Basin.



Zalan,1988 in Lowell, 2000

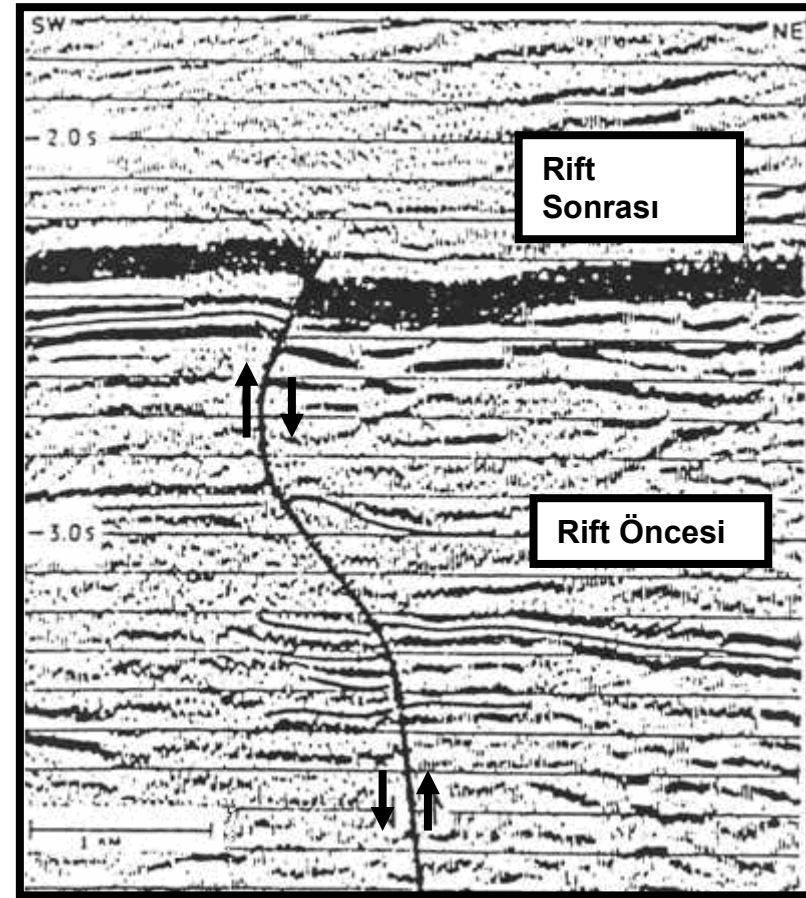
Şekil 14 : Doğrultu atımlı fay izinin karmaşık geometrisi, Piaul Baseni, Brezilya (Lowell,2000).

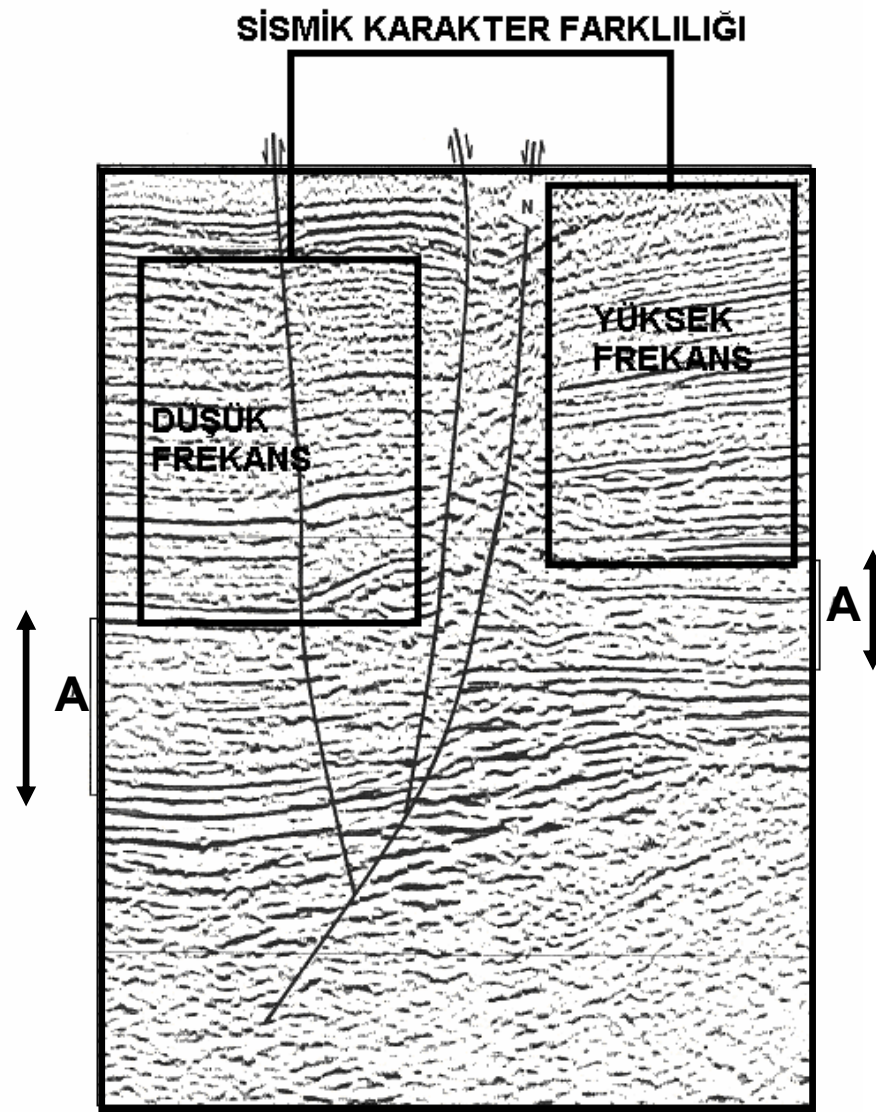
Figure 14 : Complex geometry of strike-slip fault trace, Piaul Basin, offshore Brezil (Lowell,2000).

Zalan,1988 in Lowell, 2000

Şekil 13 : Sismik fasiyes kalınlığında ani değişiklik, Piaul Baseni, Brezilya. A,B,C,D seviyeleri fayın karşı bloğunda yer almamaktadır (Lowell,2000).

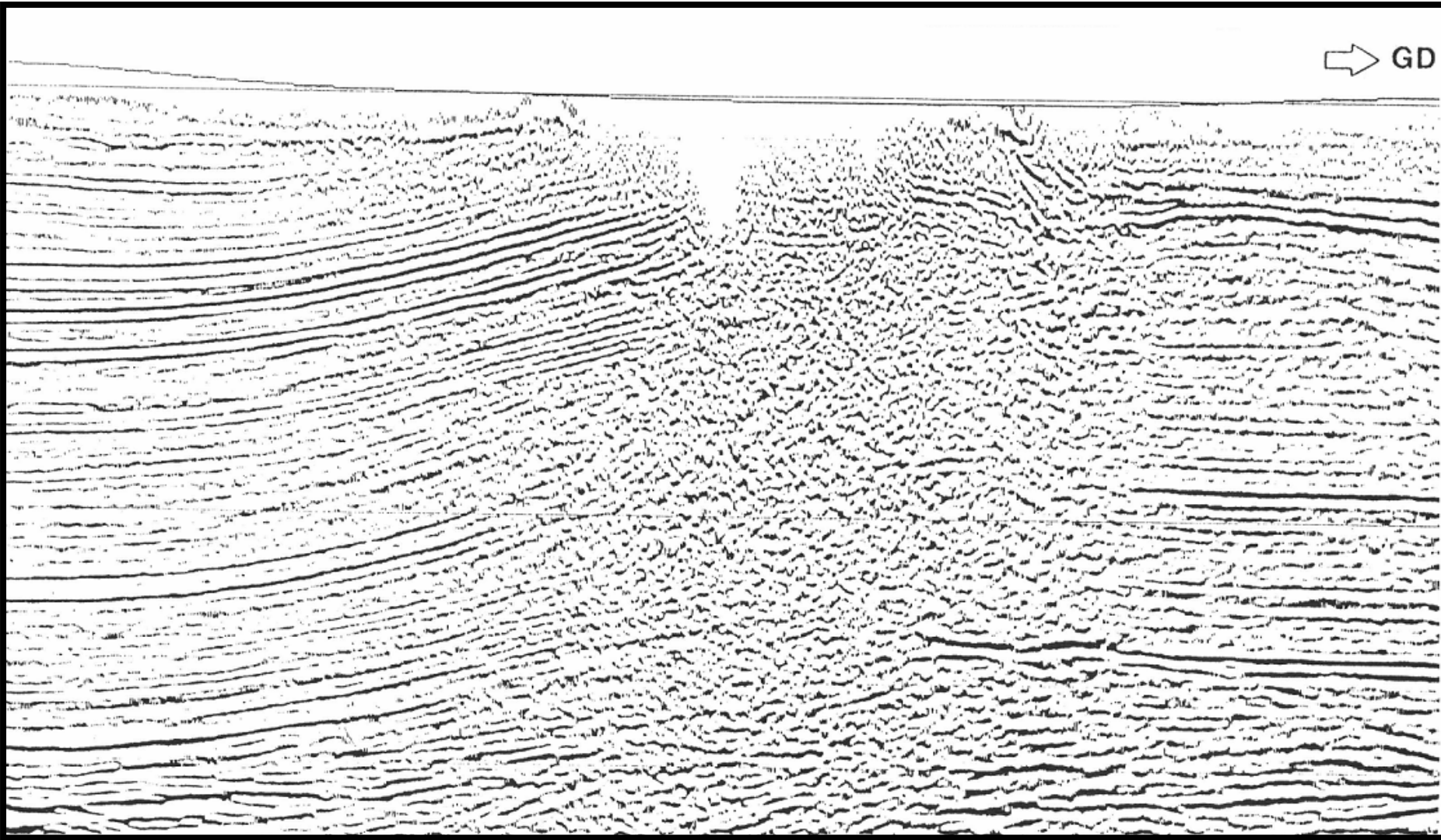
Figure 13 :Abrupt change in thickness of seismic facies in Piaul Basin, offshore Brezil. A,B,C,D horizons are missing across the fault (Lowell,2000).





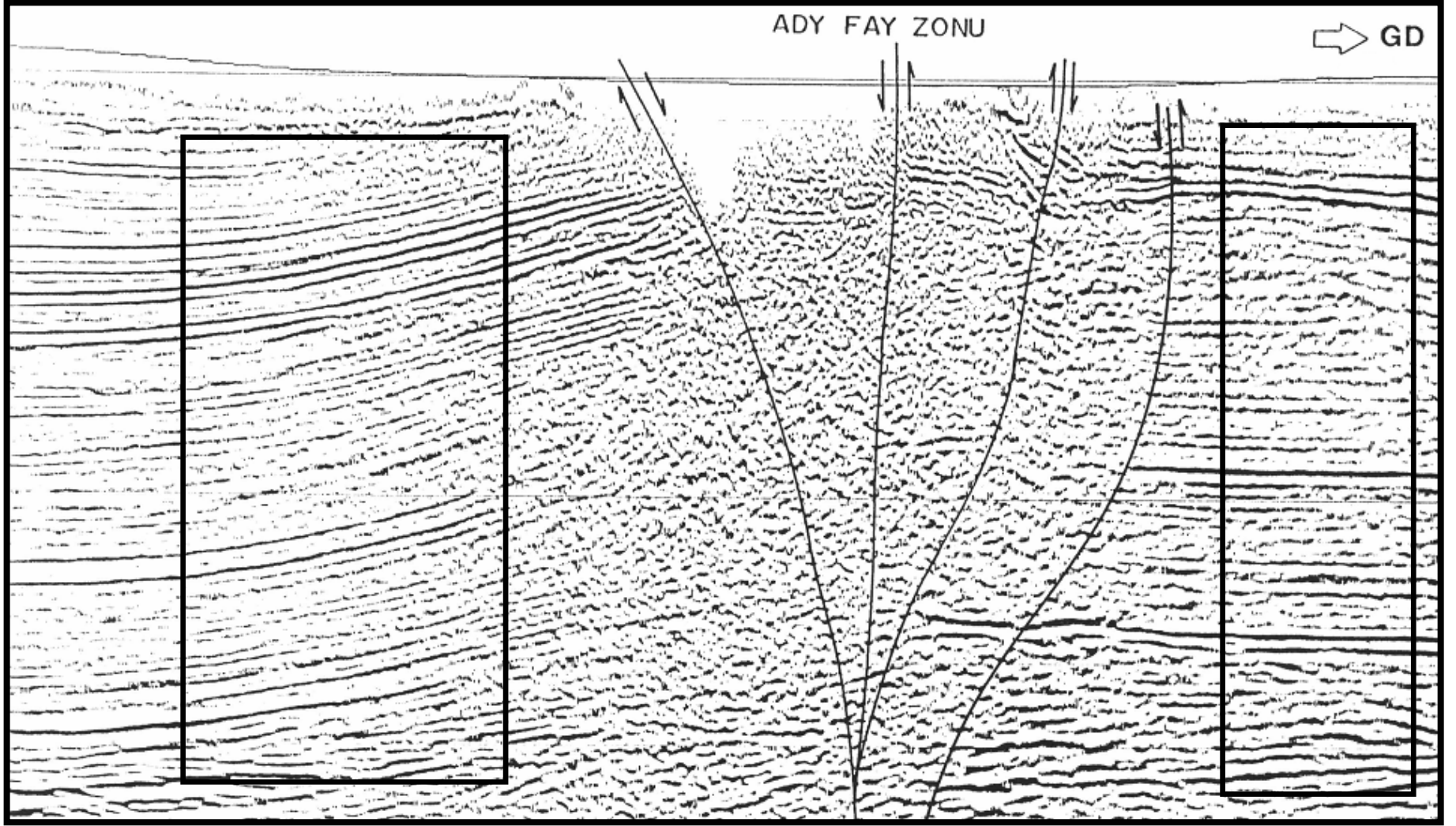
Şekil 15: Adıyaman doğrultu atımlı fayını(AFZ) kateden sismik kesit üzerinde fayın her iki tarafındaki fasiyes değişiklikleri

Figure 15: Facies change both side of Adıyaman Strike-slip fault (ADZ) on migration seismic section



Şekil 16a:Adiyaman (ADY) fay zonunu kesen migrasyonlu sismik kesit (yorumsuz) (Şekil- 1'deki II Nolu hat).

Figure 16a:Migrated seismic section across Adiyaman (ADY) fault zone (uninterpreted) (Line-II in figure 1).



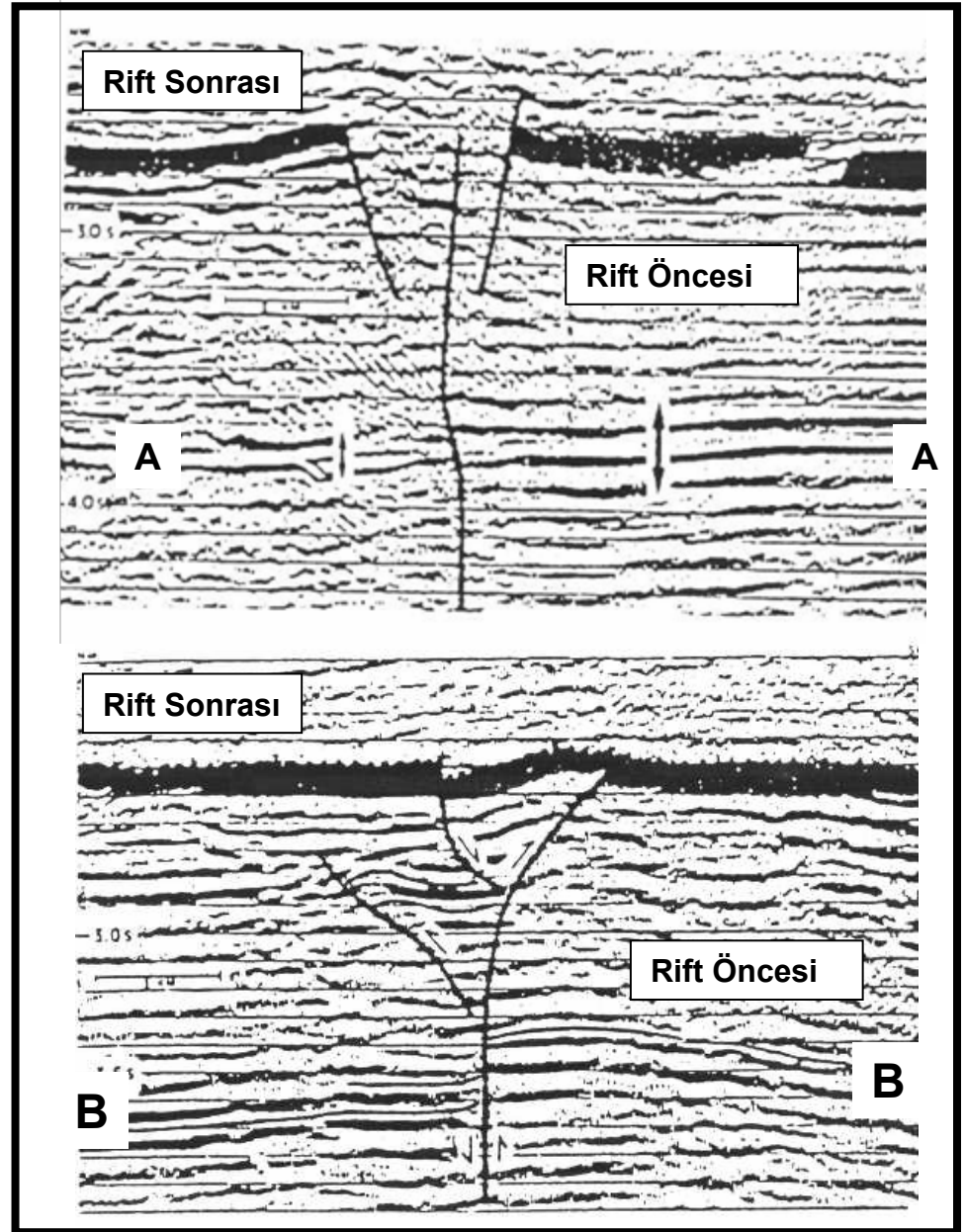
Şekil 16 b :Adiyaman (ADY) fay zonunu kesen migrasyonlu sismik kesit (yorumlu). (Şekil-1' deki Hat no II)
Figure 16 b: Migrated seismic section across Adiyaman (ADY) fault zone (interpreted). (Line-II in Figure-I)

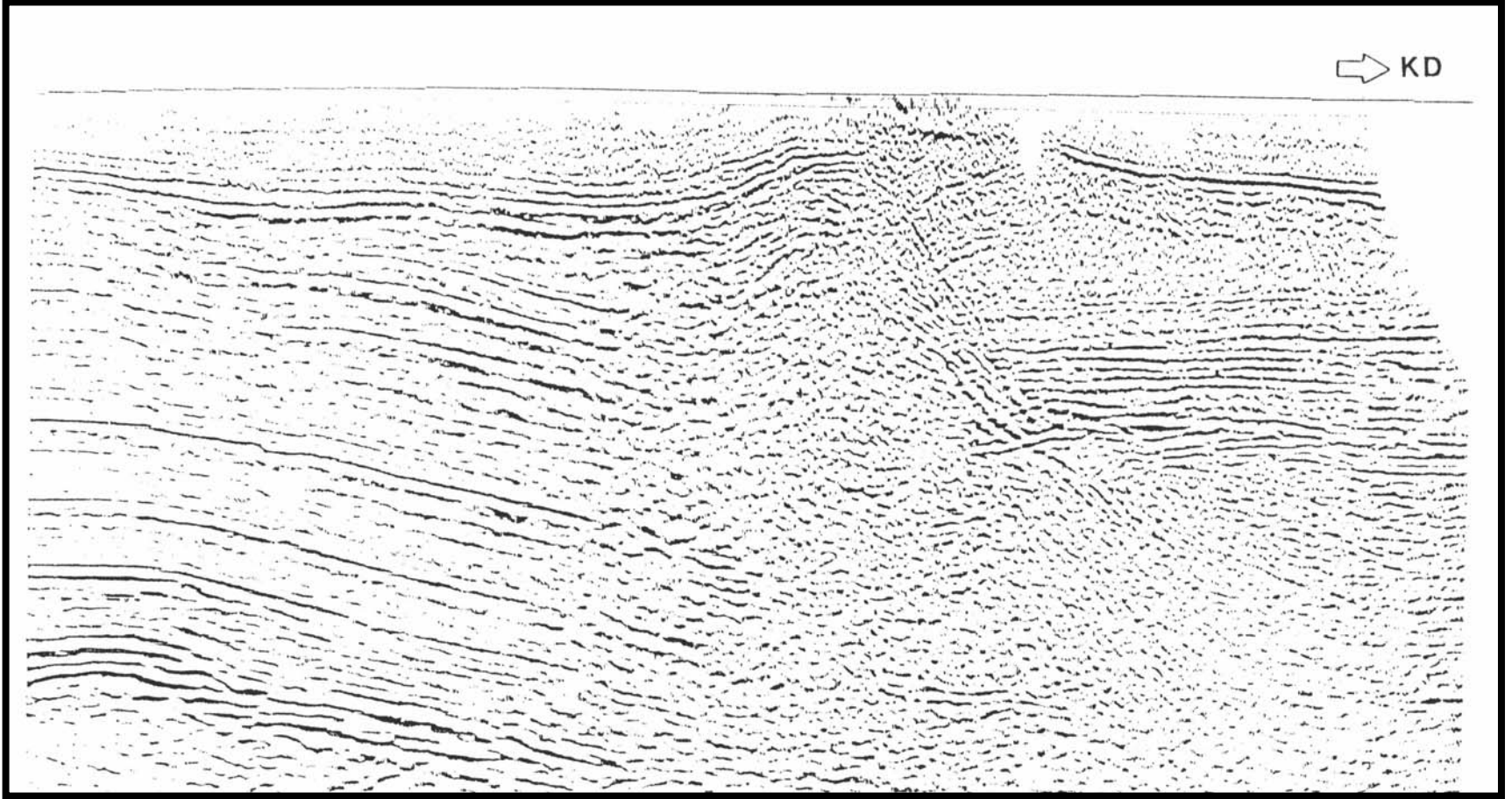
Şekil 17 : Sismik fasiyes kalınlığında ani değişiklik, Piaul Baseni, Brezilya (Lowell, 2000).

Figure 17 :Abrupt change in thickness of seismic facies in Piaul Basin, offshore Brazil (Lowell, 2000).

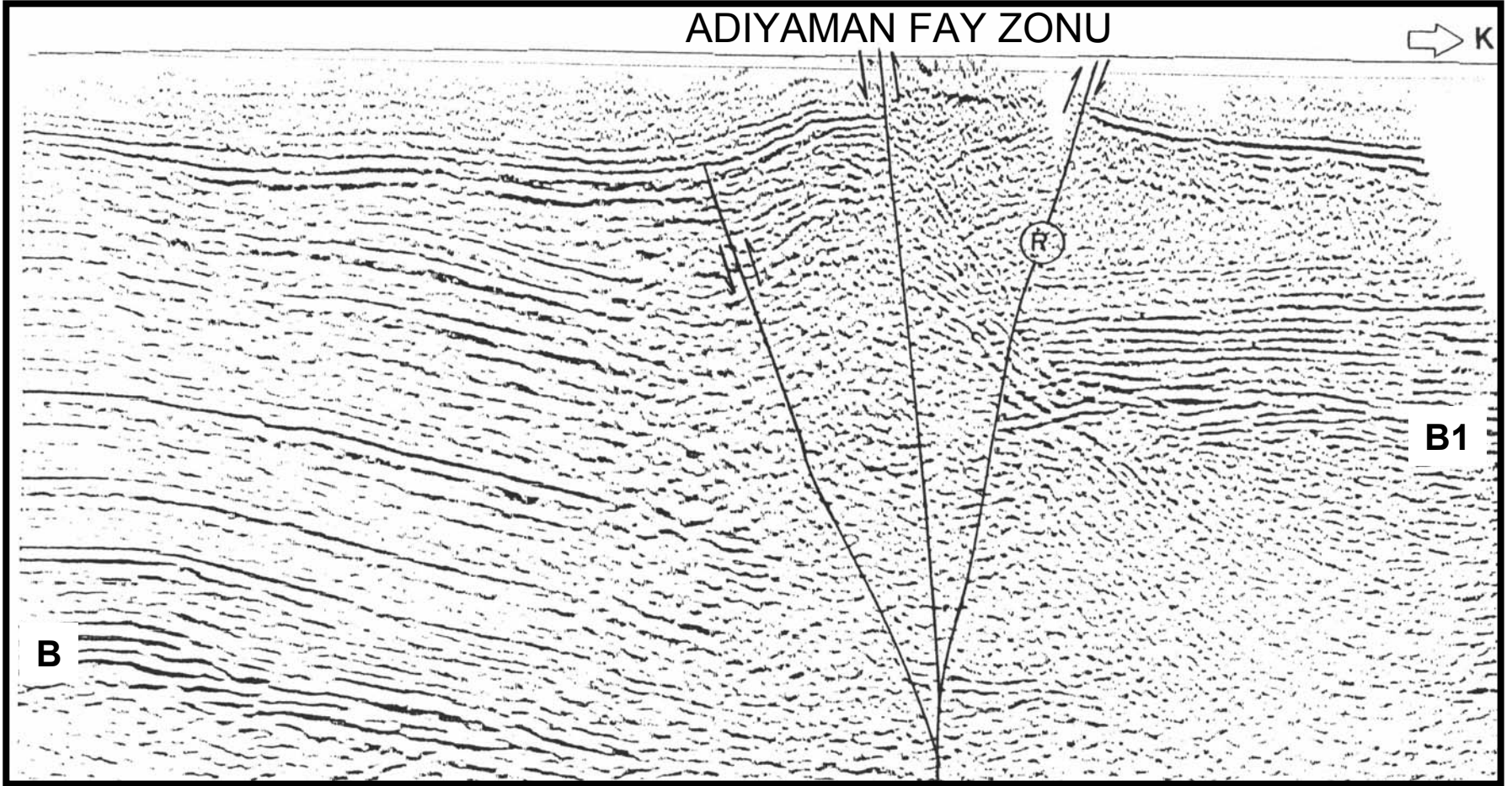
Şekil 18 : Çiçek yapısı örneği, Piaul Baseni, Brezilya (Lowell, 2000).

Figure 18 : Flower structure in Piaul Basin, offshore Brazil (Zalan, 1988 in Lowell, 2000).

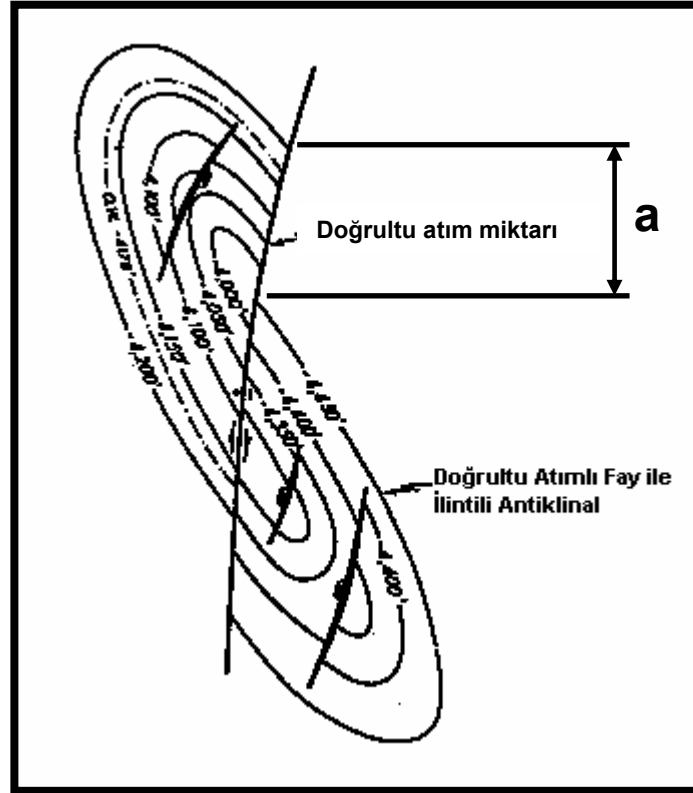




Şekil 12 a : Adiyaman fay zonunu (AFZ) kateden yorumuz migrasyonlu sismik kesit (Şekil 1'deki 1 nolu hat)
Figure 12 a : Uninterpreted migrated seismic section across Adiyaman fault (AFZ) (Line-I in figure 1).

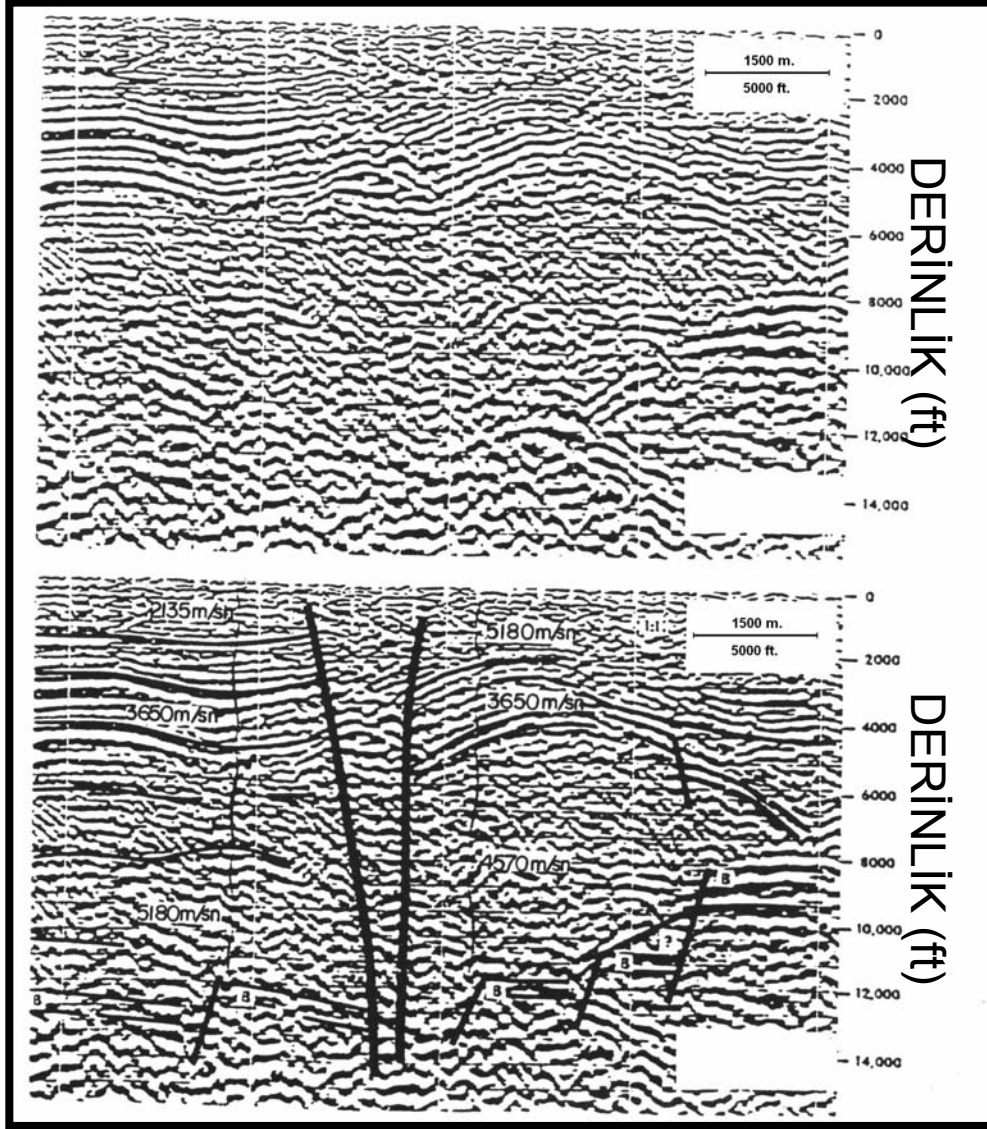


Şekil 12 b :Adiyaman fay zonunu kateden yorumlu migrasyonlu sismik kesit (Hat no-I).
Figure 12 b : Interpreted migrated seismic section across Adiyaman fault zone (Line-I in Figure-1).



Şekil 19: Doğrultu atımlı fayların derinlik haritasındaki görünümü (Tearpock ve Bischke, 1991).

Figure 19: Typical wrench fault system with associated anticlines (Tearpock and Bischke, 1991)

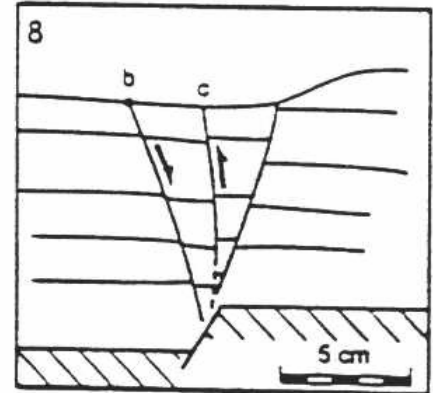
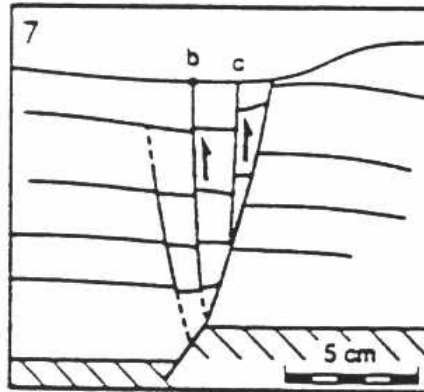
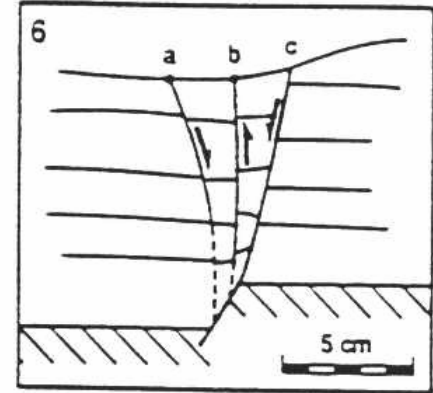
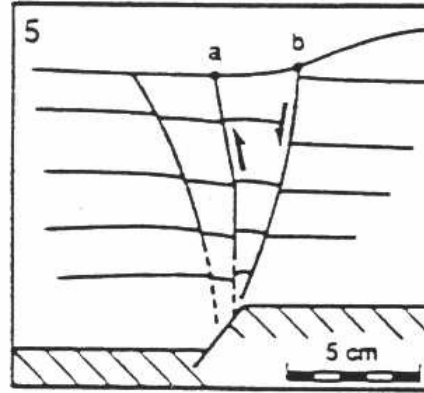
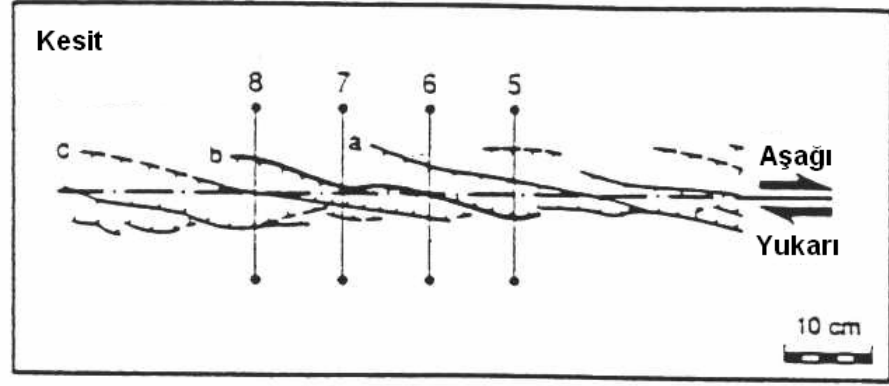


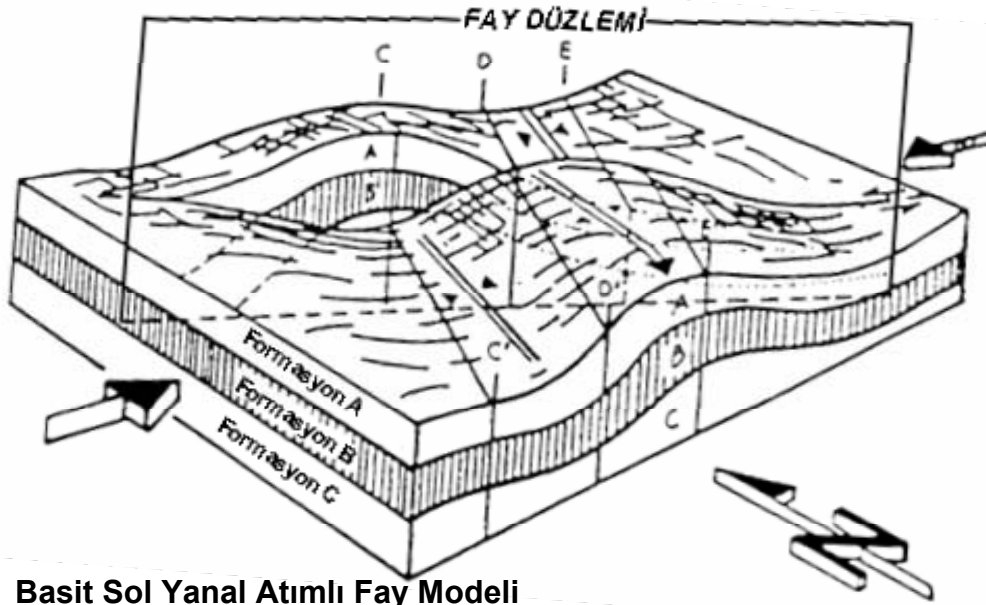
Şekil 20: Doğrultu atımlı fayın iki tarafındaki litoloji değişikliğinden kaynaklanan yanıl hız değişimi (Lowell, 2000).

Figure 20: Seismic section shows a fault zone suspected of wrench motion on the basis of mismatched seismic reflections and velocities (Lowell, 2000).

Şekil 21: Doğrultu atımlı faylar ile ilişkili yapıların üç boyutlu geometrilerinden dolayı karşılaşılan korelasyon problemlerinin gösterimi (Lowell,2000)

Figure 21: Illustration of the problem in correlating sections that arises from the three-dimensional geometry of strike-slip related structures (Lowell, 2000)

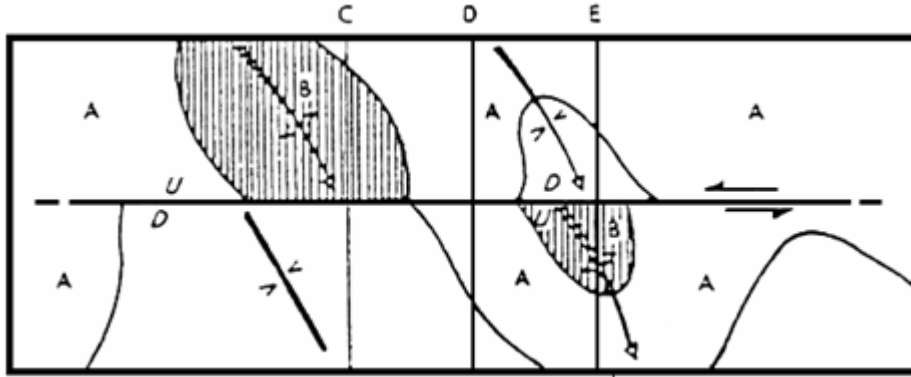




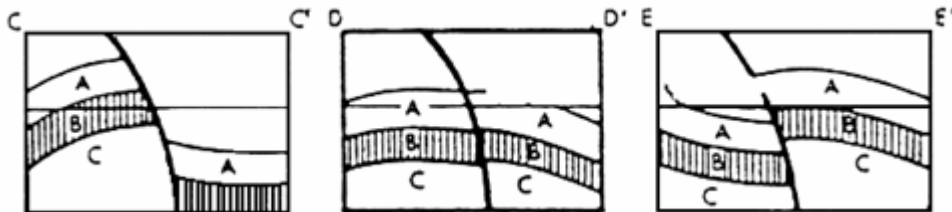
Şekil 22 : Basit sol yanal atımlı fay modeli: Blok diagram (üst), harita görüntüsü (orta), dikine kesit (alt).D. J. Tearpock and R.E.Bischke-1991

Figure 22 : Ceneptual model of simple left lateral strike-slip fault: Block diagram (top),map view (middle), cross section (bottom). D. J. Tearpock and R.E.Bischke-1991

Basit Sol Yanal Atımlı Fay Modeli



Yatay Kesit (Harita Görüntüsü)



Dikine Kesit