THE EAST ANATOLIAN FAULT: GEOMETRY, SEGMENTATION AND JOG CHARACTERISTICS

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Abbreviated title
EAF: Segmentation and Fault Jog
This electronic supplement is made up of 5 figures including additional annotated field photographs and two data tables.

Typical structural and geomorphological characteristics and long-term offsets of the fault segments of the northern and strands of the EAF zone are given in the figures. The segments and fault jogs names of the EAF zone are compared in the tables.

Most of the literature cited is listed in the bibliography of the published paper; the others are given with this supplementary material.

**Electronic Supplementary Publication, Table 1. Comparison of the segment names of the EAF zone. Abbreviations: EP, Eastern part; WP, Western part; F, Fault; S, Segment; G, Gülen et al. (1987); HA, Herece & Akay (1992); P, Perinçek et al. (1987); PC, Perinçek & Çemen (1990); PE, Perinçek & Eren (1990); PK, Perinçek & Kozlu (1984); SA: Seymen & Aydin (1972); W, Westaway (2003).**

| This study | Different Researchers | Şaroğlu et al. (1992a) | Herce (2008) | Westaway (1994) | Hampton et al. (1987) | Barka & Kadinsky-Cade (1988) | Muehlberger & Gordon (1987) |
|-----------|----------------------|------------------------|-------------|----------------|-----------------------|------------------------------|-----------------------------|
| Karlıova Ilıca | Bingöl F by SA | Karlıova-Bingöl S | Göynük S | Göynük F | S-1 | FS-1 | S-1 |
| Palu | Palu-Aydın F by HA | Palu-Lake Hazar | Palu S. | Palu-Hazar F | EP of S-3 | FS-4 | EP of S-3 |
| Pınırğe | Sıvrice-Sincik F by HA | Lake Hazar-Sincik S | Şiro S | Hazar-Şiro F | WP of S-3 | FS-5-7 | WP of S-3 |
| Erkenek | --------- | Çelikhan-Erkenek S | Erkenek S | Göksu F | EP of S-5 | FS-9 | EP of S-5 |
| Pazarcık | EP of Gölbasi-Osmanıye S by G | Erkenek-Türkoğlu S | Gölbasi S | Gölbasa-Türkoğlu F | WP of S-5 | FS-11-12 | WP of S-5 |
| Amonos | Amanos F by PE, PC, Karasu S by G | Türgüçlü-Antakya S | Islahiye S | Karasu segment of DSFZ |
| Şürgü | Şürgü F by PK | Şürgü F | | | | | |
| Çardak | Göksun F by P | Elbistan F | | | | | |
| Reyhanlı | ------- | Reyhanlı F | | | | | |
| Yumurtalık | ------- | Yumurtalık F | | | | | |
| Karataş | ------- | Karataş F | | | | | |
| Yesemek | East Hatay FS by W | | | | | | |
| Savrun | Çiçeklidere-Savrun F by P | | | | | | |
**Electronic Supplementary Publication, Table 2. Comparison of the fault jog names of the EAF zone. Abbreviations: A, Aksoy et al. (2007); AŞ, Arpat & Şaroğlu (1972); BK, Barka & Kadinsky-Cade (1988); Ç, Çetin et al. (2003); G, Gülen et al. (1987); GM, Garcia Moreno et al. (2011); HA, Herece & Akay 1992; HE, Herece (2008); H1, Hempton (1980); H2, Hempton (1982); H3, Hempton et al. (1983); HD, Hempton & Dewey (1981); HDU, Hempton & Dunne (1984); M, Mann et al. (1983); M1, Mann (2007); McK, McKenzie 1976; MG, Muehlberger & Gordon 1987; PÇ, Perinçek & Çemen (1990); Ş, Şaroğlu et al. (1992a); ŞE, Şengör et al. (1985); W, Westaway (1994); WA, Westaway & Arger (1996).**

| This study          | Previous studies                                      |
|---------------------|-------------------------------------------------------|
| Gökdere restraining bend | Gökdere uplift by Ş, AŞ, HE | Restraining double bend by BK, G | Restraining bend by GM, M1, PÇ | Compressional bend by HD |
| Lake Hazar releasing bend | Lake-Hazar pull-apart by Ş, BK, GM, H1, H2, H3, HDU, M, ŞE, Ç, HE | Mega Sag by HD, Sag-pond by McK, W | Negative flower structure by A | Evolved pull-apart basin by GM |
| Gölbüşu releasing stepover | Gölbüşu pull-apart by Ş, G, | Gölbüşu pull-apart formed in a triple junction by WA | Lowlands by PÇ |
| Yarpuzlu restraining double bend | Restraining bend by GM, G | Right -stepping bend by HD | Çelikhan uplift by HE |

**References**

AKSOY, E., İNÇEÖZ, M. & KOÇYIĞIT, A. 2007. Lake Hazar Basin: A Negative Flower Structure on the East Anatolian Fault System (EAFS), SE Turkey, *Turkish Journal of Earth Sciences*, 16, 319-338.

Hempton, M.R., 1980. Structure and morphology of the East Anatolian Transform Fault Zone near Lake Hazar. *Geological Society of America Annual Meeting*, Abstracts with Programs 12, 445.

HEMPTON, M.R., DUNNE, L.A. & DEWEY, J.F. 1983. Sedimentation in an active strike-slip basin, south-eastern Turkey, *Journal of Geology*, 91, 401-412.

KOZLU, H. 1987. Structural development and stratigraphy of Misis-Andırın region. *Proceedings of the 7th Turkish Petroleum Congress of Turkey*, 6-10 April 1987, Ankara, Turkey, 104–116.

MANN, P. 2007. Global catalogue, classification and tectonic origins of restraining and releasing bends on active and ancient strike-slip fault systems. In: Cunningham, W. D. & Mann, P. (eds) *Tectonics of strike-slip restraining and releasing bends*, Geological Society, London, Special Publications, 290, 13-142.
Figures

Electronic Supplementary Publication, Fig.1. Fault lineaments and shutter ridges along the Karlıova segment of the East Anatolian Fault at Kargapazari.
Electronic Supplementary Publication, Fig.2. Typical structural and geomorphological characteristics of the Pütürge segment of the East Anatolian Fault: (a) steep linear mountain front parallel along and the left lateral offset of 11 km in Frat River around Doğanyol on the Pütürge segment; (b) steep linear mountain front parallel along the Pütürge segment between Kamilşlık and Hazar mountains; (c) faults characterised by parallel faults and stepped morphology at the west of the Lake Hazar; (d) left lateral cumulative offset of c. 500m in the Bobik River which is tributary of Fırat River. The direction of the photographs is indicated for each photo. “x” and “y” denote piercing points used for slip in photographs. Perpendicular and lateral arrows indicate fault trace and fault slip direction, respectively.
Electronic Supplementary Publication, Fig.3. Typical structural and geomorphological characteristics of the Pütürge, Erkenek and Pazarcık segment of the East Anatolian Fault: (a) offset of c.450m in Şehment creak on the Pütürge segment immediately north of Çelikhan; (b) scarplets, lineaments and shutter ridges in the northern outskirts of the Ulubaba Mountain along the Erkenek segment; (c) linear valley at Kartal on the Pazarcık segment; (d) fresh fault scarps forming a contact between Quaternary deposits and basement rock at Kuyumcular on the Pazarcık segment; (e) a shutter ridges of c.1 km-wide and c.17 km-long formed along the Sürgü fault segment. The direction of the photographs is indicated for each photo. “x” and “y” denote piercing points used for slip in photographs. Perpendicular and lateral arrows indicate fault trace and fault slip direction, respectively.
Electronic Supplementary Publication, Fig.4. Typical structural and geomorphological characteristics and short and long term offsets of the northern strand the EAF zone: (a) offset of c. 5 m in a channel at Meryemcilbeli River valley on the Savrun fault segment; (b) left lateral offsets of 20-30 m Holocene tributaries of Ceyhan River, west of Selverler; (c) a shutter ridges was occurred on the Toprakkale fault, west of Selverler; (d) general view of the Toprakkale fault which cut Quaternary basaltic lavas between Selverler and Karagedik; (e) Holocene fault scarps located on the alluvial fans at the mountain foot forming steeped morphology on the Düziçi-Osmanlıye segment, immediately north of Osmanlıye; (f) back-tiled Holocene alluvial fans formed on the hanging wall block of the Düziçi-Osmanlıye segment, immediate north of Düziçi; The direction of the photographs is indicated for each photo. “x” and “y” denote piercing points used for slip in photographs. Perpendicular and lateral arrows indicate fault trace and fault slip direction, respectively.
Electronic Supplementary Publication, Fig. 5. Typical structural and geomorphological characteristics and short and long term offsets of the northern strand the EAF zone: (a) the fault scarps in Pleistocene fans, reaching up to 4-5 m, between Elbeyli and Alibozlu; (b) fault plane dipping 65° west in Pleistocene fan deposits crops out to the immediate south of the Yeşiltepe; (c) Holocene fault scarp related to the Yumurtalik fault in Quaternary volcanics, immediate north of Incirli; (d) fault plane of the Yumurtalik fault observed on Quaternary Delihalil volcanics at Incirli-Kurtkulağı raoccut; (e) a left lateral offset of 8 m observed in a gully channel on the Yumurtalik fault, north of Incirli. The direction of the photographs is indicated for each photo. “x” and “y” denote piercing points used for slip in photographs. Perpendicular and lateral arrows indicate fault trace and fault slip direction, respectively.