

ELECTRONIC APPENDIX A

Details of the Karaca Fault (KRF)

Segment KRF-1 follows linear valley in the Tandırlı and Ekinci villages at the northwest of Erzincan Plain (Figure A1; e-suppl.-KRF in Appendix C). The left-lateral displacements exist on the drainage between Göyne and south of Aktaş villages along the short en-echelon segments of KRF-2a_h (Figure A1).

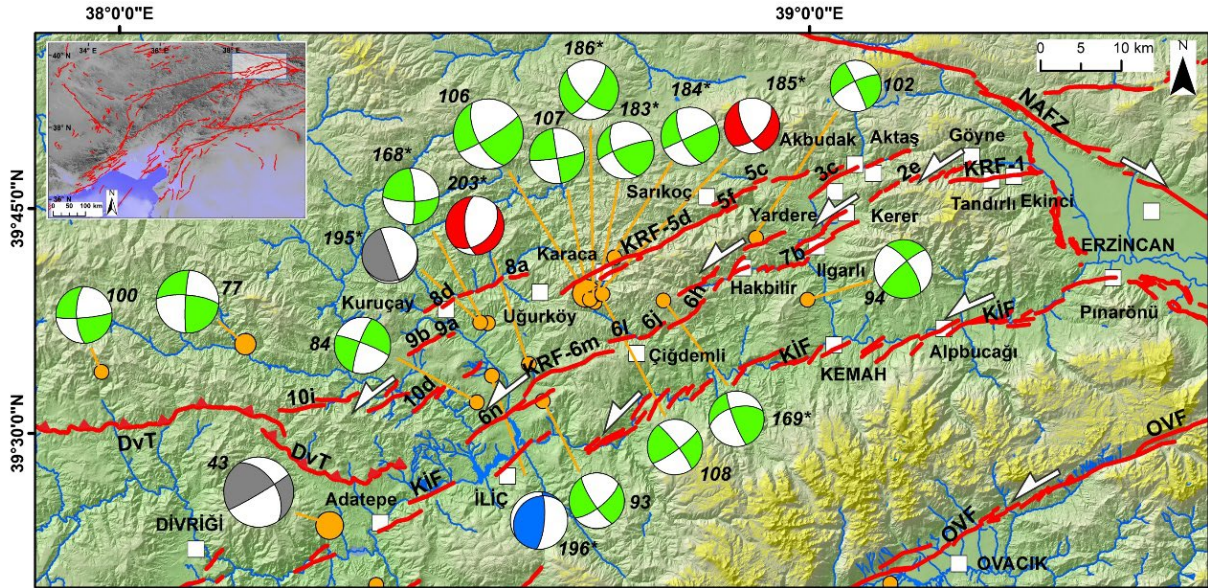


Figure A1. Segment distribution of the Karaca Fault (KRF). See Appendix B for the details of focal mechanism solutions. For detailed morphotectonic features and locations of the settlements mentioned in the text, see e-suppl.-KRF in Appendix C. NAFZ and DvT from Emre et al. (2012a). NAFZ: North Anatolian Fault Zone; DvT: Divriği Thrust; OVF: Ovacık Fault; KİF: Kemah-İliç Fault.

The segments KRF-3a_c are located on the linear Sarımsaklı Dere valley in the north of Yardere. Further to south between Kerer and Ilgarlı, the segments KRF-4a_e cause sharp diversions on route of the streams (i.e., Çamlı Dere, Kerer Çayı). The left-lateral displacements of 379 m and 239 m on the stream channels have been measured along the segment KRF-4a and KRF-4c respectively. The segments KRF-5a_d are laying between Akbudak and Uğurköy via Karaca village. They have prominent evidences of faulting in this area such as linear valleys, elongated ridges, drag folds of the geological strata and linear plant paths following fractures. The overall left-lateral drag is recognized in a geological layer along the segment KRF-5d in which an approximately 3.7 km overall left-lateral displacement of the Gülan Dere course in the south of Sarıkoç (Figure A1; e-suppl.-KRF in Appendix C).

The en echelon segments of KRF-6a_o and KRF-7a_f cause several left-lateral displacements on the stream routes particularly on Büyük Dere and Bekerçiç Dere around

Hakbilir and iđdemli. The segments KRF-8a_e are located on the linear valley of Kirzi ayı between Dikmen and Kuruay. The left-lateral lithological displacement and sudden changing of stream routes are clearly seen on the KRF-9b. The en echelon segments of KRC-10a_i left-laterally displaced the route of Kaledibi ayı in several places (950 m on KRF-10f; 1000 m on KRF-10d) and the segments slightly turn to E-W direction to connect the Divriđi Thrust mapped by Emre et al. (2012a) (Figure A1; e-suppl.-KRF in Appendix C).

The focal mechanism solutions along the KRF confirm the left-lateral nature of the fault. The #106_2011.09.22 (M=5.4) earthquake is related to the segment KRF-5d (Figure A1; Appendix B). The epicenter distribution of the seismic events also indicates that the segments KRF-6a and -6o are capable to produce earthquakes (i.e., #102_2010.08.16, M=3.6; #93_2008.01.22, M=4) (Figure A1; Appendix B).

The connection of Sarız Fault of the CAFZ and the NAFZ is provided by the Kemah - İli Fault that mainly composed of en echelon segments controlling the route of Fırat River and its southwest end become parallel to the Ovacık and Malatya Faults.

Details of the Kemah - İli Fault (KİF)

The position of the northeast end of Kemah - İli Fault is recognized by Emre et al. (2013) around Pınarönü at the southwest margin of Erzincan Plain. In this location, segment KİF-1 has nearly E-W direction and causing the displacements on the route of Fırat River (Figure A2; e-suppl.-KİF in Appendix C). The segment KİF-2 creates left bending on the small tributaries (i.e., Karanlık Dere and Deliay) of the Fırat River. The be-headed streams, displacement of small tributaries of Fırat River and landslide locations at the southern slopes of the Fırat River valley indicate the positions of the segments KİF-3, KİF-4, KİF-5 and KİF-6. Starting with the segment KİF-7, the NE-SW trending en echelon segments control the route of Fırat River and most of the segments creates left-lateral shifting on the course of the river between Alpbucađı and the town of İli (see segments from KİF- 7 to KİF-24) (Figure A2; e-suppl.-KİF in Appendix C).

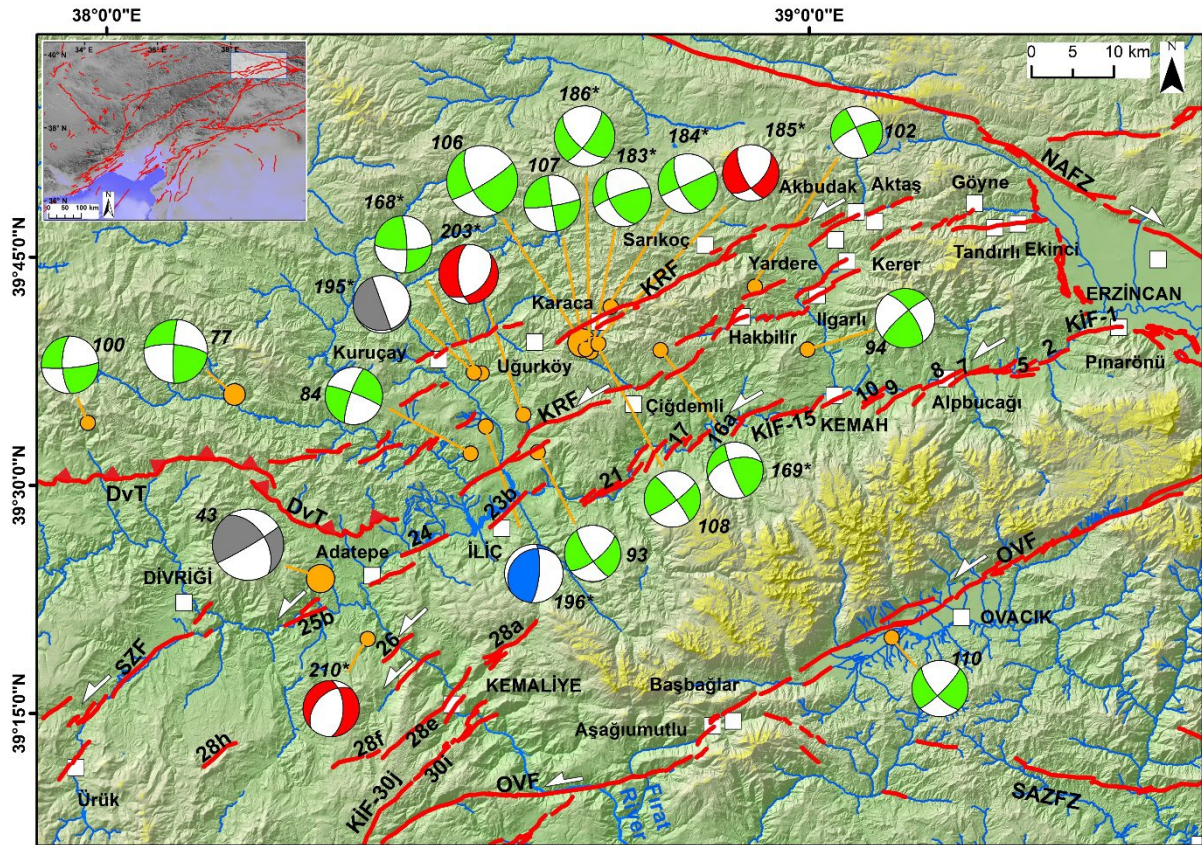


Figure A2. Segment distribution of the Kemah-İliç Fault (KİF). See Appendix B for the details of focal mechanism solutions. For detailed morphotectonic features and locations of the settlements mentioned in the text, see e-suppl.-KİF in Appendix C. The NAFZ and Divriği Thrust from Emre et al. (2012a). The OVF is after Seyitoğlu et al. (2018). KRF: Karaca Fault; OVF: Ovacık Fault; NAFZ: North Anatolian Fault Zone.

Along the segment KİF-25a, the Fırat River changes its direction from NE to NW around Adatepe. Further to southwest, a left-lateral diversion on Çaltı Çayı is observed on the segments KİF-25b and KİF-25c. The course of Fırat River shifted left-laterally along the en echelon segments of KİF-26 and KİF-27b as 222 m and 180 m respectively. These NE-SW trending segments are quite different than the N-S trending fault lines of Emre et al. (2013). The left bending of the Fırat River around Kemaliye due to en echelon segments of KİF-28e, KİF-29 and KİF-30a_b and KİF-30d are clearly seen on the Google Earth Images. The limestone lithology allows to trace the segments KİF-30a_j in the NE-SW direction that becomes parallel to the southwest continuation of Ovacık Fault (Figure A2; e-suppl.-KİF in Appendix C). The seismic event #43_1999.04.06 (M=5.4) is probably related to the segments KİF-25a and -25b where the Fırat River bends sharply (Figure A2; Appendix B).

Details of the Ecemiş - Deliler Fault (EDF)

In the Mediterranean coast of Türkiye (Turkey), 15 km east of Aydıncık, spectacular NE-SW trending linear valleys exist between Yanışlı and Hırmanlı (Figure A3).

The en echelon segments of EDF-1a_c are located on these linear valleys. The segment EDF-1c creates small left-lateral displacement (60 m) on the Bahçeli Dere at Büyükeceli where a shear zone is observed in the field (Figure A4), but further northeast, a significant 1240 m left-lateral shifting on Sayboğaz Dere is noteworthy (Figure A3; e-suppl.-EDF in Appendix C).

The en echelon segments (EDF-1d_e) have diversions on the stream channels. The Karaburun Dere has a 540 m left-lateral shift along the segment EDF-1e at the southeast of Hırmanlı. The segment EDF-2 follows the direction changes on the stream channels. A 170 m left-lateral displacement has been measured in the west of Işıklı. A semi-parallel segment EDF-3 is drawn on the distinguished topographical difference between Kayabaşı and Işıklı (Figure A5). Its northeast continuation has a 350 m left-lateral diversion on the Ağıllı Dere (Figure A3; e-suppl.-EDF in Appendix C).

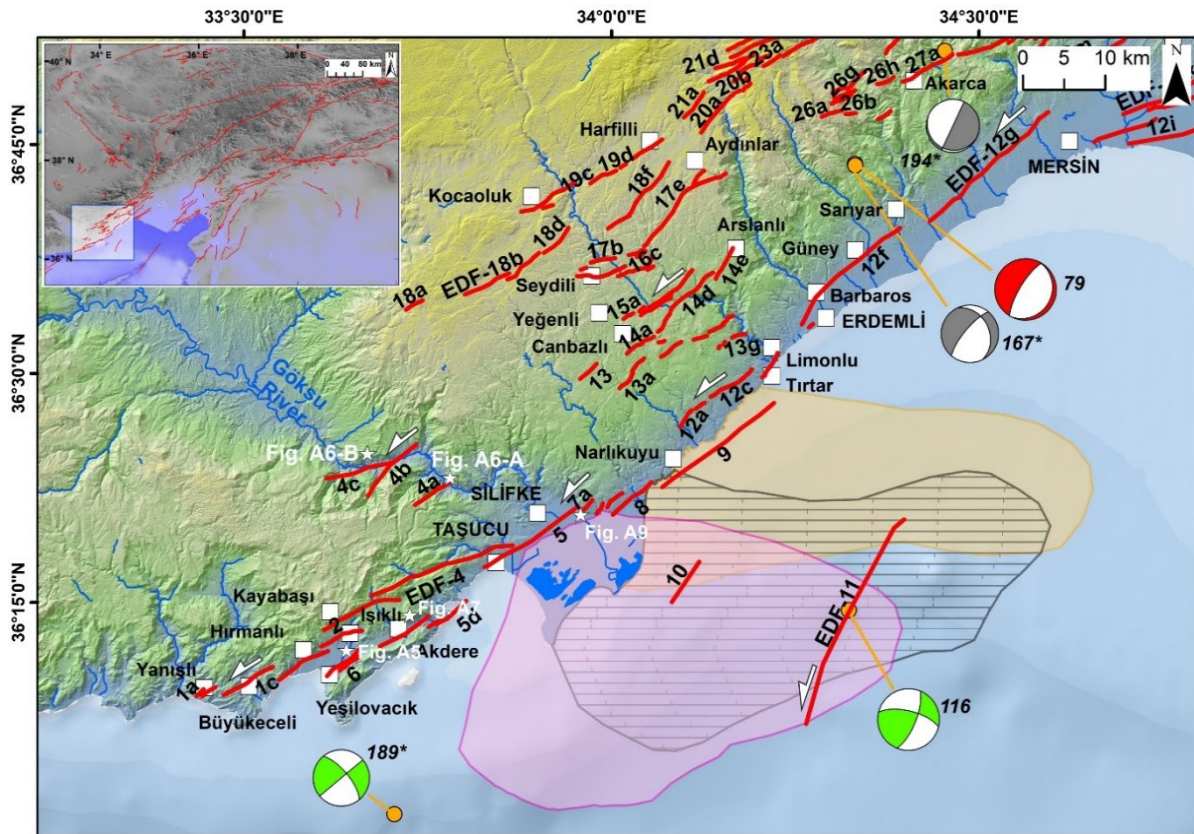


Figure A3. Segment distribution of the Ecemiş-Deliler Fault (EDF) between Taşucu and Mersin. See Appendix B for the details of focal mechanism solutions. For detailed morphotectonic features and locations of the settlements mentioned in the text, see e-suppl.-EDF in Appendix C. The submarine delta of Göksu River (Aksu et al., 2014a) indicate that EDF is a left lateral active structure around Taşucu. EDF-9 (Okyar et al., 2005), EDF-10 (Walsh-Kennedy et al., 2014; Aksu et al., 2014a) and EDF-11 (Walsh-Kennedy et al., 2014) are drawn from the seismic reflection sections.

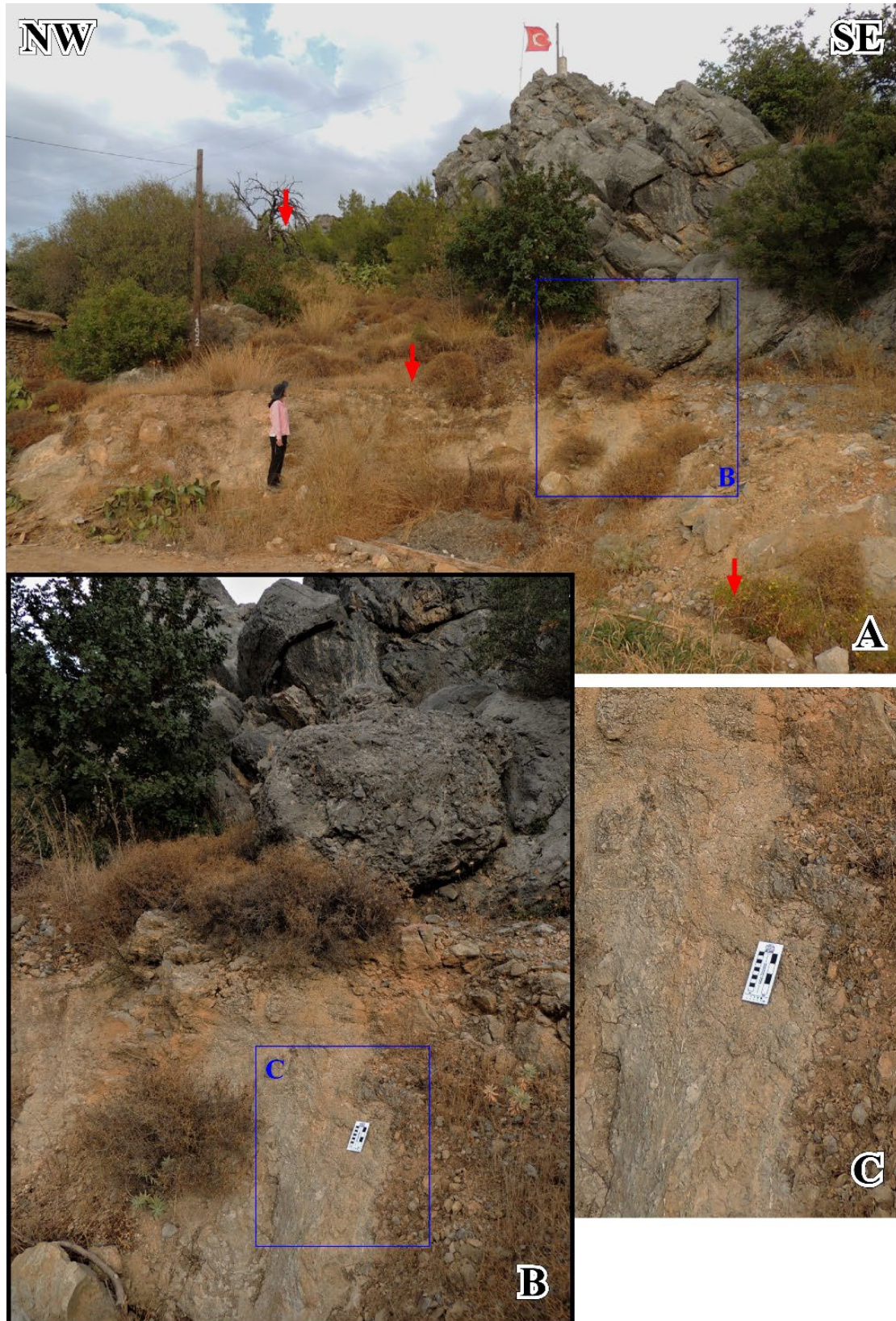


Figure A4. A) A shear zone in Büyükeceli along the segment EDF-1c (red arrows). B; C) Close up view of the shear zone. See Fig. A3 for location. Someone can argue that this shear zone is developed between Lower Devonian shale, quartz sandstone and middle Devonian dolomitic limestone (Alan et al., 2014) and belongs to paleotectonic period. However, in this location both 60 m left lateral displacement on the Bahçeli Dere and 1240 m left lateral shifting are measured on the Sayboğaz Dere further northeast (e-suppl.-EDF in Appendix C).



Figure A5. Topographic differences created by the segments EDF-2 (yellow arrows) and EDF-3 (red arrows). For location see Figure A3. The segment EDF-3 separates Jurassic-Cretaceous limestone, dolomitic limestone and Quaternary slope debris. The segment EDF-2 is in the contact between Cambrian-Ordovician limestones, siltstones and Quaternary deposits in the Işıklı village. For lithological information and geological map see Alan et al. (2014).

The position of segment EDF-4 is determined mainly by the NE-SW trending linear feature of Zindan Dere. Its continuation towards Taşucu, the segment created a 1750 m left-lateral diversion on the Kocapınar Dere (Figure A3; e-suppl.-EDF in Appendix C). The segments of EDF-4a_c have high influence on the route of Göksu River (Figure A3). The overall left-lateral diversion is recognized around the segments EDF-4b_c. Moreover, sharp left-lateral displacements along the EDF-4a (385 m) and the EDF-4b (1450 m) are measured (Figure A4; e-suppl.-EDF in Appendix C).

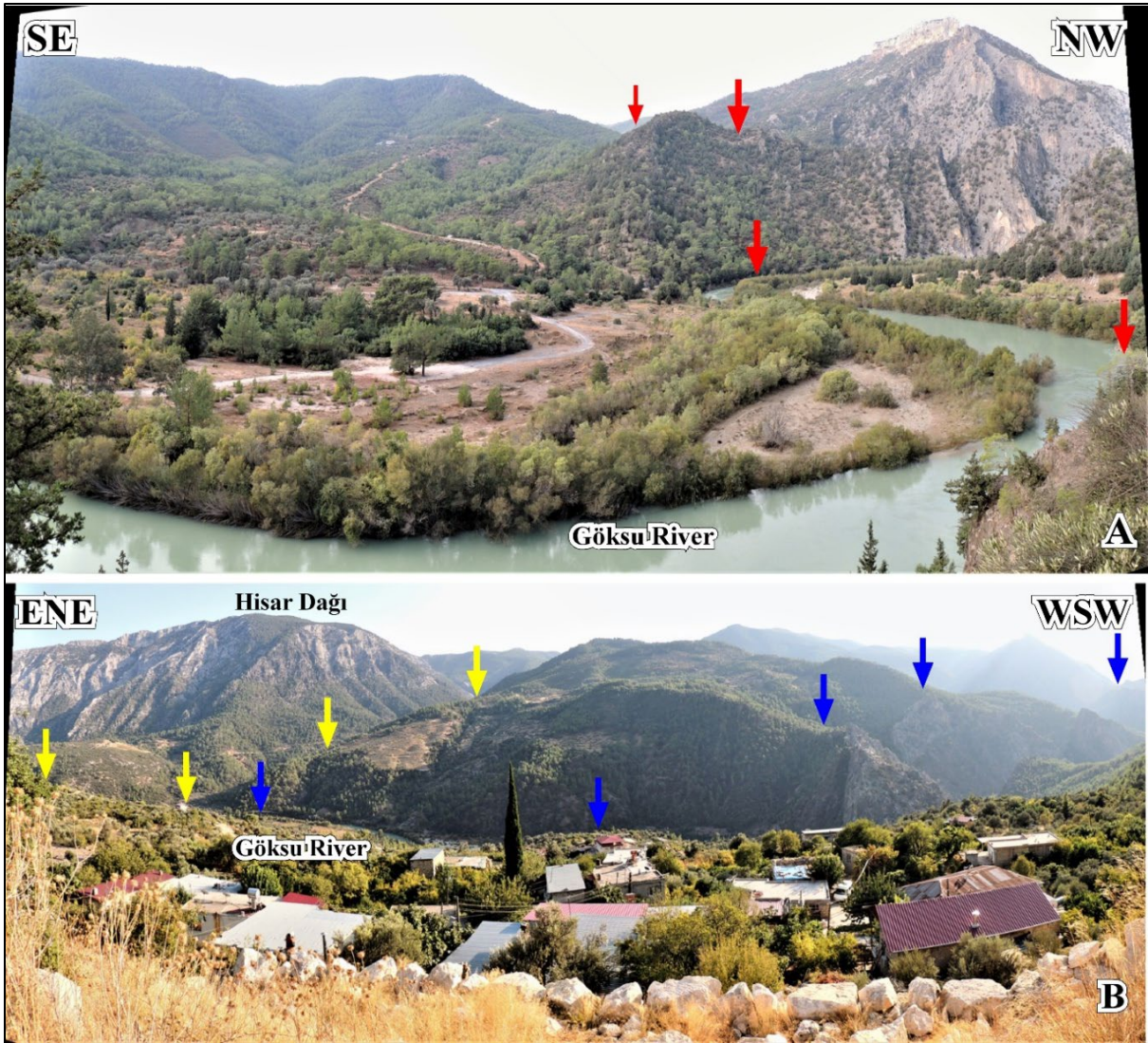


Figure A6. **A)** The segment EDF-4a creates sharp left-lateral diversion (385 m) on Göksu River. The segment (red arrows) is located between Jurassic-Cretaceous chert bearing limestone (on the right) and upper Cretaceous schists and calcschists (on the left), for geological map, see Alan et al. (2014). **B)** The EDF-4b (yellow arrows) and EDF-4c (blue arrows) around Ortaören where Göksu River has an overall left-lateral shifting. See Figure A3 for location.

The NE-SW trending Ada Dağı is located between Ovacık Plain and the Mediterranean Sea. Its linear northwest margin hosts two parallel segments, EDF-5a and EDF-6. Elongated Cemiyet Kalesi Tepe takes place between these segments. A 640 m left-lateral shifting has been measured along the segment EDF-6 implying that the Cemiyet Kalesi Tepe is a shutter ridge. The seismic event #189*_2012.05.03 (M=4) in the offshore indicates left-lateral strike-slip faulting (Figure A3; Appendix B). One of the longest segments in the area, the segment EDF-5a_e lies between Yeşilovacık to Silifke via Akdere. In the middle of the segment EDF-5b at the village of Akdere, a 3950 m left-lateral shifting is measured on the course of Akdere where the sharp diversions are seen (Figure A7).



Figure A7. Photos of the en echelon segments EDF-5b, EDF-5c and EDF-5e which are presented by pink, yellow and red arrows respectively. Note sharp diversion of Akdere along the EDF-5b (e-suppl.-EDF in Appendix C). See Figure A3 for location.

In the southwest exit of Taşucu town, fault surfaces related to the segment EDF-5e in the limestone unit provide slickenlines (Figure A8). The northeast end of segment EDF-5e shifted the Göksu River left-laterally with an amount of 1760 m. There are en echelon segments of EDF-7a_c and EDF-8 in the north of Silifke Plain where the shear zone exhibits flower structure (Figure A9).



Figure A8. A) Slickenlines on the fault surface of the Jurassic-Cretaceous limestone along the segment EDF-5e southwest exit of Taşucu town. B) Close-up view of the slickenlines. See Figure A3 for location.

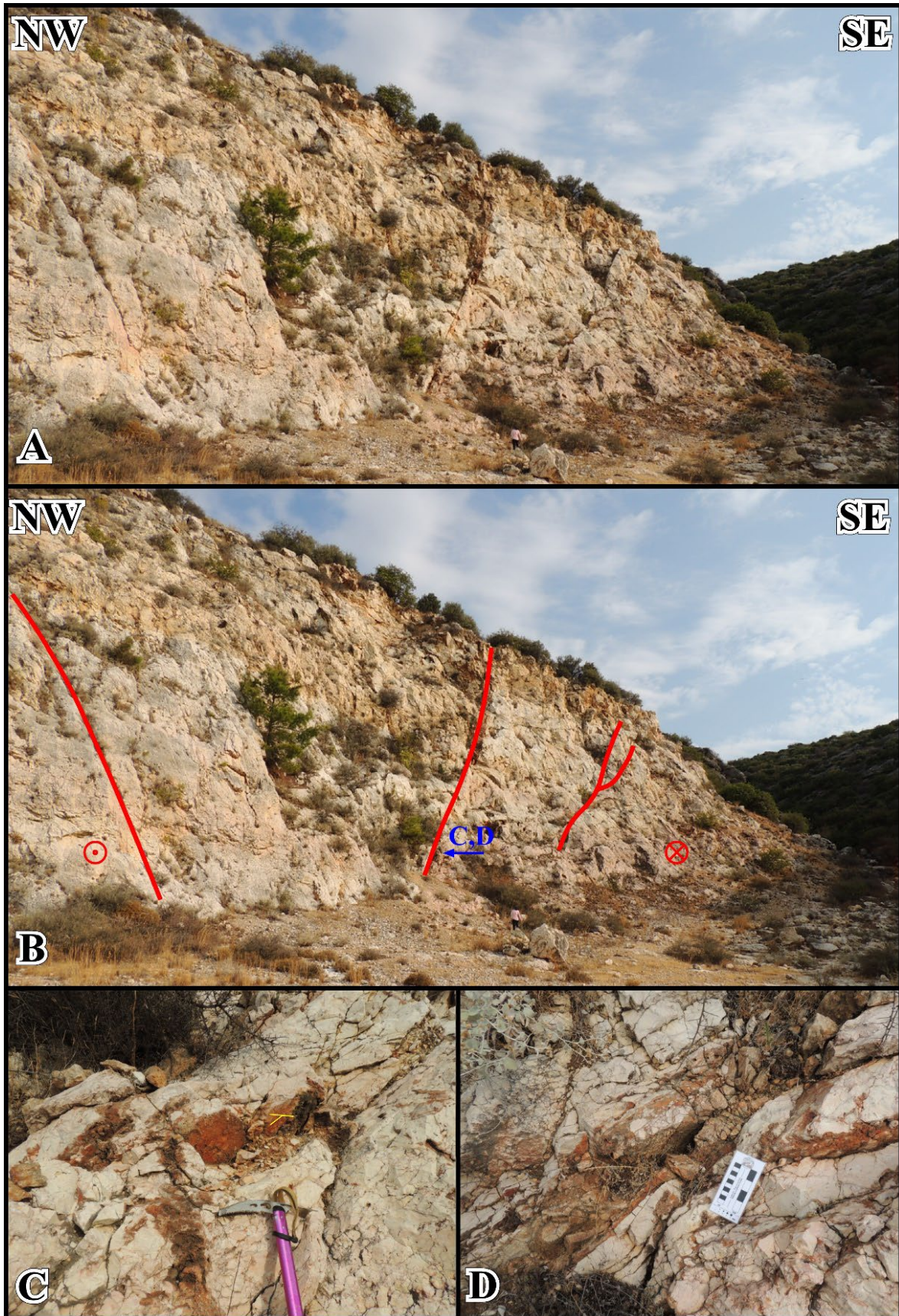


Figure A9. A shear zone exhibits flower structure in the lower-middle Miocene limestone along the segment EDF-7a. **A)** uninterpreted **B)** interpreted photo. **C; D)** close-up view of slickenlines and cataclastic zone. See Figure A3 for location.

Semi-parallel NE-SW trending segments EDF-9, EDF-10 and EDF-11 is located on offshore of Narlıkuyu. The position of segment EDF-9 is drawn by using seismic lines from Okyar et al. (2005) (Figure A3; e-suppl.-EDF in Appendix C). The location of segment EDF-10 is determined by the seismic lines from Aksu et al. (2005) and Walsh-Kennedy et al. (2014). The position of segment EDF-11 can be traced on Google Earth images reflecting a trough in the bathymetry which corresponds to the fault traces in the Seismic Lines-A, -B, -D, and -E (Walsh-Kennedy et al., 2014). In this location, the seismic event #116_2013.10.23 (M=4.5) provide left-lateral strike-slip focal mechanism solution (Figure A3; Appendix B; e-suppl.-EDF in Appendix C).

In the north of Narlıkuyu, the short segments of EDF-12a_c is drawn due to the clear left-lateral diversions on the drainage. The segment EDF-12a clearly indicates 490 m left-lateral shift on the Karain Dere and segment EDF-12c displays a 475 m displacement on the Köperin Dere at the west of Tırtar. The shoreline parallel segment EDF-12d indicates a sharp 95 m left-lateral diversion on the Lamas Dere at Limonlu. After a short segment EDF-12e is drawn by the help of bending drainage channel, a long continuous segment EDF-12f can be followed between the north of Erdemli and Sarıyar. Along this segment, several left-lateral shifting on the stream channels are observed (i.e., 360 m on Alata Çayı at Barbaros, 140 m on Tömük Suyu at Güney, 400 m on Gilindirez Dere at Sarıyar). Relatively less prominent diversions of the stream channels are seen along the segment EDF-12g at the northwest of Mersin (Figure A3; e-suppl.-EDF in Appendix C).

The semi-parallel segments laying between Mersin and Tarsus (EDF-12i, EDF-12j, and EDF-12k) are drawn by the help of small displacements of the stream channels and their positions are compatible with the seismic reflection data of Aksu et al. (2014a, Line-C). Further to northwest, another semi-parallel segments (EDF-12l_o) can be recognized by the shifting of stream channels and elongated crests (Figure A10; e-suppl.-EDF in Appendix C).

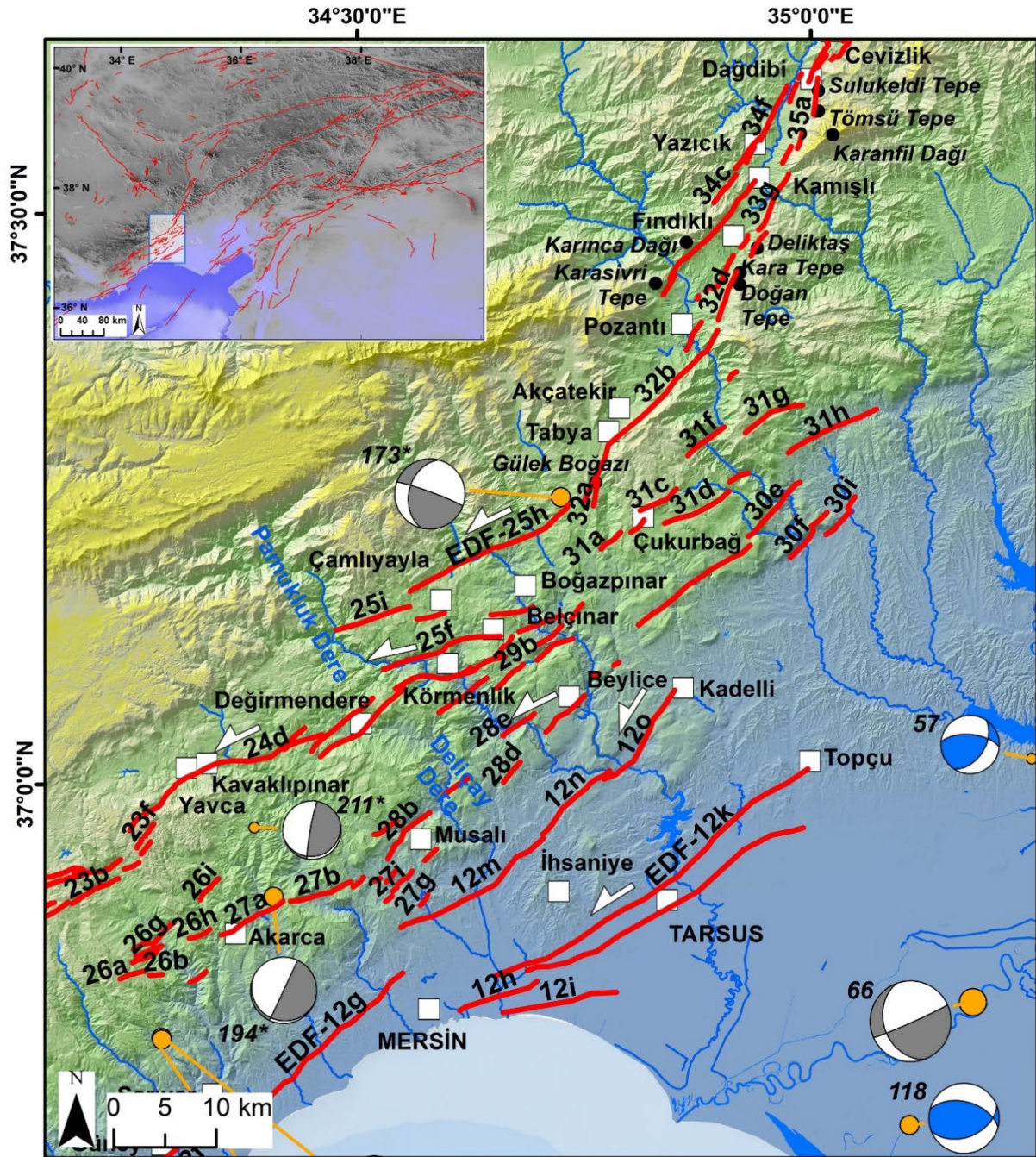


Figure A10. Segment distribution of the Ecemiş-Deliler Fault (EDF) in the north of Tarsus. See Appendix B for the details of focal mechanism solutions. For detailed morphotectonic features and locations of the settlements mentioned in the text, see e-suppl.-EDF in Appendix C. The segments near Tarsus are confirmed by the seismic section of Line C in Aksu et al. (2014a).

Nearly 10 km north of Narlıkuyu, angular drainage helps to locate the segments EDF-13a_g and EDF-14a_b. The change in the strike of regional fracture system can be followed in the Google Earth images. Intensely sheared zones are marked with the segments EDF-14c_e, EDF-15a_f where the prominent displacements are measured on the stream channels between Yeğenli and Arslanlı (i.e., a 2230 m left-lateral diversion on the Mergin Dere along the segment EDF-14d) (Figure A3; e-suppl.-EDF in Appendix C).

The other location of the intense shearing is observed between Seydili and Aydınlar where the segments EDF-16a_d and EDF 17a_e are located. A 950 m left-lateral diversion is measured on the Kızılgeçit (Kestel) Çayı along the segment EDF-17b (Figure A3; e-suppl.-EDF in Appendix C).

Further to north along the segments EDF-18a_f, the Quaternary deposits can be observed in a narrow zone or as in the case of segments EDF-19a_f, Quaternary deposits are developed in local areas such as at Kocaoluk and Harfilli. The positions of the segments control the morphology. The releasing offset between the segments EDF-19a and EDF-19b creates Kocaoluk Plain, whereas the restraining offset between the segments EDF-19b and EDF-19c causes a prominent morphological high, the Teke Dağı. This feature also indicates that the movement on the segments is left lateral which is further confirmed by the 980 m displacement of Gökler Çayı along the segment EDF-19a (Figure A3; e-suppl.-EDF in Appendix C).

A well-developed fracture system on the limestone unit, the location of Arlugözü springs and bending of Sorgun Dere indicate the position of segment EDF-20a. The parallel segment EDF-21a is located on a linear valley. The segments EDF-20b_e, EDF-21b_g, EDF-22a_d and EDF-23a_b passed in a highly sheared lithologies. The EDF-23c_f and EDF-24a_c are semi-parallel segments identified on the sheared limestone unit with the thin Quaternary deposits (Figures A3 and A10; e-suppl.-EDF in Appendix C).

The northeast continuation of EDF-24c has a bending geometry where the left-lateral shifting of the stream channels between Kavaklıpınar and Yavca are observed. A clear 695 m left-lateral diversion is measured on the N-S trending Çıkrıcak Dere between Yavca and Kurudere (Figure A10; e-suppl.-EDF in Appendix C).

The left-lateral shifting of the streams are common features along the segments EDF-24d and EDF-25a (Figure A10). The most prominent example is the position of Pamukluk Dere at the south of Körmenlik along the EDF-25a. The NE-SW trending EDF-25b creates a 630 m left-lateral diversion on the Deliçay Dere at the south of Değirmendere (Figure A10). In fact, a total of 2000 m offset would be mentioned in this area, if the sharp bend of the Deliçay Dere at Eđerkaya Tepe were taken into consideration. The short segments (EDF-25d_e) separated from EDF-25a display very sharp 360 m left-lateral displacement on the Karahan Dere at the south of Çiğrin (Figure A10; e-suppl.-EDF in Appendix C).

The segment EDF-25f corresponds to the Quaternary fault of Emre et al. (2011a) and controls major drainage pattern of the area such as Cehennem Dere, Karanlık Dere and Kadıncık Çayı. The left bending of Yağbölüğü Dere, a sharp 400 m left-lateral displacement on Karanlık Dere, E-W trending crest at the south of Belçınar and 235 m left-lateral diversion on

Kadıncık ayı indicate the position of the segment EDF-25g between amlıyayla and the south of Bođazpınar (Figure A10). The NE-SW trending en echelon segments EDF-25h and EDF-25i are drawn by using left-lateral significant displacements on the major streams around amlıyayla. A 3230 m displacement on Kadıncık ayı and a 410 m shifting on Karanlık Dere along EDF-25h and a 600 m diversion on the Yađbölüđü Dere along EDF-25i indicate that the faults around amlıyayla have left-lateral strike-slip character which is different than the normal fault evaluation of Emre et al. (2011a) (Figure A10; e-suppl.-EDF in Appendix C).

The segments EDF-26a_i, EDF-27a_k, EDF-28a_e, EDF-29a_c, EDF-30a_i, EDF-31a_h generally follows the NE-SW trending morphological features and constitute the middle branch between the Mediterranean coast and amlıyayla (Figures A3 and A10). Some of the segments have significant displacements on the major stream channels. Along the segment EDF-27a, Erel Dere is shifted left-laterally at the northeast of Akarca (Figure A10). Elongated crest along the EDF-27h is a noteworthy feature (Figure A10). At the southwest of Sarıkavak, a 390 m left lateral displacement on the Pamukluk Dere is observed along the segment EDF-29a. A sharp 300 m left-lateral shift on the course of Kaplan Dere is measured at the southeast of Beylice along the segment EDF-30a. The distinct morphological troughs help to locate particularly the positions of EDF-30d and EDF-30e (Figure A10). Further to northwest, the segment EDF-31f displaces the route of akit Suyu which is parallel to the previously mapped Ecemiř Fault (Emre et al., 2011a) (Figures A3 and A10; e-suppl.-EDF in Appendix C).

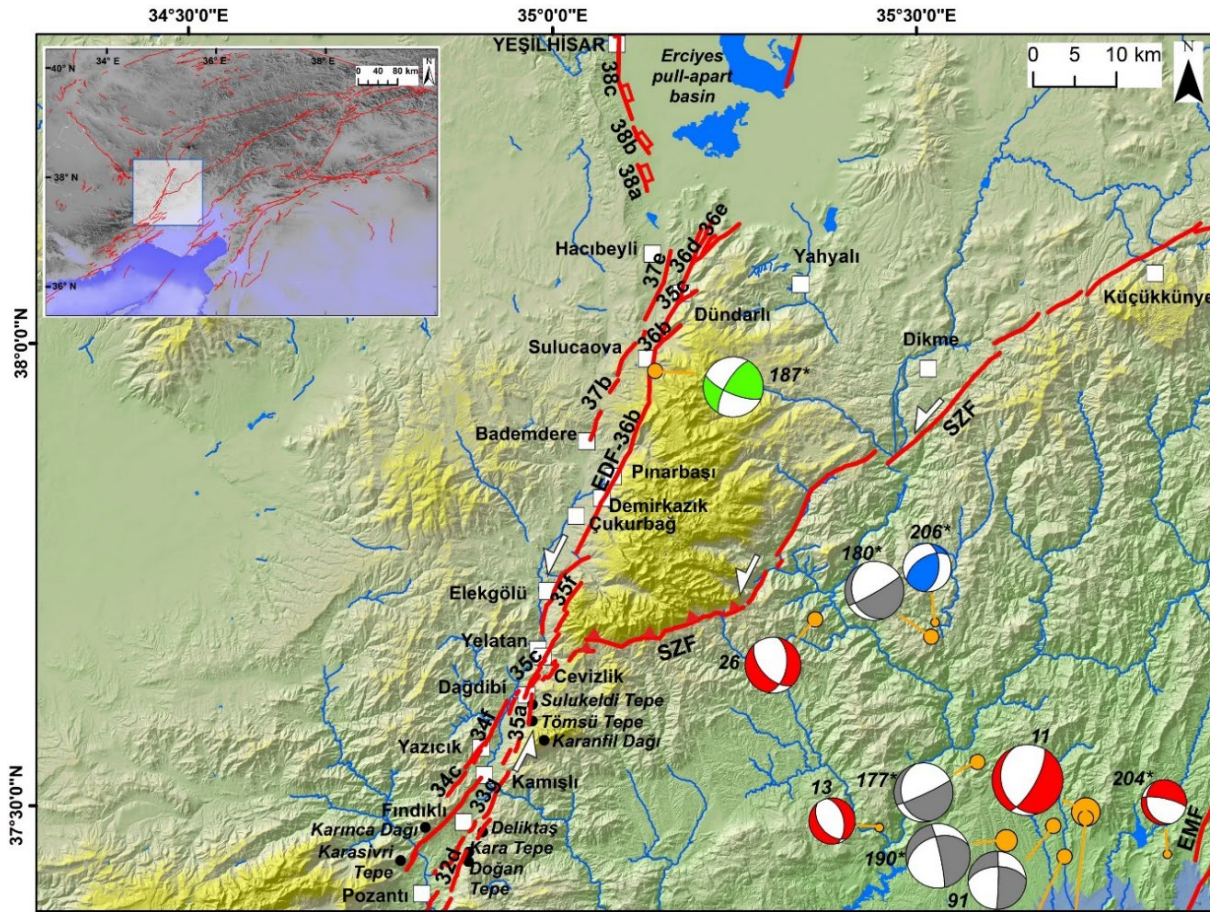


Figure A11. Segment distribution of the Ecemiş-Deliler Fault (EDF) between Pozantı and Hacıbeyli. See Appendix B for the details of focal mechanism solutions. For detailed morphotectonic features and locations of the settlements mentioned in the text, see e-suppl.-EDF in Appendix C. See previous studies, Emre et al. (2013), Sarıkaya et al. (2015), Yıldırım et al. (2016), for comparison. SZF: Sarız Fault.

As an intermediate result, the segment distribution of nearly continuous shear zone having strong left-lateral movement indicators between Aydınçık and Gülek demonstrates that the Ecemiş Fault can safely be extended to the Mediterranean coast (Figures 5 and 6).

In the following section, re-defined segments of Ecemiş-Deliler Fault will be presented between Pozantı and Hacıbeyli (Figure A11). The segment EDF-32a and EDF-32b start at north of Gülek and join each other in Gülek Boğazı, then EDF-32b continues to north-northeast direction via left bending of Kıraboğazı Dere (Figures A10 and A11; e-suppl.-EDF in Appendix C). The segment has a more northeasterly direction at Akçatekir and displaces Çakıt Suyu 450 m left-laterally at the southeast of Pozantı. The segment EDF-32c is relatively short segment but creates 500 m left-lateral displacement on Çoğuşu Dere and 1350 m shifting on Yana Dere. The segment EDF-32d follows rocky western slopes of Karatepe and Doğan Tepe (Figures A10 and A11; e-suppl.-EDF in Appendix C).

The right stepping short en echelon segments of EDF-33a_c, left-laterally divert the route of Çakır Dere and the longer segment EDF-33d follows the linear valley of Çakır Dere for a

3500 m. In the southeast of Fındıklı, at Deliktaş area, the sharp bending of stream channels helps to locate the segments EDF-32e and EDF-32f (Figure A10; e-suppl.-EDF in Appendix C).

The semi-parallel right stepping segments of EDF-33f and EDF-33g continue northeasterly direction and the EDF-33g creates a 180 m left-lateral displacement on the Körkün Çayı at the southeast of Kamışlı. The segment EDF-33h is characterized by left bending of stream channels and be-headed streams. The position of segment EDF-33i is determined by bending points on the linear stream channels flowing from east-southeast to west-northwest direction at the western slopes of Karanfil Dağı (Figure A10; e-suppl.-EDF in Appendix C).

The western margin of Ecemiş corridor is bounded by the segment EDF-34a at the northwest of Pozantı where a typical triangular facet developed at Karaçam Tepe. A similar triangular facet is also developed on the southeast slopes of Karınca Dağı where the segment EDF-34b is located (Figure A10). The en echelon segment EDF-34c creates a 490 m left-lateral shifting on the Aksu Dere. The left bending of Ören Dere at Kamışlı and the left bending of small creeks between Kamışlı and Yazıcık help to locate the two sub-parallel segments of EDF-34d and EDF-34e (Figures A10 and A11; e-suppl.-EDF in Appendix C).

The segment EDF-34f is characterized by elongated crests and left bending stream channels. The positions of EDF-34g and EDF-34h are determined by the left bending of small stream channels on the eastern side of Ecemiş Çayı. The segment EDF-35a causes very distinct topographical differences on the western slopes of Tömsü Tepe and Sulukeldi Tepe (Figure A11). The en echelon segment EDF-35b located on Dağdibi has 90 m and 180 m left-lateral displacements on the stream channels. This is also the area of connection with Sarız Fault that described in the following section. The segment EDF-35c has sharp left-lateral shift on Karanlık Dere at Cevizlik (Yelatan). The segments EDF-35d, EDF-35e and EDF-35f create distinct topographical differences on the western slope of Aladağlar (Figure A11; e-suppl.-EDF in Appendix C).

The spectacular morphological features along the EDF-36a_b such as be-headed streams, left bending and left-lateral displacements of stream channels, are closely examined and dated by the recent papers (Sarıkaya et al., 2015; Yıldırım et al., 2016). The segment EDF-36a creates be-headed streams in the south of Elekgölü and a 940 m left-lateral displacement on the Ayotu Dere. This segment is also responsible for the additional left-lateral diversions of Sarıçamur Dere (725 m), Alagöz Dere (2225 m) and Karaç Dere (1017 m) (Figure A11; e-suppl.-EDF in Appendix C). The longest segment of the area, the segment EDF-36b creates a left bending on Çamlık Dere and a 320 m left-lateral displacement on Ferik Dere at the east of Çukurbağ village.

The segment continues to northeast via Demirkazık and Pınarbaşı and terminates with the 560 m left-lateral diversion on Atalamaz Dere at the northeast of Sulucaova (Figure A11; e-suppl.-EDF in Appendix C). In this location, the seismic event #187*_2011.09.30 (M=4.3) provides a focal mechanism solution that the NNE trending segment EDF-36b has left-lateral strike-slip character which is concordant with the morphological features explained above (Figure A11; Appendix B; e-suppl.-EDF in Appendix C).

To the north of Dünderlı, the segments (EDF-36c_g) are bifurcating towards the Kayseri Plain. The left-lateral displacements on Karköprü Dere (1100 m) along EDF-36 c, on a stream channel (365 m) along EDF-36d and on the Demiroluk Dere (630 m) along EDF-36e are particularly important data together with the morphological features on the semi-parallel segments EDF-37a_e between Bademdere and Hacıbeyli such as shifting (i.e., 160 m along EDF-37c) and bending of stream channels (i.e., EDF-37a, EDF-37e) demonstrating an active fault zone (Figure A11; e-suppl.-EDF in Appendix C).

The segment EDF-36h has a role of shortcut in the Erciyes pull-apart basin (Dirik and Göncüoğlu, 1996; Koçyiğit and Beyhan, 1998) and its route is mainly taken from Emre et al. (2011b) and Higgins et al. (2015) (Figure A12). Its northeast end has distinguished left-lateral shifting and left-lateral bending of the stream channels at the west of Gesi. The en echelon segment EDF-36i also causes left-lateral shifting of the stream channel at the southwest of Ağırnas (Figure A12; e-suppl.-EDF in Appendix C).

The segment EDF-38a_f should be a normal fault of the Erciyes pull-apart basin (Dirik and Göncüoğlu, 1996; Koçyiğit and Beyhan, 1998) (Figure A12). The segment EDF-39a_g, having strike-slip morphological indicators, changes its direction from the NNE to NE-SW gradually between Dört Yol and Hasan Arpa (Figure A12). Particularly, consistent left-lateral displacements on İğdenin Dere (230 m), Hasanbalının Dere (215 m) and Sakamnoğlu Dere (200 m) along the segment EDF 39b are noteworthy. Significant left-lateral displacements on the Seylik Dere (800 m) along the segment EDF-39c at Sultansazı and on the Kışla Dere (1300 m) along the segment EDF-39d at İncesu all demonstrate that the strike-slip character on the EDF-39a_g and EDF-40a_s become dominant on the northern side of the Erciyes pull-apart basin. This is supported by the focal mechanism solutions of the seismic events #97_2008.11.12 (M=4.7) and #39_1998.12.14 (M=4.5) (Figure A12; Appendix B; e-suppl.-EDF in Appendix C).

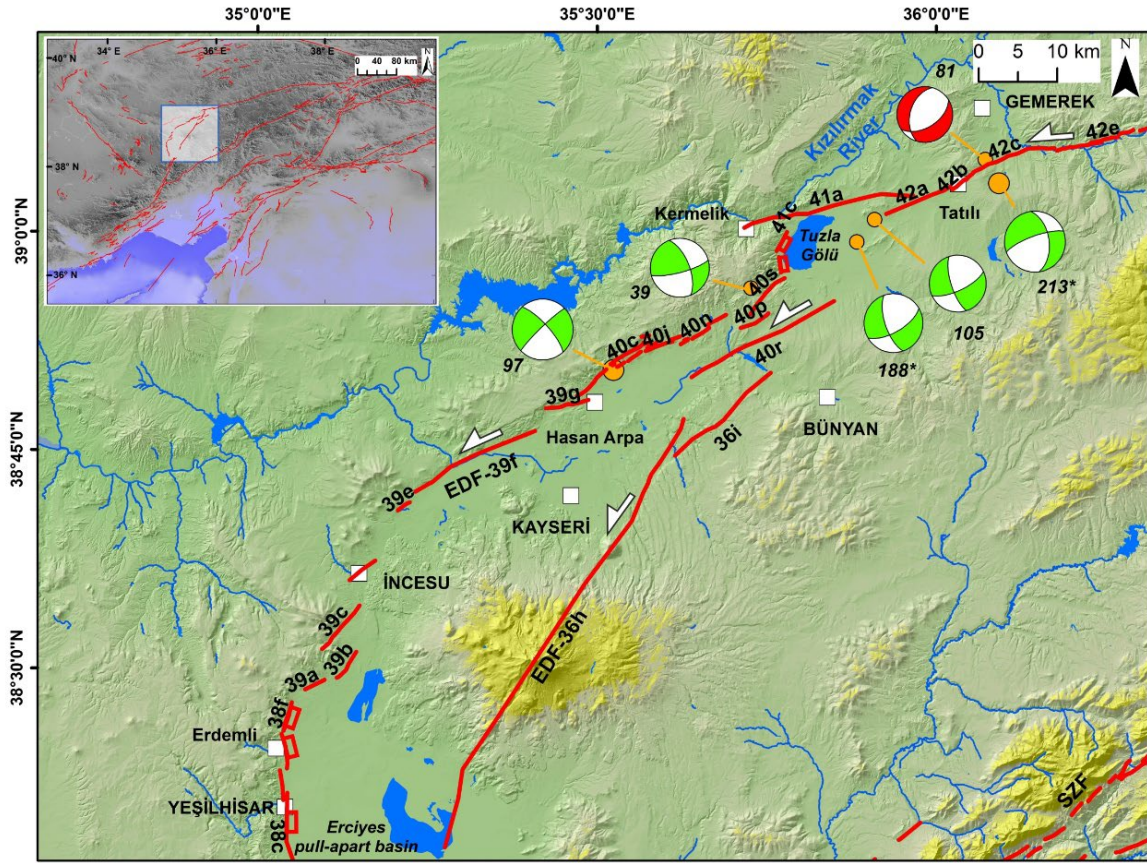


Figure A12. Segment distribution of the Ecemiş-Deliler Fault (EDF) around Kayseri. See Appendix B for the details of focal mechanism solutions. For detailed morphotectonic features and locations of the settlements mentioned in the text, see e-suppl.-EDF in Appendix C. See previous studies Dirik and Göncüoğlu (1996), Koçyiğit and Beyhan (1998), Emre et al. (2011b), Higgins et al. (2015) for comparison.

The en echelon segments of EDF-40a_s reach to the southern margin of Tuzla Gölü. The segment EDF-41a is located on the northern margin of Tuzla Gölü and creates a 2900 m left-lateral displacement on the Kızılırmak River at the northeast of Kermelik (Figure A12). When we consider the positions of EDF-40a_s and EDF-41a, it can be said that Tuzla Gölü is located on a pull-apart basin. The segments on the western margin of Tuzla Gölü must have normal fault character (EDF-41b_c). On the other hand, the positions of EDF-41a and EDF-42a creates a restraining stepover where Büyükkuşaklı Tepe and Sivri Dağ, having an average height of 170 m from the overall plain, can be evaluated as pressure ridges (Figure A12; e-suppl.-EDF in Appendix C). A 2000 m displacement on the Sarıoğlan Suyu and the focal mechanism solutions of the seismic events #188*_2011.11.22 (M=4.5), # 105_2011.08.16 (M=4.3) and #213*_2021.02.02 (M=4.7) indicate that the segment EDF-42a is a left-lateral strike-slip fault (Figure A12; Appendix B; e-suppl.-EDF in Appendix C).

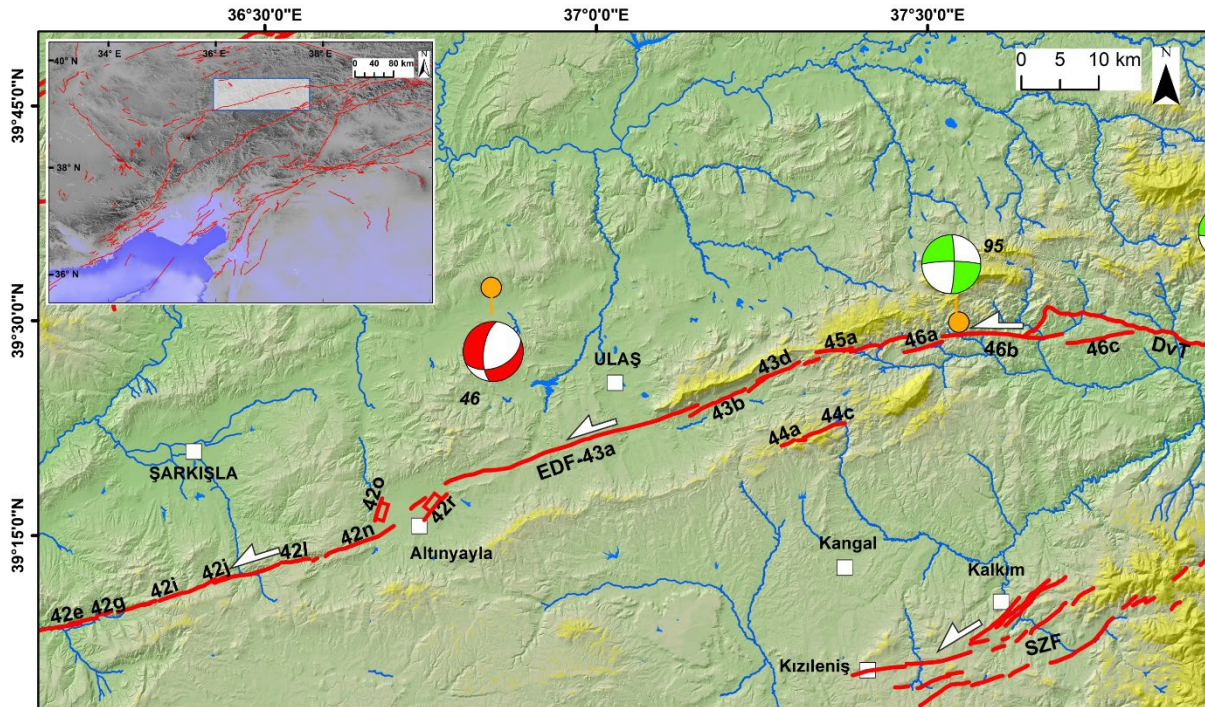


Figure A13. Segment distribution of the Ecemiş-Deliler Fault (EDF) around Şarkışla. See Appendix B for the details of focal mechanism solutions. For detailed morphotectonic features and locations of the settlements mentioned in the text, see e-suppl.-EDF in Appendix C. DvT: Divriği Thrust from Emre et al. (2012a). SZF: Sarız Fault; KRF: Karaca Fault; KİF: Kemah-İliç Fault; OVf: Ovacık Fault.

The en echelon segments EDF-42b_n between Tatlı and Altınyayla can be easily followed by using shifting and bending of stream channels (Figures A12 and A13). The left-lateral displacements on the stream channels are in the range of 100-160 m. The Altınyayla pull-apart basin is located on a releasing stepover between EDF-42n and EDF-43a (Figure A13). The segments EDF-43b_f, EDF-45a_e, EDF-46a_c link to the Divriği thrust fault. The structural position of limestone blocks at the north of Kangal along the segments EDF-44a_c observed in the Google Earth image indicates left-lateral shear in the region which is also supported by the focal mechanism solutions of the seismic event #95_2008.06.25 (M=4.6) (Figure A13; Appendix B; e-suppl.-EDF in Appendix C).

Details of the Sarız Fault (SZF)

This fault is previously mapped as the Aladağ normal fault and the Sarız Fault by Emre et al. (2011a; 2011b; 2012c). Our segmentation and evaluation are somewhat different than the previous studies (Figure A14). The Sarız Fault (SZF) is separated from the Ecemiş-Deliler Fault (EDF) at the north of Dağdibi. The en echelon right stepping segments of SRF-1a_c displaced the course of Ziyaret Dere where 145 m, 430 m and 370 m left-lateral shifting are measured along the SZF-1a, SZF-1b and SZF-1c, respectively. The similar displacements are available

along the segments SZF-1d_e on the Karanlık Dere and Deliboğmaç Dere (Figure A14; e-suppl.-SZF in Appendix C). The segments SZF-2a_b previously mapped as the Aladağ normal fault, but its position between left-lateral strike-slip segments SZF1a_e and SZF-3a_d indicates that the segments SZF-2a_b must be reverse faults. Moreover, in the regional scale, the connection of the EDF and SZF kinematically requires a pressure ridge where the highest summit of Aladağlar, the Demirkazık Tepe is located (Figure A14). The segments SZF-4a_f can be followed easily by bending and shifting stream channels. The left-lateral displacements on Değirmen Dere (570 m) along the SZF-4a at the east of Dikme and on Homurlu Dere (770 m) and along the SZF-4d at Küçükkünye are determined (Figure A14). In the north of Tufanbeyli, the SZF can be followed along the two semi-parallel branches. The northwestern branch is composed of the segments SZF-4g_j, SZF-9a_k. The lithological correlation along the segment SZF-9f indicates an 890 m left-lateral displacement. The sinistral shifting of the stream channels along the segment SZF-9g are measured as 243 m and 168 m at the north of Yedioluk (Figure A14; e-suppl.-SZF in Appendix C).

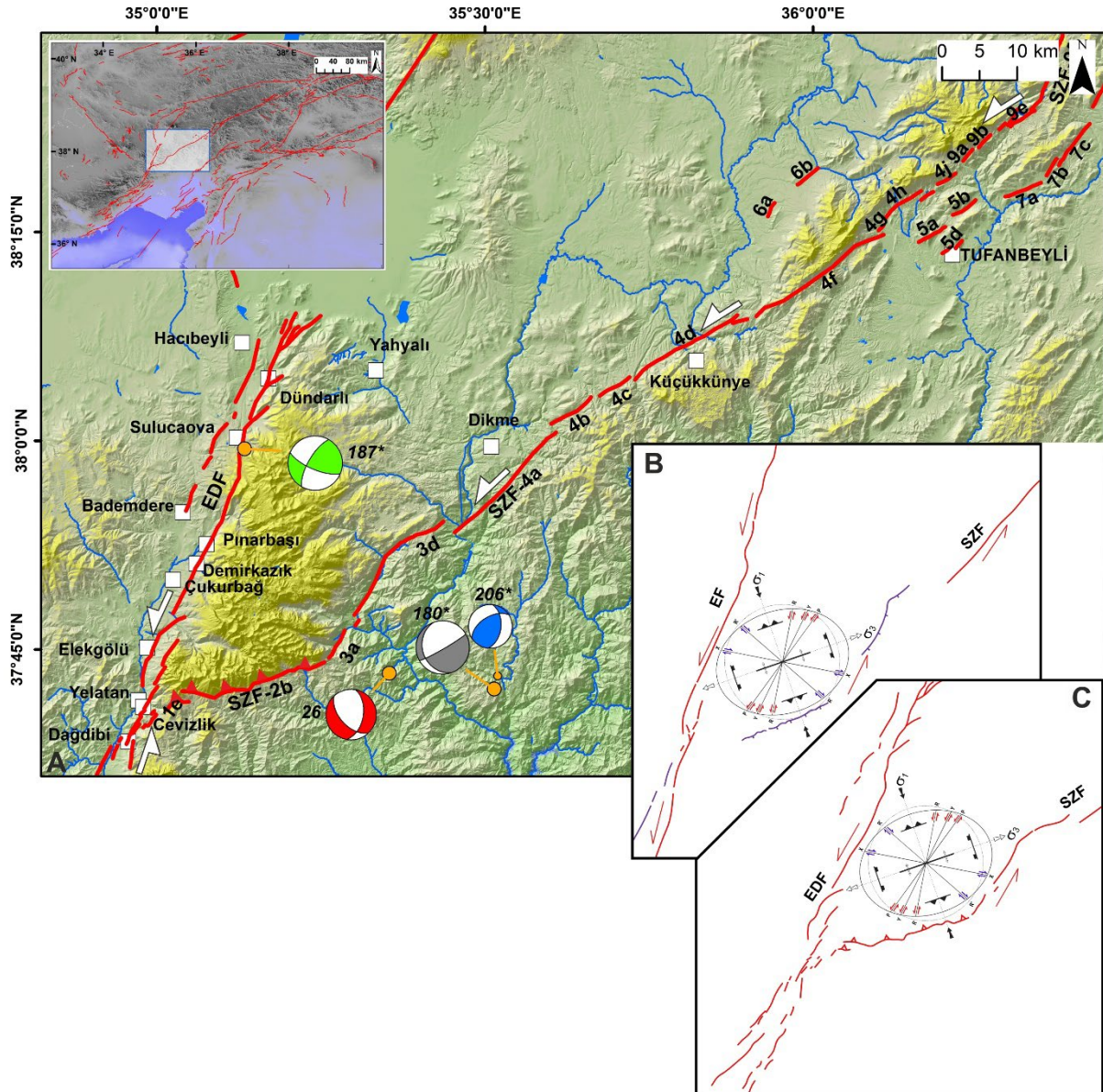


Figure A14. A) Segment distribution of the Sarız Fault (SZF) around Tufanbeyli. See Appendix B for the details of focal mechanism solutions. For detailed morphotectonic features and locations of the settlements mentioned in the text, see e-suppl.- SZF in Appendix C. Local and regional position of SZF-2a and SZF2b indicate that they must be reverse/thrust fault which were previously mapped as normal faults (Emre et al., 2011a, Aladağ fault). Inset **B)** is simplified map of Emre et al. (2011a) and our simplified map is presented in the inset **C)** for comparison. Please note that the previous evaluation is not compatible with the principal stress distribution of a left-lateral strike - slip faulting. EDF: Ecemiş-Deliler Fault; SZF: Sarız Fault.

The southeastern branch is composed of the segments SZF-5a_d, SZF-7a_e, SZF-8a_m, SZF-10a. The left bending of the stream channels along the segments SZF-7d_e, SZF-8l are significant (e-suppl.- SZF in Appendix C; Figure A15). The northwestern and southeastern branches join each other at the northeast of Sarız (Figure A15). The limestone lithology gives great opportunity to follow the segment SZF-10a_g. Two left-lateral shifting are measured on Şekerpınar Dere (72 m) and on Asmaca Dere (360 m) along the segment SZF-11a. The segment SZF-11b is drawn by using linear spring locations (Figure A15; e-suppl.- SZF in Appendix C).

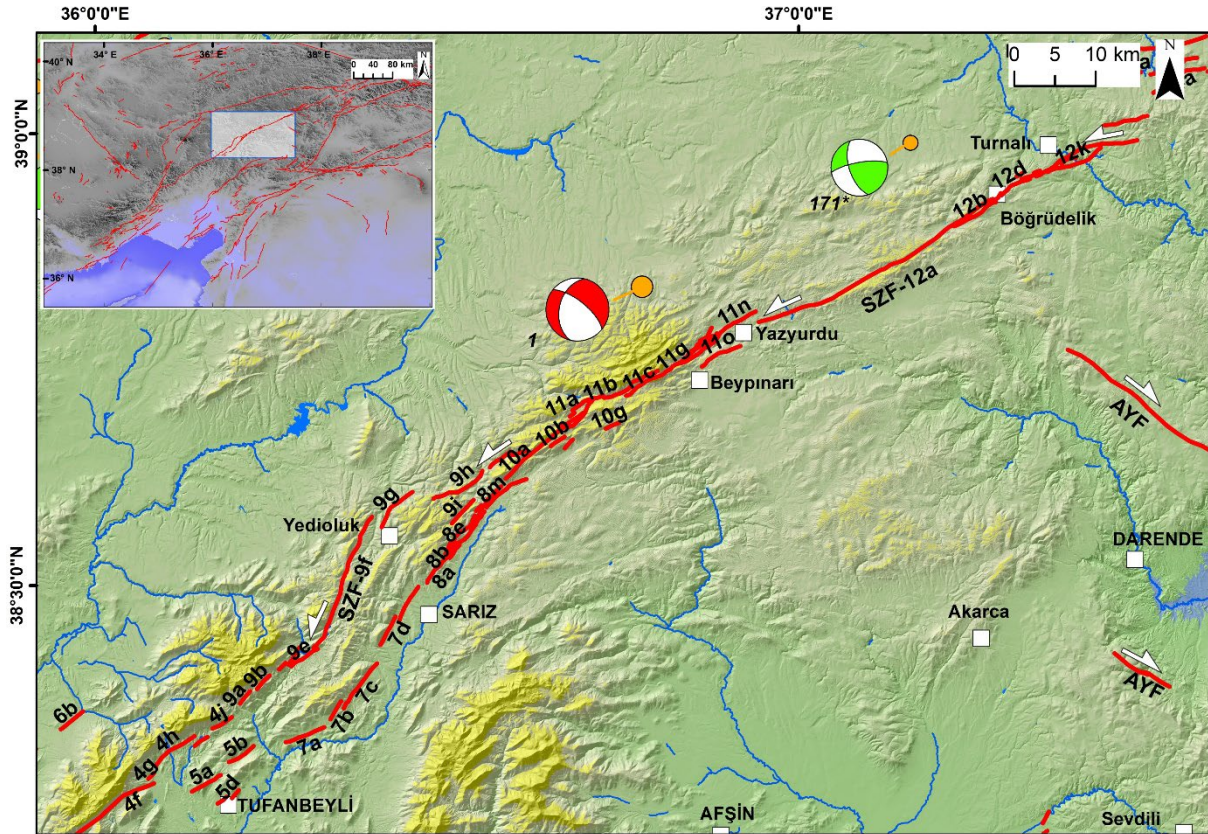


Figure A15. Segment distribution of the Sarız Fault (SZF) between Tufanbeyli and Turnalı. See Appendix B for the details of focal mechanism solutions. For detailed morphotectonic features and locations of the settlements mentioned in the text, see e-suppl.- SZF in Appendix C. AYF: Ayvalı Fault.

The segment SZF-11c displaced the crests and a well-developed fracture system is easily distinguished along the segments SZF-11d_f where a sharp left-lateral shifting of 25 m is measured. A great bend on the Kındıralık Dere along the segment SZF-11n indicates a left-lateral movement at the north of Yazyurdu. In detail, sharp 60 m and 20 m displacements are measured on the Kındıralık Dere by using Google Earth image. A Pliocene basaltic unit is left-laterally displaced along the segment SZF-11o between Beypınarı and Yazyurdu (Figure A15; e-suppl.-SZF in Appendix C).

The length of segment SZF-12a is 32 km between Yazyurdu and Böğürdelik. It can be easily followed on the Google Earth image due to the well-developed fracture system in the limestone outcrop. The left-lateral diversion along this segment is measured as 260 m on Dikenliyurt Dere. The SZF-12b_k are the en-echelon segments. A remarkable left-lateral total displacement of 1866 m on the Tohma Çayı is measured at the southeast of Turnalı. This amount is shared by the segments SZF-12h (611 m), SZF-12j (490 m), SZF-12k (765 m) (Figure A15; e-suppl.-SZF in Appendix C).

The northeast end of SZF is composed of three en echelon NE-SW trending branches between Kızıleniş to Divriği before joining to the Kemah - İliç Fault (KIF) described earlier.

The segments of SZF-15a_b, SZF-16a_e, SZF-17a_d, SZF-18a_c constitutes the northeastern branch. The middle branch is composed of the segments SZF-14a_d, SZF-19a_d and SZF-20a_b. The southeastern branch is located between Ürük and Divriği and is composed of the segments SZF-19e_g, SZF-20c_j (Figure A16; e-suppl.-SZF in Appendix C).

The regional left-lateral displacement on the Kalkım Dere at the south of Kalkım is a significant morphological evidence. The direct measurements on the course of Kalkım Dere are 470 m and 710 m along the segments SZF-17a and SZF-17c respectively. The overall regional shifting is much higher than these values (approximately 3115 m) (Figure A16; e-suppl.-SZF in Appendix C).

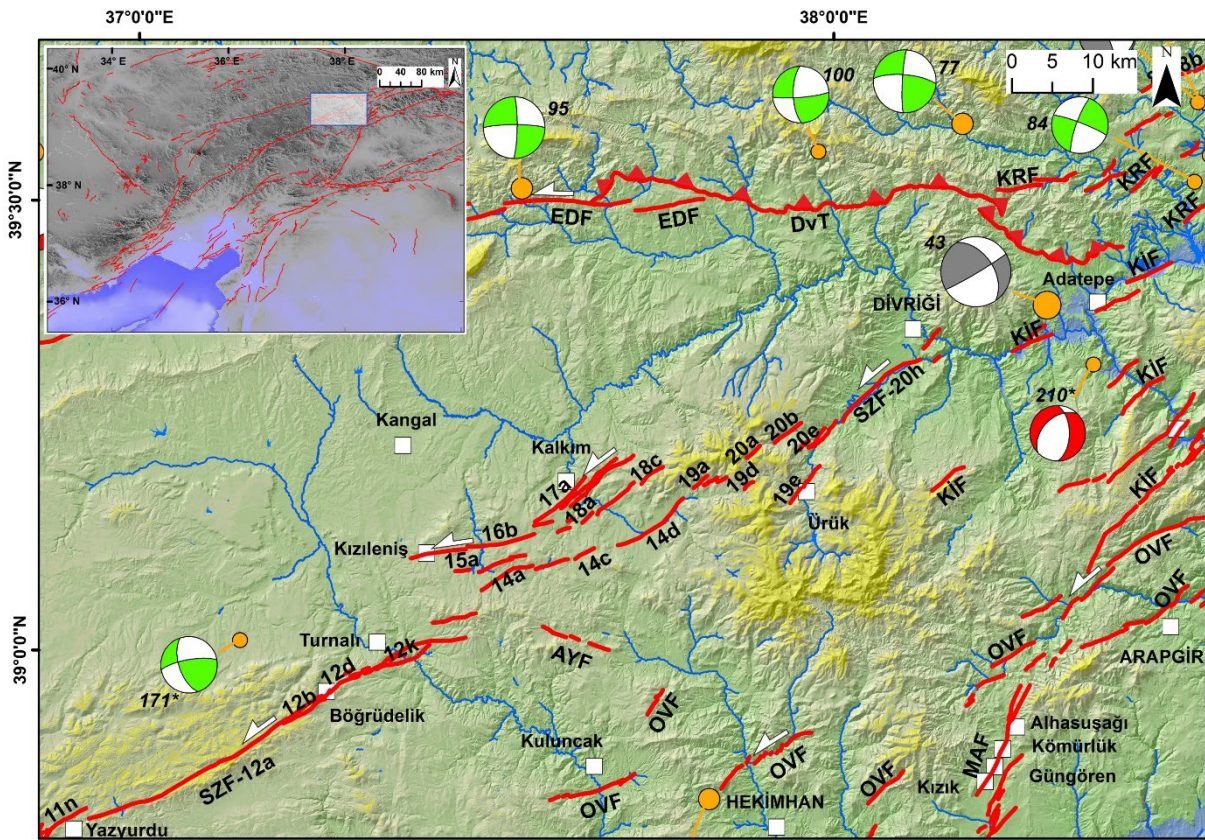


Figure A16. Segment distribution of the Sarız Fault (SZF) between Divriği and Yazıurdu. See Appendix B for the details of focal mechanism solutions. For detailed morphotectonic features and locations of the settlements mentioned in the text, see e-suppl.- SZF in Appendix C. EDF: Ecemiş-Deliler Fault; DvT: Divriği Thrust; KRF: Karaca Fault; KIF: Kemah – İliç Fault; OVF: Ovacık Fault; AYF: Ayvalı Fault; MAF: Malatya Fault.

Details of the Ovacık Fault (OVF)

The southeast of Erzinan Plain is the connection area between the right-lateral NAFZ and the left-lateral strike-slip Ovacık Fault (OVF) (Figure A17). It is at the same time, the northern

corner of Kiğı rhomboidal cell and the thrust-related seismic events are reported at the north of Pülümür (Seyitoğlu et al., 2018).

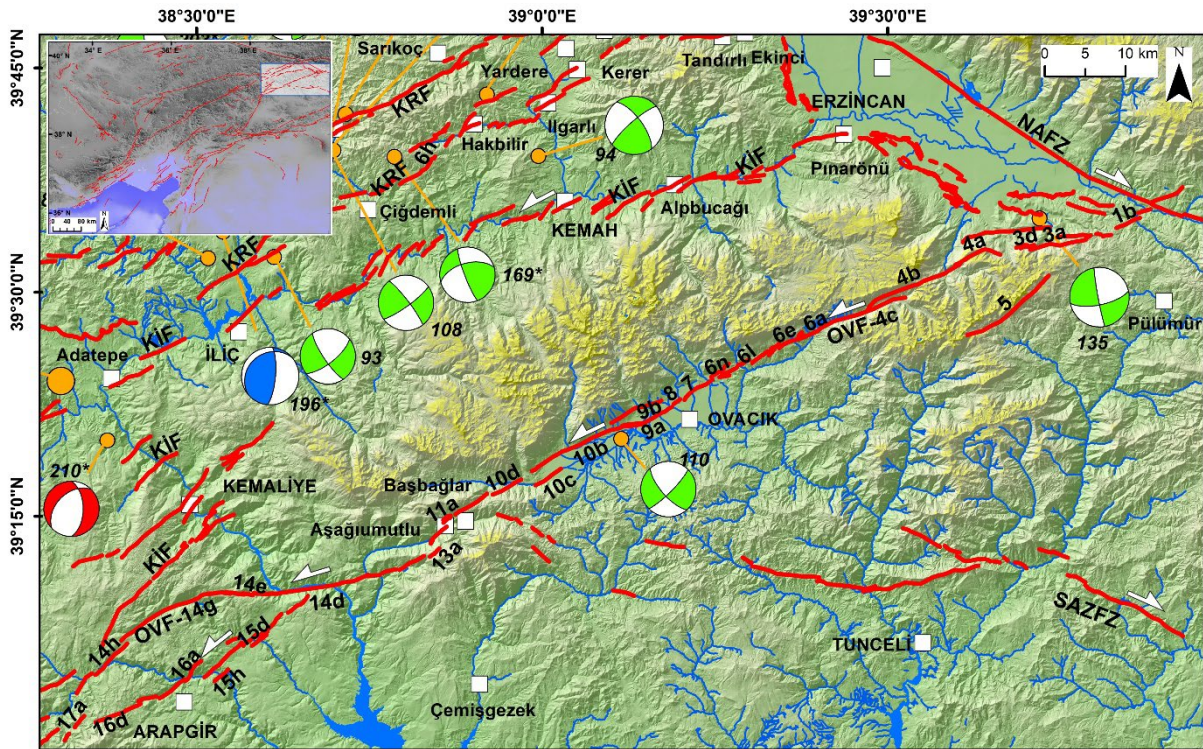


Figure A17. Segment distribution of the Ovacık Fault (OVF) between Erzincan Plain and Arapgir. See Appendix B for the details of focal mechanism solutions. For detailed morphotectonic features and locations of the settlements mentioned in the text, see e-suppl.-OVF in Appendix C. KRF: Karaca Fault; KİF: Kemah-İliç Fault; NAFZ: North Anatolian Fault Zone; SAZYZ: South Anatolian - Zagros Fault Zone.

The segments OVF-1a_b are located in the linear valleys as en echelon segments between Fırat River and Kırkmeşe village at the SE of Erzincan (Figure A17; e-suppl.-OVF in Appendix C).

The segment OVF-2a mainly follows linear springs and the OVF-2b creates sharp diversion of the stream. The segment OVF-3a follows linear valleys and steep slopes. A sag pond is created along the segment OVF-3b. A topographical through at the south of Kalecik and Gürlevik is traceable to the south of Tatlısu where the segment OVF-3c is located. In this point, the OVF is bending towards southwest. The OVF-3d and -3e are semi-parallel short segments. The focal mechanism solution of the seismic event #135_2016.12.16 (M=4.4) confirms the existence of left-lateral OVF's segments in the southeast of Erzincan Plain (Figure A17; Appendix B; e-suppl.-OVF in Appendix C).

At the near to the peak of Bakıl Dağı, the segment OVF-4a has an arc shape. The en echelon segment OVF-4b creates a sharp left bending on Mek Dere. The OVF-4b follows the

ENE-WSW trending linear valley and the spring locations on the northwestern slope guide us to follow the fault trace. The segments OVF-4b and OVF-4c are located on a topographic through between Mercan and Avcı mountains. The segment OVF-5 is located on the major topographical difference at the southeast slope of Hel Tepe (Figure A17; e-suppl.-OVF in Appendix C).

The Ovacık Fault is composed of several NE-SW trending, en echelon, short segments between Şahverdi and Gözeler (OVF-6 a_r) and their traces can easily be observed on the Google Earth images (e-suppl.-OVF in Appendix C). The segment OVF-7 clearly cuts the Quaternary alluvial fans at the southwest of Gözeler. Same feature is observed along the segment OVF-8 at the north and northeast of Paşadüzü village. In the west of Paşadüzü, the segment OVF-9a cuts the Quaternary alluvial fan and the segment OVF-9b bends Karagöl stream left laterally at the west-southwest of Köşeler. The en echelon segments are located between Koyungölü and Eğripınar (OVF-10a_b). The focal mechanism solution of the seismic event #110_2011.12.03 (M=4.0) confirms the left-lateral strike-slip nature of this segment. In the south of Eğripınar and Hayıroğlu, other en echelon segments of OVF-10c_e are located (Figure A17; Appendix B; e-suppl.-OVF in Appendix C).

In the west of Başbağlar, the en echelon segments of OVF-11a and -11b are in the semi-parallel position to the segments OVF-12a_c that creates a left-lateral shifting of the Barasor Çayı valley at Aşağıumutlu. The en-echelon segments OVF-13a_b, OVF-14a_j mainly follow the route of Emre et al. (2012a) in which prominent left-lateral displacements have been measured. For example, 300 m displacement in Çerme Dere along the segment OVF-14b; 1500 m shifting on Tirnik Çayı along the OVF-14c; 6500 m translation in Fırat River along the segment OVF-14d are measured. The left bending of Viran Çay along the OVF-14g and that of Angu Çayı along the OVF-14h are important morphological features (Figure A17; e-suppl.-OVF in Appendix C). The en echelon segment of OVF-14i controls the southwesterly position of Pertek Çayı at the northwest of Çiğnir. Another en echelon segment OVF-14j probably causes left bending of Kuzukıran Dere at the south of Eynir (Figure A17; e-suppl.-OVF in Appendix C). We also determine the NE-SW trending Soylu Block that is a wooden shuttle shape structure resembles the Almacık Block in the NAFZ around Bolu (Şengör et al., 1985; Seyitoğlu et al., 2015) in Soylu Dağı. Its southeast margin is composed of segments OVF-15a_h, OVF-16a_d. Along these segments, 1200 m and 2300 m left-lateral total offsets are measured on the Viran Çayı and Kozluk Çayı, respectively (Figures A17 and A18; e-suppl.-OVF in Appendix C).

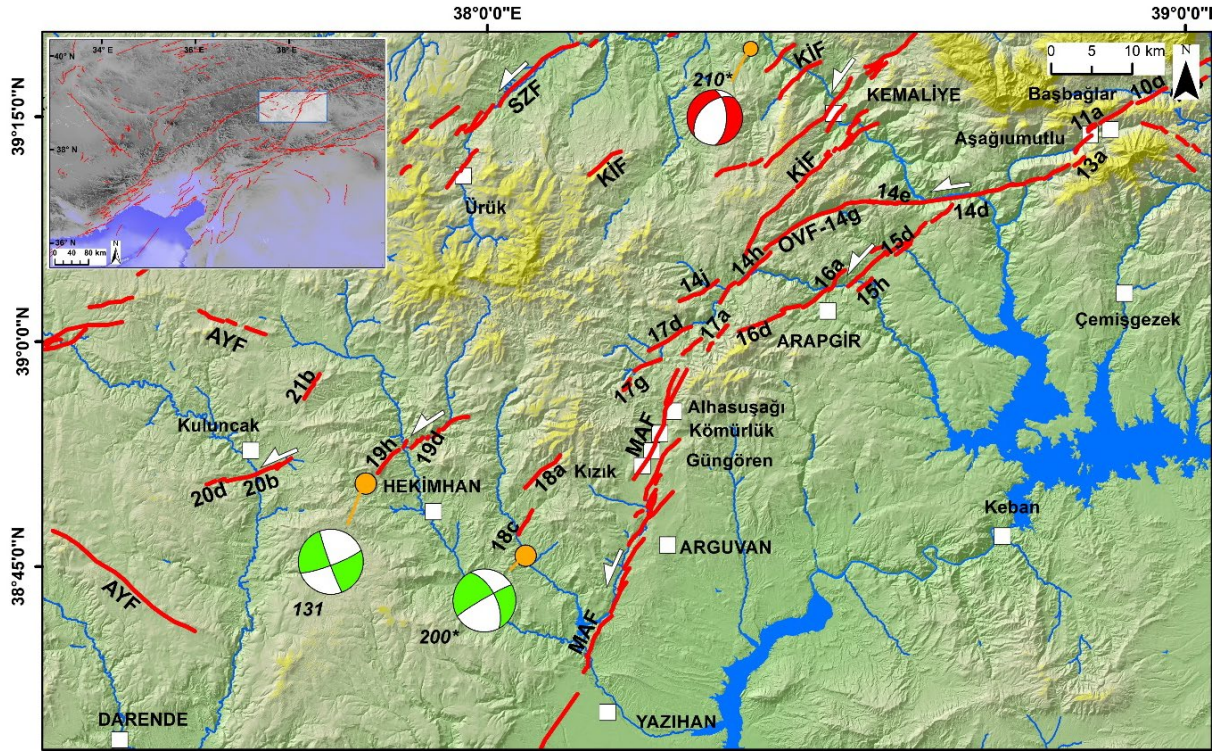


Figure A18. Segment distribution of the Ovacık Fault (OVF) between Arapgir and Hekimhan. See Appendix B for the details of focal mechanism solutions. For detailed morphotectonic features and locations of the settlements mentioned in the text, see e-suppl.- OVF in Appendix C. SZF: Sarız Fault; KRF: Karaca Fault; KİF: Kemah-İliç Fault; MAF: Malatya Fault.

The en echelon segments OVF-17a_g indicate that the Ovacık Fault continues towards southwest where the NW-SE trending volcanic centers are still recognizable on the Google Earth Images (red circles at the e-suppl.-OVF in Appendix C). The Ovacık Fault terminates with the en echelon short segments which are located on the east, northeast, north and northwest of Hekimhan (segments OVF-18a_c; OVF-19a_h; OVF-20a_d; OVF-21a_b) and they are responsible for the seismic activity in the area. The focal mechanism solutions of the seismic events #200*_2019.03.25 (ML=4.7) and #131_2015.11.29 (Mw=4.9) confirm that the NE-SW trending segments of OVF are left-lateral strike-slip in nature (Figure A18; Appendix B; e-suppl-OVF in Appendix C).

Details of the Malatya Fault (MAF)

The Malatya Fault starts in the north of Alhasuşağı and has NNE-SSW strike which is different than the NE-SW trending Ovacık Fault (Figure A19). The two segments MAF-1a and MAF-1b are nearly parallel to each other and the longest one is the segment MAF-1a mainly following the same route with Emre et al. (2012a). It constitutes northwest margin of a releasing offset in

which Kızık, Güngören and Kömürlük villages are located (Figure A19; e-suppl.-MAF in Appendix C).

Our segment distribution between the north of Arguvan and Fethiye roughly follows the route of Emre et al. (2012b), but in detail, they are quite different (MAF-2a_e; MAF-3a_d; MAF-4a_c) (Figure A20). Our segments are relatively short and NE-SW trending rather than the NNE trending long continuous segments of Emre et al. (2012b). There are limited or no sign of strike-slip faulting between Fethiye and west of Mısırdere, therefore segment MAF-5 is signed with question mark (Figure A20). Between west of Tohma and Doğanşehir, however, strong morphological indicators (i.e., elongated ridges, displaced streams, topographic troughs) help to locate Malatya Fault (MAF-6a_b; MAF-7a_d; MAF-8a_d) where the slip rates were obtained (1.12 mm/yr, Sançar et al., 2020) (Figures A19 and A20; e-suppl.-MAF in Appendix C).

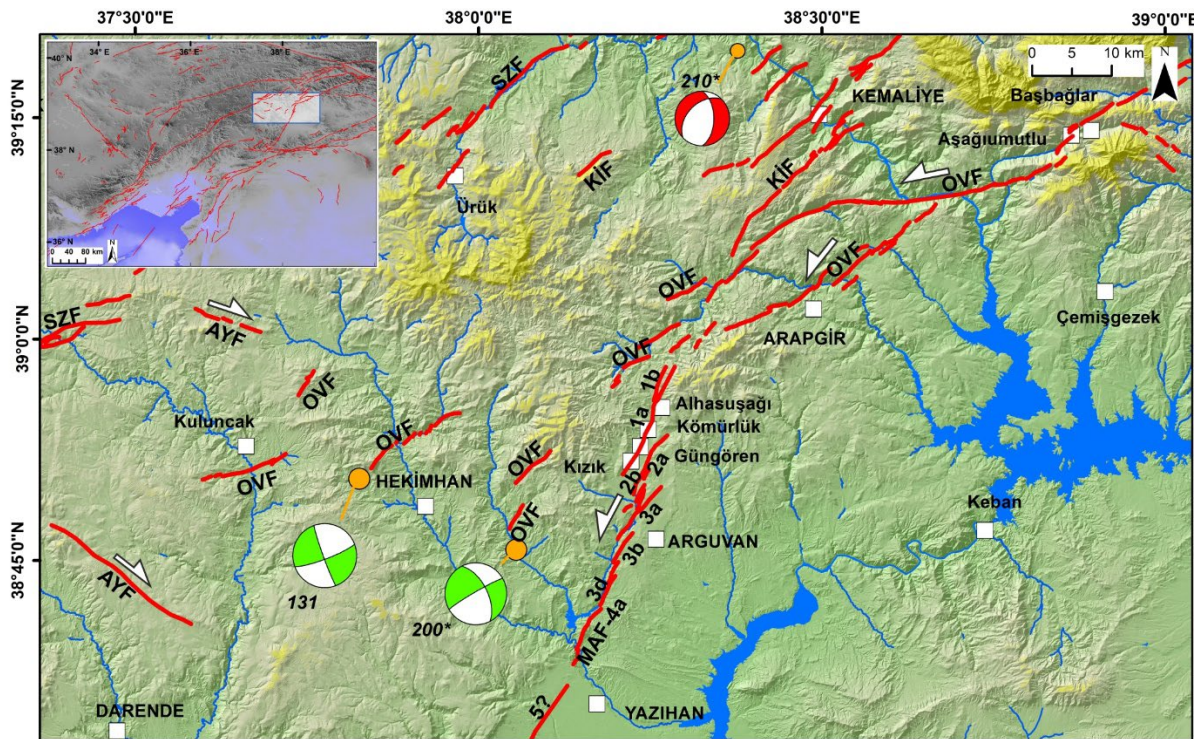


Figure A19. Segment distribution of the Malatya Fault (MAF) around Arguvan and Yazlıhan. See Appendix B for the details of focal mechanism solutions. For detailed morphotectonic features and locations of the settlements mentioned in the text, see e-suppl.-MAF in Appendix C. OVF: Ovacık Fault.

The MAF starts to bend towards southwest and bifurcates around İkinciler village (Figure A20). One branch follows linear valleys and ridges at the north of Dedeyazı (MAF-9a_g). The other branch continues towards southwest via Karaterzi and Elmalı (MAF-10a_h; MAF-11a_g).

The MAF is bending from the NE-SW to E-W direction (MAF-11h_j). Similarly, the segments MAF-12a_e and MAF-13a_e show the restraining bend between Tatlar and Nurhak (Figure A20; e-suppl.-MAF in Appendix C). The MAF ends with at the east of Barış village with the segment MAF-13e probably triggering a huge elliptical landslide (1850 m x 1100 m) threatening the Nurhak -Elbistan road (Figure A20; e-suppl.-MAF in Appendix C).

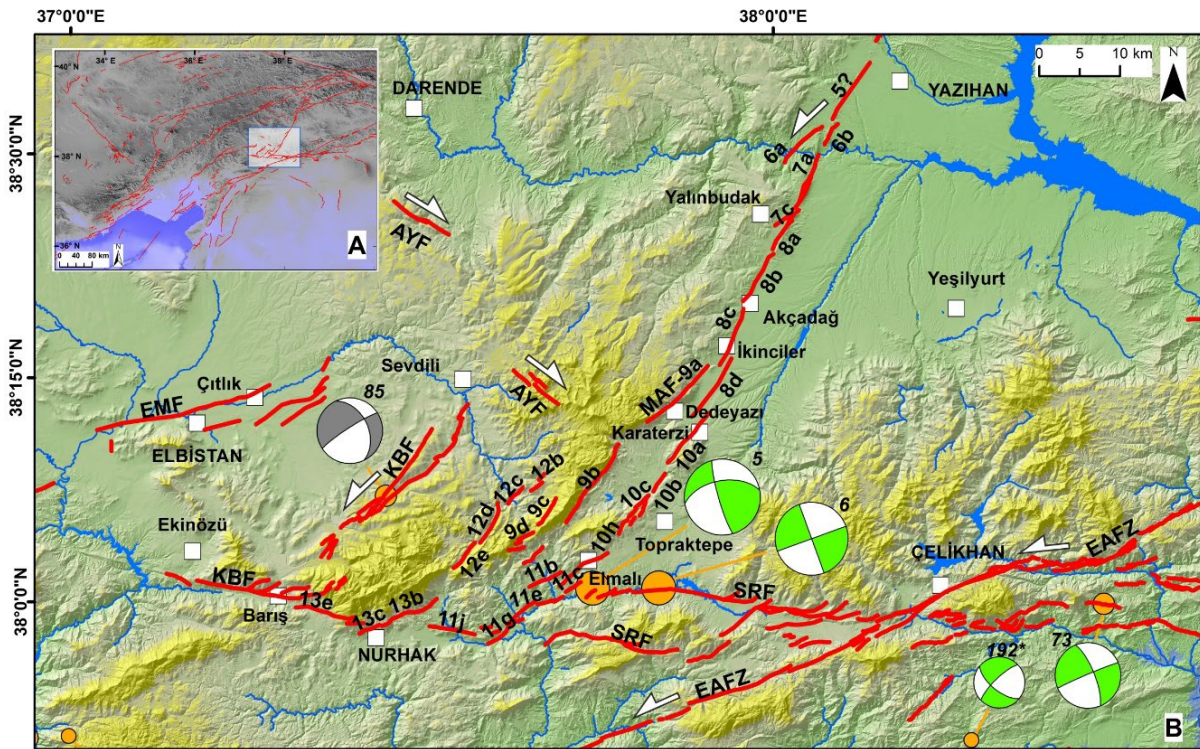


Figure A20. Segment distribution of the Malatya Fault (MAF) around Nurhak and Akçadağ. See Appendix B for the details of focal mechanism solutions. For detailed morphotectonic features and locations of the settlements mentioned in the text, see e-suppl.-MAF in Appendix C. AYF: Ayvalı Fault; EMF: Elbistan-Misis Fault; KBF: Kantarma-Barış Fault; The East Anatolian Fault Zone (EAFZ) from Emre et al. (2013).

Details of the Sürgü Fault (SRF)

The role of SRF is to provide a connection between the EAFZ and the MAF (Figure A21). There are different views about the character of the fault. It is evaluated as a right-lateral strike-slip fault (Koç and Kaymakçı, 2013), but Emre et al. (2013) show as a left-lateral strike-slip fault. The general mapped position of the fault is an E-W trending single line, probably drawn under the influence of the prominent linear ridge at the north of Kurucaova at the southwest of Çelikhan (Emre et al., 2013). However, our segment distribution (SRF-1 - SRF-5) indicates that the tectonic style of SRF mimics the southwest end of MAF and shows curvilinear segments bending from NE-SW to E-W direction (Figure A21; e-suppl.-SRF in Appendix C).

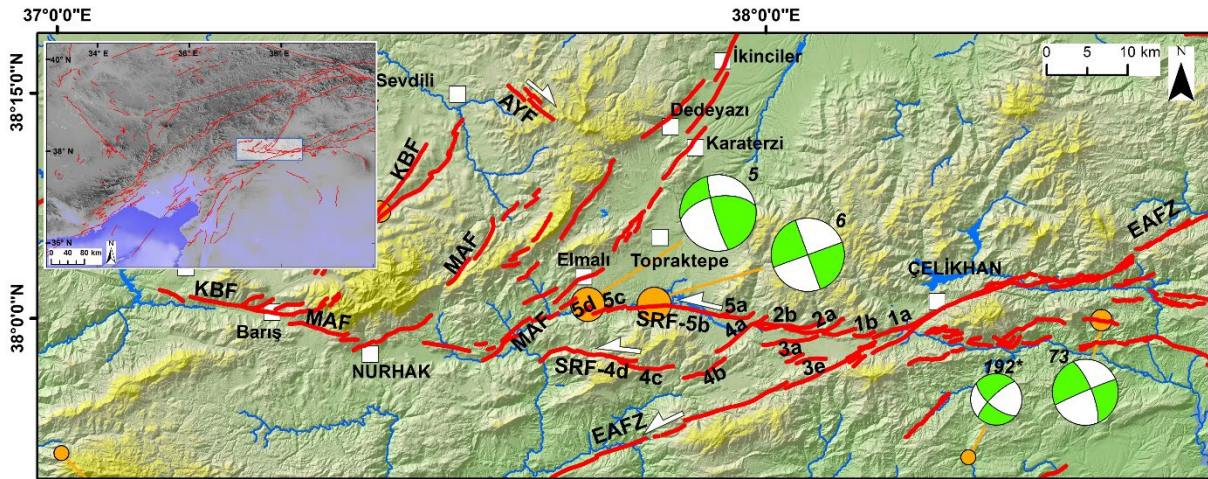


Figure A21. Segment distribution of the Sürgü Fault (SRF) between Çelikhan and Elmalı. See Appendix B for the details of focal mechanism solutions. For detailed morphotectonic features and locations of the settlements mentioned in the text, see e-suppl.-SRF in Appendix C. MAF: Malatya Fault. The East Anatolian Fault Zone (EAFZ) from Emre et al. (2013).

These segments also control the actual route of Kuruçay in the northeast of Reşadiye and in the south of Sürgü where 1100 m and 1000 m left-lateral shifts are measured along the SRF-3a and the SRF-4a, respectively. The style of segments also creates lens shaped block surrounded by the strike-slip faults (SRF-4a_d and SRF-5a_d) (Figure A21; e-suppl.-SRF in Appendix C). The left-lateral strike-slip focal mechanism solutions of the seismic events #5_1986.05.05 (mb=6.0) and #6_1986.06.06 (mb=5.7) support the observed morphological data (Figure A21; e-suppl.-SRF in Appendix C).

Details of the Kantarma-Barış Fault (KBF)

Kantarma-Barış Fault (KBF) is a right stepping branch between Malatya Fault (MAF) and Elbistan-Misis Fault (EMF) (Figure A22). Its segments can easily be followed in the Google Earth images due to brittle limestone unit in the region (e-suppl.-KBF in Appendix C). The segment KBF-1a_e is mainly following the linear valleys whereas the discontinuities created on the limestone unit by the segments KBF-2a_e and KBF-3a_d are obvious. In the north of Barış, the segments (KBF-5, KBF-6 and KBF-7) become curvilinear as in the case of southwest end of Malatya Fault (MAF) (Figure A22; e-suppl.-KBF in Appendix C).

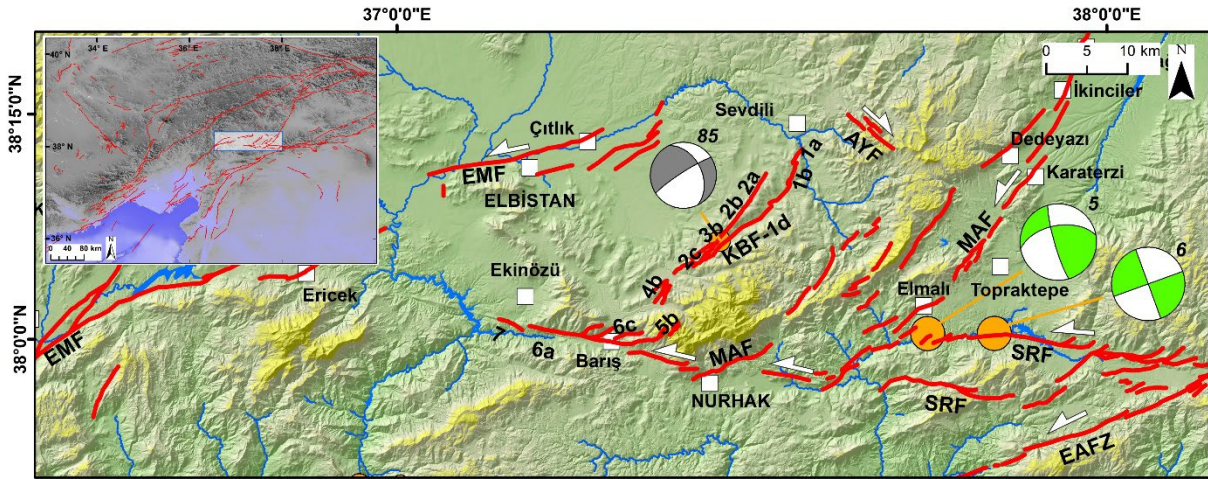


Figure A22. Segment distribution of the Kantarma-Bariş Fault (KBF). See Appendix B for the details of focal mechanism solutions. For detailed morphotectonic features and locations of the settlements mentioned in the text, see e-suppl.- KBF in Appendix C. EMF: Elbistan-Misis Fault; MAF: Malatya Fault; SRF: Sürgü Fault; EAFZ: East Anatolian Fault Zone.

Details of the Elbistan - Misis Fault (EMF)

The southeast margin of Elbistan plain is controlled by the left-lateral segments of EMF-1a_e, EMF-2a. Especially multiple left-lateral displacements of the stream channels along a single segment are noteworthy (Figure A23; e-suppl.-EMF in Appendix C).

The segment EMF-1d creates both 650 m left-lateral displacement on Ekinlik Dere and left bending of Öziçi Dere. The segment EMF-1c causes both 600 m left-lateral shifting on Öziçi Dere and a 500 m left-lateral diversion on Keykirli Dere. The left-lateral diversions on the route of Tilsuyu (170 m) and on the Ceyhan River (550 m) at the city center of Elbistan are created along the segment EMF-1e. Several small creeks of the Söğütlü Çayı are left-laterally shifted that are measured 960 m, 580 m, 325 m from the northeast to southwest between Çıtlık and Elbistan along the segment EMF-2a (Figure A23; e-suppl.-EMF in Appendix C).

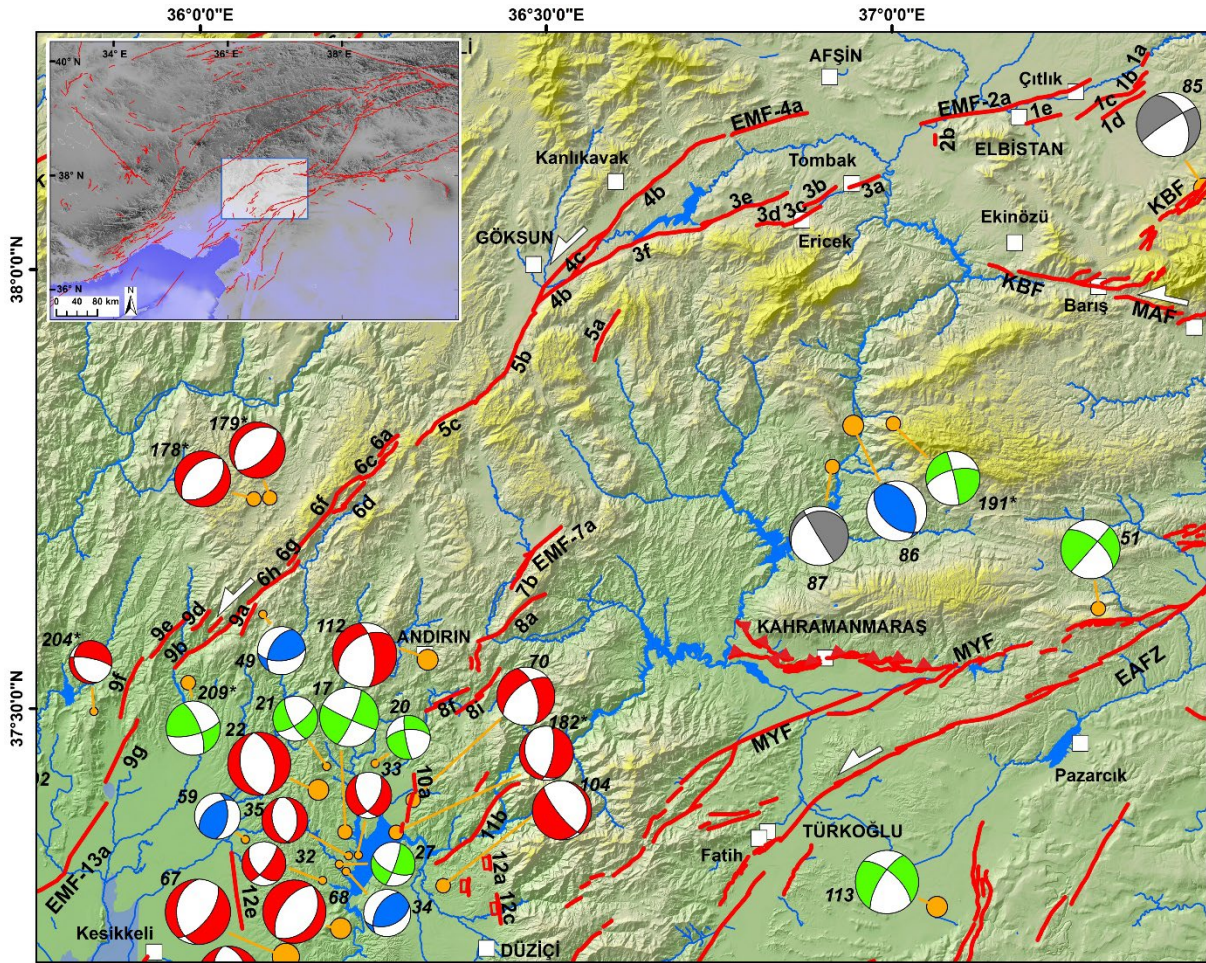


Figure A23. Segment distribution of the Elbistan-Misis Fault (EMF) between Elbistan and Andırın. See Appendix B for the details of focal mechanism solutions. For detailed morphotectonic features and locations of the settlements mentioned in the text, see e-suppl.- EMF in Appendix C. KBF: Kantarma-Bariş Fault; MAF: Malatya Fault; MYF: Maraş-Yumurtalık Fault. The East Anatolian Fault Zone (EAFZ) from Emre et al. (2013).

The segments EMF-2a and EMF-3a create a releasing offset where the Kalealtı Plain is developed and the segment EMF-2b is probably a normal fault. Further to southwest, the segments EMF-3a and EMF-3b create a pressure ridge (Tandırılık Tepe) at the southwest of Tombak village. The NE-SW striking segments (EMF-3a_c) are bending around Ericek and they become ENE-WSW trending (EMF-3c_d). However, NE-SW trend is maintained by EMF-3e and EMF-3f between the Çardak and Karahmet which merge with the other branch (EMF-4a_c) at the southeast of Göksun (Figure A23; e-suppl.-EMF in Appendix C).

Further to southwest, some of our segments partly correspond to the Savrun Fault of Emre et al. (2012c; 2012d) and reach to north of the Ceyhan Plain (EMF-5b_c; EMF-6a_h; EMF-9a_g). In the northeast and east of Andırın, the drainage is controlled by the N-NE trending segments (i.e., EMF-7a_b and Korsulu Dere; EMF-8h_i and Ulusu Dere). Moreover, in the east of Andırın, the segments EMF-8b_e indicate the normal faults developed in the releasing stepover between the strike-slip faults (EMF-8a and EMF-8f_i). The nearly N-S trending

normal fault related focal mechanism solution of the seismic event #112_2012.07.22 (mb=5.0) supports this evaluation (Figure A23; Appendix B; e-suppl.-EMF in Appendix C).

Our segmentation of the EMF in Ceyhan Plain is quite different than the existing N-S trending left-lateral faulting approach (see Misis Fault of Emre et al., 2013). Our careful examination of the Google Earth images indicates that the systematic displacements on the current drainage or abandoned drainage can be used to locate active fault segments such as EMF-13a, EMF-13b, EMF-14a, EMF-15a which can easily be controlled by the future seismic reflection studies (Figure A24-A; e-suppl.-EMF in Appendix C).

In detail, the drainage system in Ceyhan Plain demonstrates that the plain dissected by the NE-SW trending left-lateral strike-slip segments showing left-lateral diversions on the stream channels. For example; left-lateral shifting on epelce Dere (585 m) at dud and on Gmş Dere (225 m) at Sađkaya along the EMF-13a; a left bending on Soysallı Dere and a 525 m left-lateral diversion on Krveli Dere at the south of Tumlu along the EMF-13b; the left-lateral diversions on Ceyhan River (1850 m) at İnceyer, on Han Dere (300 m) at Kırıklı, on Hzarlı Dere (550 m) at Bykburhaniye, on Baklalı Dere (240 m) at the east of Baklalı along the EMF-14a; the left-lateral deflection on Ceyhan River (2150 m) at Kesikkeli, on the abandoned Ceyhan River channel (1700 m) at Karakayalı along the EMF-15a are measured (Figure A24-A; e-suppl.-EMF in Appendix C).

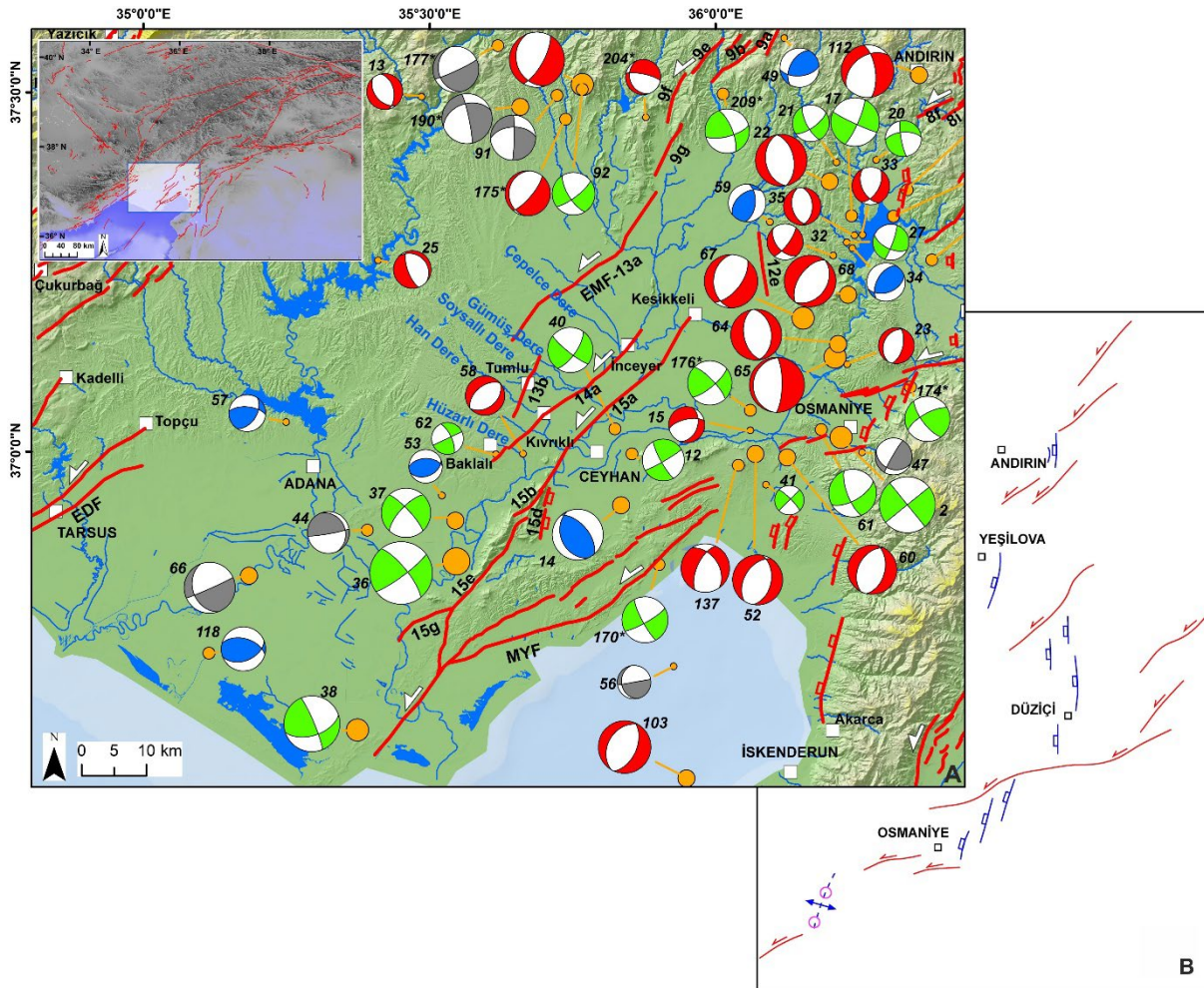


Figure A24. A) Segment distribution of the Elbistan-Misis Fault (EMF) around Ceyhan. See Appendix B for the details of focal mechanism solutions. For detailed morphotectonic features and locations of the settlements mentioned in the text, see e-suppl.- EMF in Appendix C. **B)** Simplified tectonic style between Osmaniye and Andirın. NE-SW trending left-lateral strike-slip faults create releasing stepovers where nearly N-S trending normal faults developed. Pink circles are the cones of basaltic volcanism, blue double arrows represent the extensional direction (e-suppl.-MYF in Appendix C). MYF: Maraş-Yumurtalık Fault. The East Anatolian Fault Zone (EAFZ) from Emre et al. (2013).

In the southwest and northeast of Ceyhan, the seismic events (#36_1998.06.27, $M=6.2$; #40_1999.01.15, $M=4.1$) indicate clearly NE-SW trending left-lateral strike-slip faulting which can be related to the segments EMF-15a, -15b and EMF-15d. Further to south these segments are joining to the MYF (Figure A24-A; Appendix B; e-suppl.-EMF in Appendix C).

The focal mechanism solutions of the earthquakes in Figure A24-A give a clue about the neotectonic style applicable to the Ceyhan, Osmaniye, Düziçi, Yeşilova and Dörtöyl plains where the N-S trending normal faults (i.e., EMF-10a_c, EMF-12 a_e) developed in the releasing stepovers between NE-SW left-lateral strike-slip faults (i.e., EMF-11a_b, MYF) (Figure A24-B; e-suppl.-EMF in Appendix C).

Details of the Maraş-Yumurtalık Fault (MYF)

We present a new fault that is separated from the EAFZ at the northeast of Kahramanmaraş and reaches to the Yumurtalık-Karataş via Osmaniye including Karataş and Yumurtalık faults of Emre and Duman (2011a).

The segment MYF-1a is separated from the EAFZ between Sakarkaya and Küçükören where Dokuzçınar Çayı meets with Aksu Çayı (Figure A25; e-suppl.-MYF in Appendix C).

The MYF-1a creates bending on stream channel at Sakarkaya and follows the linear ridge at the southwest of Sakarkaya. MYF-1a causes 125 m left-lateral shift on the Kısık Dere and fractured limestone units help to follow the route in the Google Earth images between Sakarkaya and Büyüknacar villages with en echelon segments (MYF-1a_g). The MYF-2a passes through at the toe of the landslide (1200 m x 400 m) and follows linear valley with en echelon segments (MYF 2a_e) (Figure A25; e-suppl.-MYF in Appendix C).

The NE-SW elongated ridges help to locate segment MYF-3a_b. The segments MYF-3c and MYF-4a are located on the south of Maraş Plain and the MYF-4a creates a sharp left bending on route of Aksu Çayı at the northeast of Selimiye village. The segment enters to the Deliçay valley at Altınova and creates lens shaped topographical high which is surrounded by the segments MYF-4a_f. Moreover, the segment MYF-5a_d creates a distinguished morphology at the north of Türkoğlu which is another possible connection point of MYF with the EAFZ (Figure A25; e-suppl.-MYF in Appendix C).

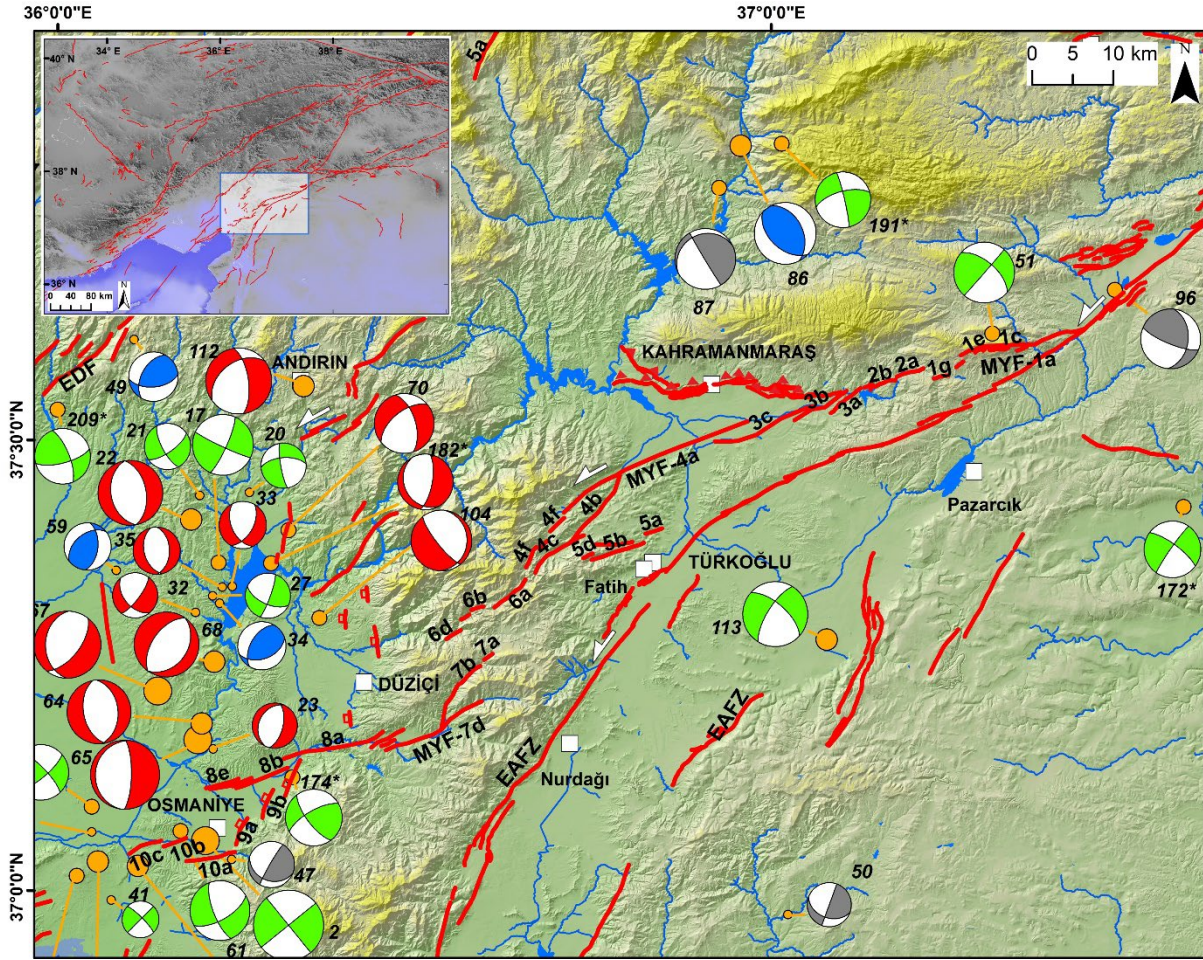


Figure A25. Segment distribution of the northeastern Maraş-Yumurtalık Fault (MYF). See Appendix B for the details of focal mechanism solutions. For detailed morphotectonic features and locations of the settlements mentioned in the text, see e-suppl.- MYF in Appendix C. EMF: Elbistan-Misis Fault; The East Anatolian Fault Zone (EAFZ) from Emre et al. (2013).

Further to southwest, the en echelon segments MYF-6a_d and MYF-7a_c reach to the Bahçe where these segments meet with the releasing bend of MYF-7d controlling the drainage of Akçasu together with the en echelon segments MYF-7e_f creating multiple left-lateral shifting on the route of Akçasu. The major influence on the current route of Akçasu is seen at the north of Osmaniye where the segments (MYF-8a_e) control the river flow. The NNE trending en echelon normal faults (MYF-9a_c) is developed in the releasing stepover between the MYF-8a_e and MYF-10a_c (Figure A25; e-suppl.-MYF in Appendix C).

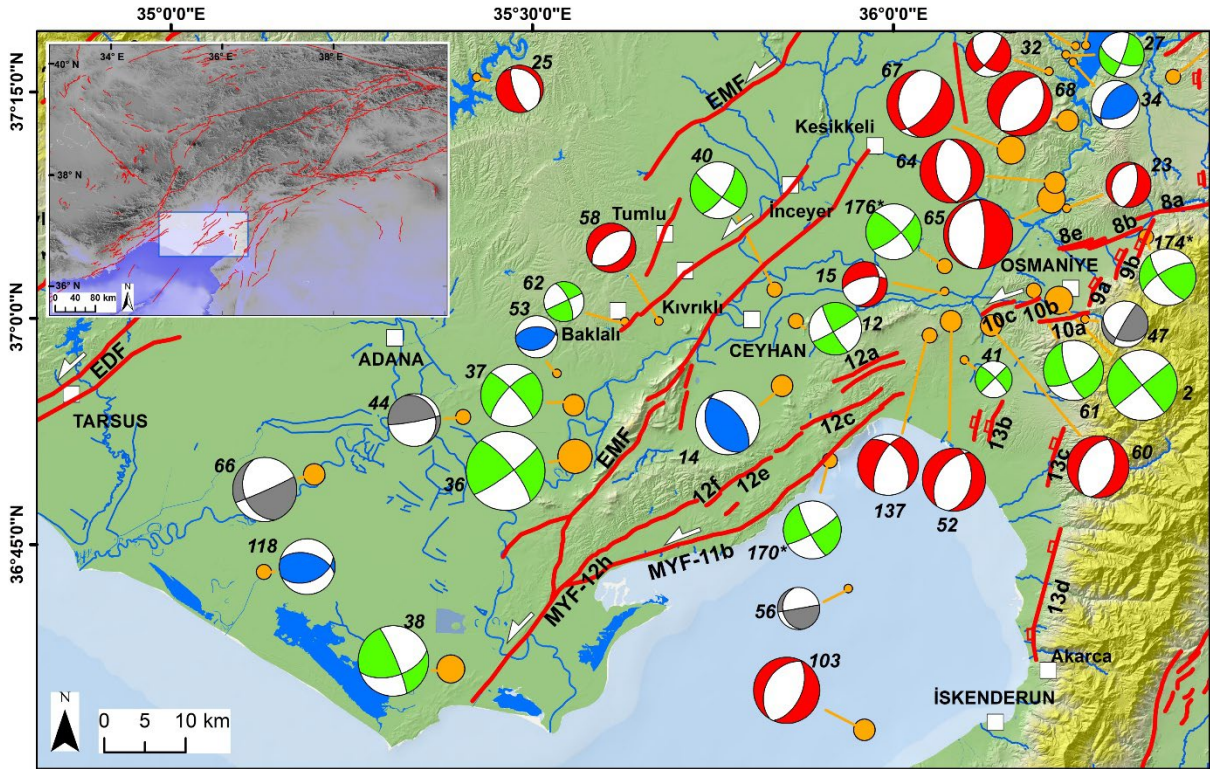


Figure A26. Segment distribution of the southwestern Maraş-Yumurtalık Fault (MYF). See Appendix B for the details of focal mechanism solutions. For detailed morphotectonic features and locations of the settlements mentioned in the text, see e-suppl.- MYF in Appendix C. EMF: Elbistan-Misis Fault; EDF: Ecemiş-Deliler Fault.

A basaltic volcanic dome is located between the Yumurtalık and Karataş faults of Emre and Duman (2011a) which are represented by MYF-11a_b and the MYF-12a_h that they merge to the Elbistan-Misis Fault (EMF) at the north of Kaldırım (Figure A26; e-suppl.-MYF in Appendix C).

Details of the Ayvalı Fault (AYF)

This fault has been mapped by Emre et al. (2012c) as a NW-SE trending right-lateral strike-slip fault. It is located at the southwest of Ayvalı as a single segment (AYF-1), but there are other segments having same direction and character in the 35 km north (AYF-2a_c) and south (AYF-3a_b, AYF-4a_e) which is gathered under the same name. They interpreted as right-lateral X-shears in the left-lateral shear zone of Anatolian Diagonal (Figure A27; e-suppl.-AYF in Appendix C).

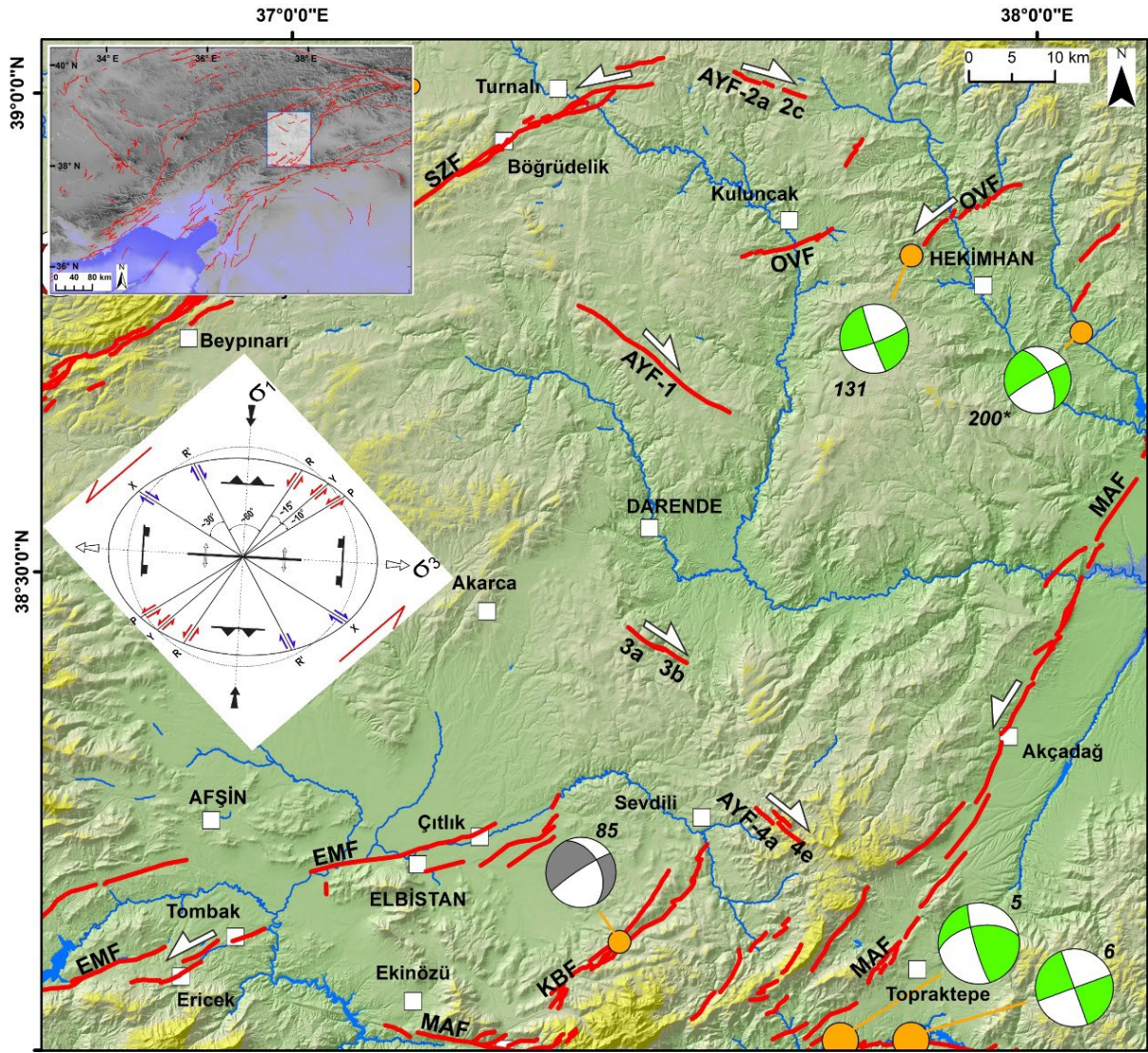


Figure A27. Segment distribution of the Ayvalı Fault (AYF). See Appendix B for the details of focal mechanism solutions. For detailed morphotectonic features and locations of the settlements mentioned in the text, see e-suppl.-AYF in Appendix C. Inset indicates the position of principle stress distributions and secondary structures in a left-lateral shear zone. Note that the position of right-lateral strike-slip AYF corresponds to the X-shear. SZF: Sarız Fault; OVF: Ovacık Fault; EMF: Elbistan-Misis Fault; MAF: Malatya Fault.

Please see the article (<https://doi.org/10.25288/tjb.1015537>) for references list