Hamiel, Y., Katz, O., and Avni, Y., 2022, Migration and localization of faulting near the intersection of the Dead Sea Fault and the Carmel–Gilboa–Faria Fault System: GSA Bulletin, https://doi.org/10.1130/B36361.1.

Supplemental Material

Text. Seismological observations

Figure S1. Topography map showing the area of the current active intersection between the Dead Sea Fault (DSF) and the Carmel-Gilboa-Faria Fault System (CGFS).

Figure S2. The new geological map of the study area.

Figure S3. An Image showing the Wadi Malih Fault (WMF), which ruptures the ancient Wadi Malih alluvial fan.

SEISMOLOGICAL OBSERVATIONS

To understand the subsurface deformation near the intersection zone of the Faria anticline and the Beit She'an Valley we acquired three high resolution seismic reflection profiles (Fig. 2). The seismic lines were placed across the Faria graben in the south (L11) and in northern areas where the young Wadi Malih and Lisan Formations are exposed at the surface. The length of the lines were 3000 m for line L11, 1375 m for lines L12 and L13 and 1000 m for line L14, respectively. Along each seismic line, twelve 10 Hz geophones were placed every five meters. The seismic source wavelet was generated by the Commander-AHV-IV 364 vibroseis truck and recorded simultaneously from all geophones using the Inova-G3 system. The seismic data were processed using the SeisSpace ProMAX Software by Landmark solutions (https://www.landmark.solutions/SeisSpace-ProMAX).

Seismic line L11 (Fig. 7) was acquired across the Faria graben near the Jordan Valley at the southern part of the study area. It shows evidence for blind faults at the two boundaries of the Faria graben. Other lines (L12, L13, L14) were acquired at the northern part of the study area. Seismic line L12 was acquired at the southern part of Beit She'an Valley (Fig. 2C). This profile shows no evidence of faulting at the subsurface (Fig. 12A). In this area, a ~300 m strand of ~30 m "wavy" variations from relatively high to low topography exists, and the subsurface data present a similar strand of folded area. It indicates a zone of wide deformation at shallow layers within the southern part of Beit She'an Valley. Seismic line L13 was acquired near the southern border of Beit She'an Valley. It crosses Wadi Malih and the inferred WMF (Fig. 2C) and shows clear evidence for normal faulting (Fig. 12B). The fault dips to the north toward Beit She'an Valley. Layers at the Footwall block show normal drag-like bending and layers at the hanging wall block dip to the north. Seismic line L14 was acquired at the northernmost part of Faria Anticline and crosses the inferred MF. This profile also shows evidence for faulting (Fig. 12C). Normal faulting component here is probably smaller and the fault zone is wider than in profile L13. The fault-dip here is relatively high, suggesting a combination of normal and strike-slip fault. Overall, we found good agreement between faulting observed at the surface (Figs. 2, 3) and the subsurface (Figs. 7, 12B, 12C) in all seismic lines.

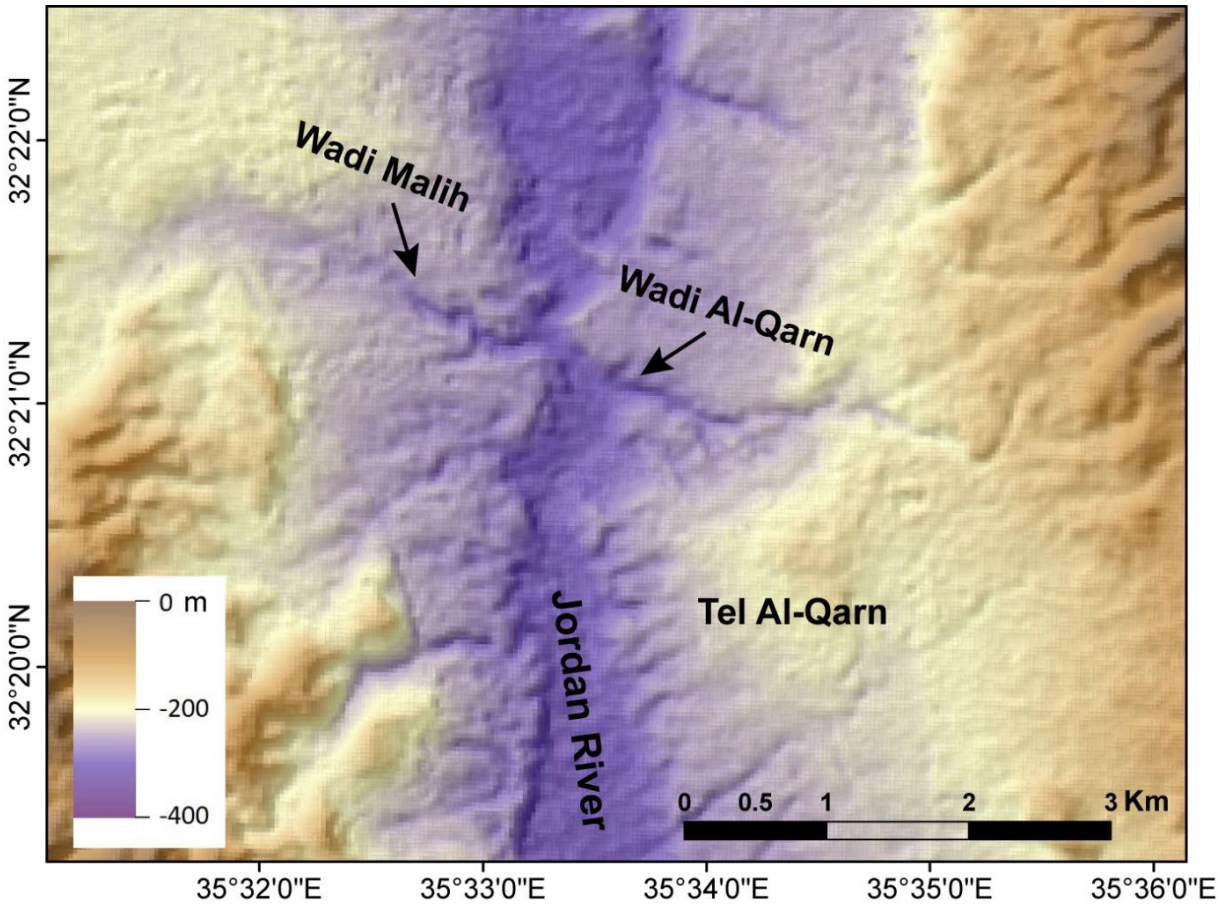

Figure S1. Topography map showing the area of the current active intersection between the Dead Sea Fault (DSF) and the Carmel-Gilboa-Faria Fault System (CGFS). Note the NW-SE lineament that crosses the Jordan Valley and denotes by the Wadi Malih (west to the Jordan River) and the Wadi Al-Qarn (East to the Jordan River). This lineament marks the northern boundary of the Faria Anticline and the easternmost tip of the active CGFS.

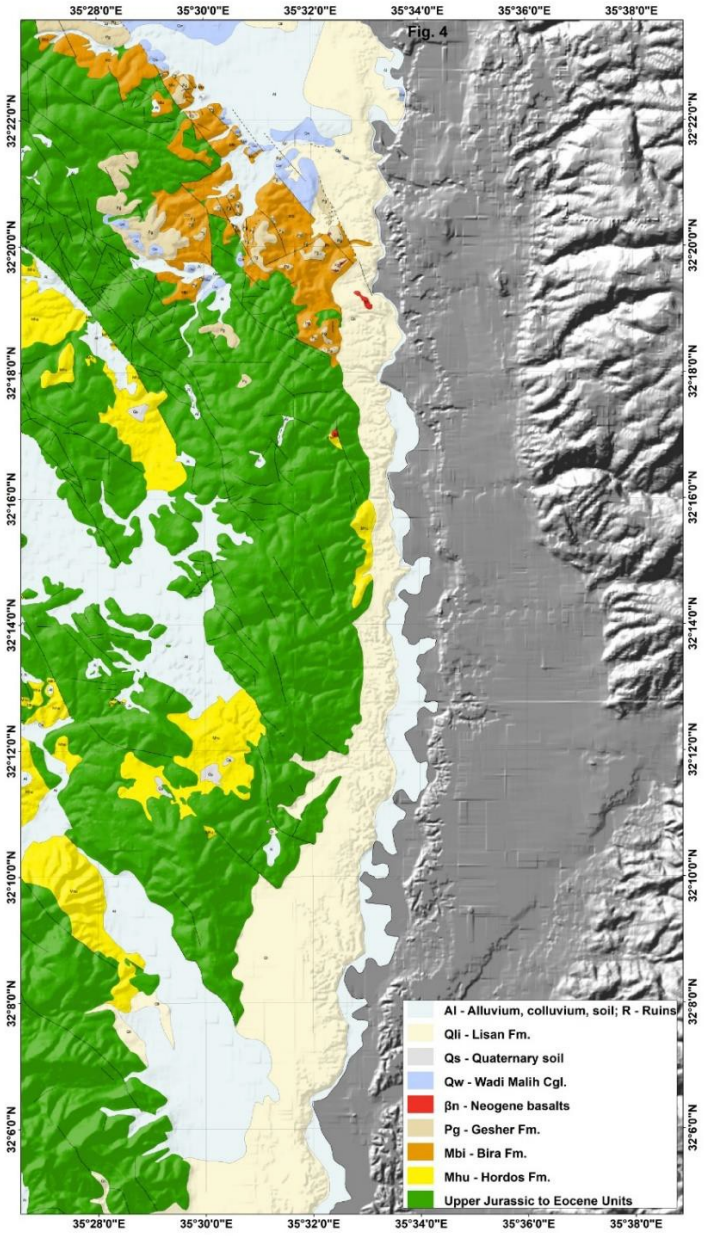

Figure S2. The new geological map of the study area. All pre-Miocene geological units are marked by green color. Note that while the Early-Middle Miocene Hordos Formation is exposed in the southern and central parts of the study area, along NW trending grabens and the eastern flank of the Faria Anticline, the Late Miocene Bira, Late Miocene-Early Pliocene Gesher and Early Pleistocene Wadi Malih Formations are exposed only in the northern part of the study area. The geological units east to the Jordan River (easternmost part of the map) were not mapped.

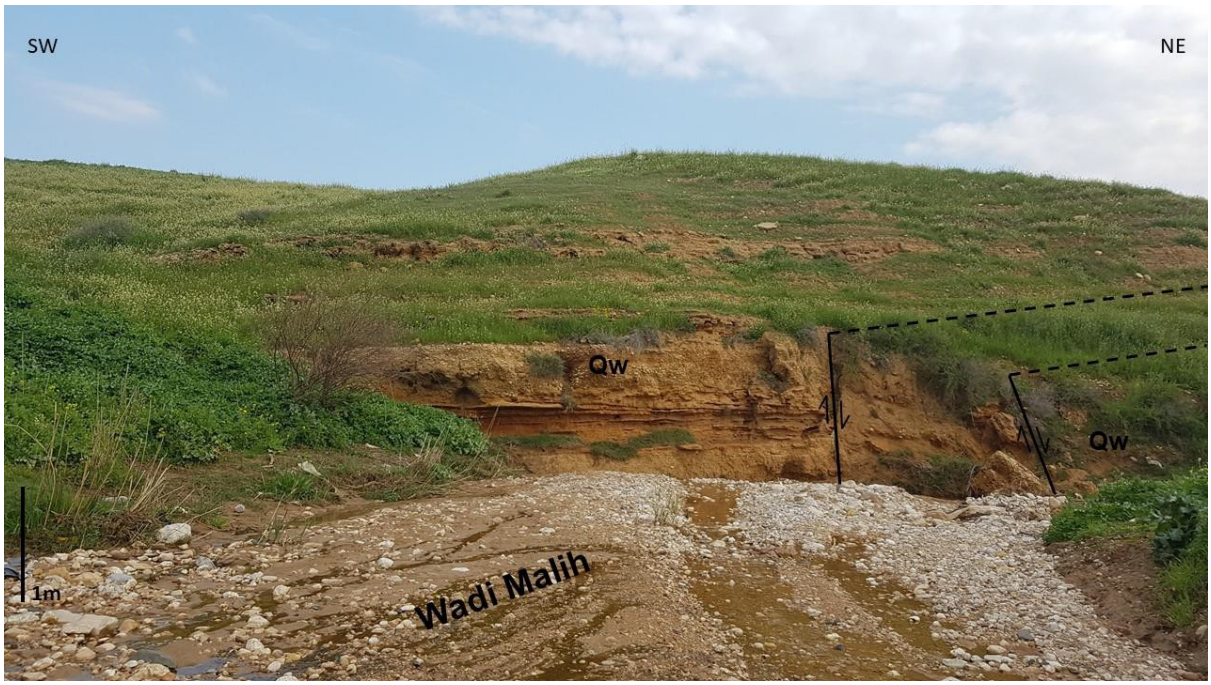

Figure S3. An Image showing the Wadi Malih Fault (WMF), which ruptures the ancient Wadi Malih alluvial fan.