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Initiation of the northern Dead Sea Fault Zone to the present location in southern Turkey

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The left-lateral strike-slip Dead Sea Fault Zone (DSFZ) extends from the Read Sea in south to the East Anatolian Fault Zone (EAFZ) in north. The present trace of the DSFZ bounds the western edge of the Ghab Basin in Syria and continues further north to Turkey. Nearly N-S-trending segment enters Turkey along the western side of the Asi River and further north, it extends through the Amik Basin. Analysis of boreholes data and electrical resistivity profiles across the Amik Basin shows that the present trace of the DSFZ offsets a pre-Quaternary basin sinistrally by about 10 km. Detailed examination of geological and geomorphological evidence observed around the Amik Basin suggests that the northern DSFZ initiated in the present location in the Late Pliocene-Pleistocene. Combination of field evidence with the results of previous studies suggests that the northern DSFZ extended through the Mediterranean Sea and it used the NE-SW-trending Antakya-Samandag corridor until Late Pliocene. A left step-over in the fault zone around the Amik Basin resulted in subsidence where the pre-Quaternary basin beneath the present Amik Basin formed as a pull-apart basin during this phase. At present, the major strand of the DSFZ extends across the Amik Basin in N-S direction and as a result, the Amik Basin has been elongating. Slip on the DSFZ transferred to the EAFZ via the Karasu Fault Zone (KFZ) during the first phase and, at present, the KFZ still transfers the significant amount of slip from DSFZ to the EAFZ.