

FLUID FLOW AROUND FAULTS: FIELD EVIDENCE FOR DILATANCY PUMPING?

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Abstract: Near *Chah-Bahar* on the Makran coast of S.E. Iran, a number of E-W striking normal faults, mainly downthrown to the north, disrupt a flat-lying shale/sandstone sequence exposed in cliffs beneath a flight of Late Pleistocene raised beach deposits. The throw on individual faults, which dip 50-70° north, ranges up to several metres and fault surface striations indicate almost pure dip-slip. Some of the faults, at least, displace the raised beaches.

For about a hundred metres or so each side of the faults, the sediments are cut by innumerable vertical, parallel-striking extension fractures infilled with fibrous gypsum, the most intense development being in the more shaly units. The orientation of these tension gashes indicates that they developed in the same stress field as the normal faults with σ_1 vertical and σ_3 horizontal at right angles to their strike, but nowhere do they cross the faults. A series of clastic sandstone dykes are also developed, initially running parallel to the extension fractures, but then feeding onto the faults.

From the field evidence, the most favoured interpretation for these structures is that the tension gashes developed by pre-failure fracture dilatancy, and that dilatancy collapse at failure led to expulsion of water and the mobilisation of the sandstone dykes. One may infer that the faulting took place at very shallow depths.