



## **Fault-controlled geomorphology and paleoseismology of Fethiye fault and gulf**

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Fethiye gulf is located at the south-westernmost part of the large left-lateral Fethiye-Burdur fault zone. It is modified and controlled by sets of NE – SW trending normal and oblique left-lateral faults. The gulf forms coastlines that are often aligned nearly perpendicular to one another. Coastlines are mainly NE – SW trending and they are inundated by small bays, mainly in NNW-SSE direction. Those directions are comparable to the main mainland fault lines, as measured on outcrops in the area. The brittle features of the area overprint the pre-existing tectonic fabric of low-angle thrusts and pure strike-slip faults. Recent activity of the faults seems to be possible, since there is indication for hangingwall submergence at the “Cleopatra’s bath” site, where an early-Byzantine building complex has been submerged by at least 2 m.

The mainland active fault zone is located S-SE of Fethiye town and it forms an N-NW dipping fault scarp that is characterized by multiple en échelon segments. The quantitative tectonic geomorphology of this fault has been studied by using morphotectonic indices (scarp sinuosity, valley width/depth ratio, etc.), which show that the fault has a rather low level of activity. Nevertheless, the fault zone near Fethiye presents other morphotectonic features, such as riverbed catchment, slight left-lateral bend of streams at the foot of the scarp, etc. The fault zone seems to fan out towards the west and the deformation is less evident.

Although the fault segments near Fethiye are classified as low-activity ones, they are associated with the large 1957 earthquake ( $M_s$  7.1). This earthquake produced extensive damage and casualties. It was physically manifested by surface ruptures, rockfalls, etc. A palaeoseismological survey has been carried out in the area. Trenches in two different segments show that the 1957 surface rupture is traceable along the fault, while at least two previous events seem to have affected the area and produced surface faulting. Dating and correlation results show that these two earthquakes happened at AD 619-642 (well constrained) and at BC 700-200 (not well constrained).