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Structural Setting and Upper Quaternary landscape evolution at Delphi, Central Greece

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We present an alternative view of the active tectonics and landscape evolution of the Delphi archaeological site, located on the southern margin of Mt Parnassos, central Greece, based on detailed geological mapping. The tectonic grain of the area provides the key to understanding the nature and degree of tectonic activity and associated natural hazards in this worldwide famous site, on the northern margin of the Corinth Rift. The dominant structure is a gently north-dipping thrust fault (SPT), which marks the southern boundary of Mt Parnassos. This thrust brings the Mesozoic carbonates over the flysch members of the Parnassos Unit. Intense folding is observed at all scales and the hanging-wall of the thrust corresponds to an overturned anticline, thrusted over the flysch, the latter cropping out along the south-facing mountain slope and the adjacent valley of Pleistos. The hanging-wall block of the SPT is intensely fractured; a dominant set of steep discontinuities, east and west of the archaeological site has facilitated slope failure, with some of them accommodating minor amounts of dip-slip displacement. One of them is identified as an active structure ("Delphi Fault") exposed after road improvement works several years ago. This surface can be mapped for only $\sim$150 m east and 1.3 km west of Delphi: detailed geological mapping showed that it invariably belongs to the hanging-wall of the SPT, which has a total length of ca 25 km. Slope failure processes, which appear to be dominant at least during the Upper Quaternary years have led to the accumulation of sizeable blocks (measuring from 0.2 – 3.5km2) which have slipped on the incompetent, impermeable clastics that form the footwall of the SPT.
We therefore suggest that the structure identified as the "Delphi Fault" belongs to a set of subvertical discontinuities which have developed on the culmination of an overturned anticline, on the hanging-wall block of a major thrust fault. This surface is associated with minor plane-parallel slip. The repeated destructions of the Delphi archaeological site are attributed to extensive rockfalls, debris flows and subsidiary ground fracturing and not to the reactivation of a major, marginal normal fault.