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Western closure of the Corinth Rift: Stratigraphy and structure of the Lakka fault block

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In the Corinth Gulf, seismicity is highest in the west, where the active Psathopyrgos-Neos Erineos-Aegion fault zone (PNEAFZ;30 km long, N dip) defines the south coast. To the south and SE the inactive early rift records N and NW migration of deformation since the Pliocene. When was the PNEAFZ initiated? How did it grow? What is the relevance of this fault zone within the full rift history? This paper presents new data for the onshore westernmost rift, indicating that it had a distinct early rifting history (Early to Middle Pleistocene) before being overprinted around 400 ka by the NW migrating Corinth rift.

Two syn rift stratigraphic groups are recognised in the uplifted Lakka fault block in the footwall of the PNEAFZ. The youngest Galada group, comprises marine deposits and terraces that mainly document footwall uplift since initiation of the PNEAFZ at around 400-350 ka (Palyvos et al. 2010). The oldest sediments derived from the footwall of the Lakka fault are the 400-350 ka old Aravonitsa Gilbert delta (Palyvos et al. 2010), suggesting this fault is not significantly older than the PNEAFZ. The Galada group records a gradual eastward block tilting due to differential footwall uplift as the PNEAFZ propagated east.

The underlying Profitis Ilias group, (pre 400 ka, < 600 m) is characterised by south and southeastward fining continental facies from coarse alluvial conglomerates in the immediate footwall of the Psathopyrgos fault (Rodini formation) passing east and south to fluvial sandstones and conglomerates (Salmoniko formation), to deltaic and shallow water sandstones interfingering with lacustrine marls, silts and fine sandstones with rare conglomerates and lignites (Synania formation). Faunal assemblages in the Synania formation indicate freshwater to brackish conditions with occasional marine levels and support an Early to Middle Pleistocene age. To the ESE, the Synania formation passes laterally and up into a 200 m succession of fine sandstones with rare conglomerates, lignites and mudstones (Koumaris formation). In the area of the Meganitis and Selinous rivers, the Profitis Ilias group underlies and may be partly laterally equivalent to the Early to Middle Pleistocene Middle group comprising Gilbert deltas sourced from the south. New data indicate that the Profitis Ilias group was a fluvio-lacustrine system sourced from the north. Accommodation was probably created by an, as yet, unidentified south dipping fault on the north side of or below the present Gulf. The same fluvio-lacustrine system may be traced into the Patras area, further west. The Profitis Ilias group depocentre may have been part of the NE limit of the Patras rift. The westernmost Corinth rift was therefore dominated by continental facies until late Middle Pleistocene. The Rion Straits did not open west to the Mediterranean until well after 400 Ka. Any marine influence in the earlier rift came from the east.

Palyvos N., Mancini M., Sorel D., Lemeille F., Pantosti D., Julia R., Triantaphyllou M., De Martini P.M. (2010) – Geomorphological, stratigraphic and geochronologic evidence of fast Pleistocene coastal uplift in the westernmost part of the Corinth Gulf (Greece). Geological Journal, 45, 78-104.