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Active tectonics of the offshore western Gulf of Corinth, Greece

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The Gulf of Corinth, central Greece is the primary focus for extension in the highly seismically active Aegean region. The area has been studied for decades with interest centred primarily on the southern shore where active normal fault scarps outcrop (e.g., the Agion and Eliki faults). Current deformation models to explain the morphology of the basin include only the well examined southern shore faults and as such the Gulf of Corinth is often described as an asymmetric half graben.

Geodetic studies have reported that the western Gulf of Corinth is opening at a rate of ˜10-15mm/yr. Slip rates on the southern shore faults in this area, determined through the examination of uplifted geomorphic features and paleoseismology can only account for ˜4-6mm/yr. Such a discrepancy in geodetic and seismic extension rates could be explained by activity on offshore faults which have not been quantified.

A high resolution seismic and bathymetric survey has been conducted in the western Gulf of Corinth and highlighted the presence of significant sea floor topography and the existence of major active normal faults. Interpretation of seismic stratigraphy demonstrates a clear northward dipping trend of sediment packages in the deep gulf towards a central south dipping fault which here has structural control. This invalidates the simple asymmetric half graben model which has been proposed for the western gulf. The north and south Eratini faults, close to the northern shore, uplift a horst block, isolating a sediment filled sub-basin. The existence of low-stand paleoshorelines within the sub-basin has allowed age estimation of horizons on comparison with a sea level curve. Sub-basin stratigraphy may be correlated to 100ka sea level cycles, and evidence suggests these 100ka packages are identifiable also within the main basin. Faulting geometries and seismic stratigraphy will be discussed together with what these results could mean for future Corinthian rift models.