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Geometrical constraints on active faults from microearthquake relocation in the Corinth Rift

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The Corinth Rift is rapidly opening at the rate of about 1.5 cm/yr in a N-S direction. The deformation mechanism is still under debate, in part due to the unknown geometry of the active faults at depth. In particular, the existence of a detachment as the important structural feature at depth, with secondary listric faults that smoothly root into it, is under discussion. To resolve the active faults' geometry at depth, we relocated the microearthquakes of the region. The data employed were recorded in the year 2001 by the permanent Corinth Rift Laboratory network. It corresponds to 12 short-period and 3 broad-band stations that cover an area of 30x30 km around the city of Aigion, Greece. A total of 6427 earthquakes were recorded and located using HYPO71. Two different techniques were used to extract the multiplets, the first is based on the comparison of wavelet transform of waveforms and the second is based on the coherency measure. Both give similar results. The travel time delays between all pairs of events in a multiplet are computed by spectral cross-correlation, considering both P and S wave data. The geometry of the underlying structures at depth is estimated by calculating the poles of all possible 3-point planes, each hypocenter being a point. We present the most interesting multiplet relocations. One multiplet of broad spatial extent, located at 6.8 km of depth indicates a preferential plane dipping at 50-60 degrees to the NNW. We interpret this seismic activity as slip on the Aigion Fault, thereby excluding that the latter fault be listric at least down to a depth of ˜7 km. The northern multiplets, located at 8 km in depth and more, have a tendency to dip at a low angle, while those above show a much steeper geometry. We will discuss the implications of our results on the extensional mechanism of the Corinth Rift.