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The January 2010 Efpalio earthquake sequence interpreted in terms of the tectonics of western Corinth Gulf

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On 18th and 22nd January 2010 two moderate size (Mw5.2) earthquakes occurred in western Corinth Gulf, resulting in two clusters of aftershock activity which lasted almost six months. Both clusters operated simultaneously and the focal mechanisms revealed the activation of almost E-W normal faults, in many cases dip slip motions had a considerable strike-slip component, especially at the edges of the activated area. In this contribution we attempt to shed light on the tectonics of the western Corinth Gulf using the information provided by the Efpalio sequence. More specifically we jointly interpret the relocated aftershock locations, moment-tensors and slip inversions in an attempt to identify the activated faults. Previous studies in Corinth Gulf have identified the existence of a major low-angle, north-dipping structure producing intense seismicity. The Efpalio sequence basically confirmed this general trend. However, it also clearly depicted the significance of the shallow activity, so far less recognized, and possibly connected with the relatively steep faults outcropping on the northern coast of the Gulf. The January 18th mainshock had almost no on-fault aftershocks, whereas its off-fault aftershocks and the aftershocks of the January 22nd shock formed two separate clusters, both likely provoked by the Coulomb stress change due to the first shock. One of these clusters fits a north-dipping structure at which the January 22nd event took place. Later aftershocks mapped a relatively sharp spatial termination of the sequence towards north-west and south-east. The termination is marked by strike-slip mechanisms, proving a mixture of diverse tectonic elements on the northern coast. The SW-NE trending strike-slip faults acted probably as the surfaces along which the two mainshocks (of almost parallel faults), were displaced with each other. The sequence emphasized the role of the transfer faults possibly linking Corinth Gulf with regional structures, such as the Trichonis and Rion-Patras fault system.