



High Frequency Monitoring of the Aigion Fault Activity

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In 2007, a high frequency monitoring system was deployed in the 1000 m deep AIG10 well that intersects the Aigion fault at a depth of 760 m. This active 15 km long fault is located on the south shore of the Corinth rift, some 40 km east from Patras, in western central Greece. The borehole intersects quaternary sediments down to 495 m, then cretaceous and tertiary heavily tectonized deposits from the Pindos nappe. Below the fault encountered at 760 m, the borehole remains within karstic limestone of the Gavrovo Tripolitza nappe. The monitoring system involved two geophones located some 15 m above the fault, and two hydrophones located respectively at depths equal to 500 m and 250 m. The frequency domain for the data acquisition system ranged from a few Hz to 2500 Hz. The seismic velocity structure close to the borehole was determined through both sonic logs and vertical seismic profiles. This monitoring system has been active during slightly over six months and has recorded signals from microseismic events that occurred in the rift, the location of which was determined thanks to the local 11 stations, three components, short period (2 Hz), monitoring system. In addition, the borehole monitoring system has recorded more than 1000 events not identified with the regional network. Events were precisely correlated with pressure variations associated with two human interventions. These extremely low magnitude events occurred at distances that reached at least up to 1500 m from the well. They were associated, some ten days later, with some local rift activity. A tentative model is proposed that associates local short slip instabilities in the upper part of the fault close to the well, with a longer duration pore pressure diffusion process. Results demonstrate that the Aigion fault is continuously creeping down to a depth at least equal to 5 km but probably deeper.