



Multiplet focal mechanisms from polarities and relative locations: The Iznajar earthquake swarm (S- Spain)

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In April 1998, a swarm of ~ 1800 microearthquakes near the village of Iznajar (S-Spain) was recorded at the Granada basin short period seismic network. Focal mechanisms from P-wave polarity readings are poorly constrained and cannot characterize the seismotectonics of the series. Here, we propose to resolve ambiguities of first motion mechanisms by using the local strike and dip inferred from multiplet relocation as an additional constraint on source orientation. We use waveform cross correlation on P- and S-arrivals to identify events with highly similar seismograms, group our detections into multiplet clusters, and invert the cross correlation time delays to obtain precise relative locations within our largest multiplet clusters. Relative locations have errors of several 10s of meters horizontally and vertically, and define strike and dip of active fault patches with an accuracy of typically $\sim 20\text{-}30^\circ$. We introduce the multiplet fault plane orientations and their confidence limits to restrict the parameter range for focal mechanism grid search, yielding mostly well-constrained solutions, in addition resolving the nodal plane symmetry of the point source focal mechanism. We observe mainly N-S left-lateral strike slip faulting and a few NNW-SSE normal faulting solutions, highlighting the kinematic complexity of the swarm, and pointing to an overall deformation style different from the nearby Granada basin.