



3-D crustal structure in the Agadir region (SW High Atlas, Morocco)

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The 1960 Agadir earthquake (Mw 6.0) constitutes the most damaging earthquake event in Morocco. With the expansion of seismic networks during the last decade in Morocco, a large volume of new seismic data has been collected in this region. The P and S arrivals at 19 stations located south of Morocco are used to investigate the lithosphere in the Agadir region. In this study we use a linearized inversion procedure comprising two steps: 1) finding the minimal 1-D model and simultaneous relocation of hypocenters and 2) determination of local velocity structure assuming a continuous velocity field. The resolution tests results indicate that the calculated images give near true structure for the studied region from 0 to 45 km depth. The results show that the total crust thickness varies from 30 to 40 km in SW High Atlas and confirm the modest crustal tectonic shortening and thickening in the Atlas Mountains of Morocco. The inferred geological structure reconstructed from the calculated image illustrates the existence of fault-related folding. The evidence for coseismic ruptures in 1960 on the Kasbah anticline combined with the 1960 earthquake hypocenter located in the tomographic image determine the seismic potential of the active fault and related fold. The tomographic results show that the fault-related fold and related south Atlas thrust front structure are associated at depth (extending to 10-km-depth) to high velocity values.