

GEOPHYSICAL PARAMETERS AND THE TECTONIC DEFORMATION
OF THE ATLAS-RIF AREAS OF MOROCCO

by

Jannis MAKRIS & Shahid Nadeem QURESHI
Institut für Geophysik, Universität Hamburg

By considering deep seismic soundings, gravity and seismicity data, we developed crustal thickness models along several cross-sections. From these gravity models and a 3-D evaluation of the Bouguer Map we defined the crustal thickness of the various areas of Morocco

It could be established that most of the Moroccan Meseta is approximately 28 km thick and that towards the coastal areas to the Atlantic Ocean the crust thins rapidly to less than 25 km. The High Atlas attains a thickness of over 35 km in some areas, thinning towards the Anti-Atlas where the crust is only 30 km thick.

The Atlas-Meseta transition is marked by a strong tectonic boundary which in the gravity field is expressed by a steep gravity gradient of approximately 2 mGal/km. A correlation of the seismicity of Morocco with the tectonic map showed that the seismic activity is confined mainly along the Agadir-Ouarzazate part of the South Atlas fault. East of Ouarzazate the main seismic activity changes from an ENE-WSW to a NNW-SSE direction, and from the Beni Mellal area the direction of the seismicity changes again to a NE-SW trend. Along the Azrou-Midelt zone of weakness the seismic activity again has a maximum value, and in the area of the Rif, that is north of the cities of Fez and Taza, it is again aligned along the major thrust zones. This seismic activity can also be followed along the Alboran Plateau and all the way across the Alboran Sea. It seems that this zone of deformation in the Rif area is associated with overthrusting processes and the evolution of the Rif Nappes.

