



Offshore-onshore recent tectonic deformations in the eastern Rif and its foreland (Alhoceima-Nador, Morocco)

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The Rif Cordillera is formed by the southwestwards emplacement of the internal zones on the African foreland in the western Alboran Sea. However, the recent deformations are driven also by interaction with the NW-SE convergence of the Eurasian and African plates. The eastern Rif and its foreland constitute a key region to study the variability in structure and stresses related to a lateral boundary of this Alpine Cordillera. The continental crust of the Rif thinned toward Alboran Sea. The onshore and offshore area nearby the coast line, between Al Hoceima and Nador are suitable for recent tectonics studies due to the presence of wide Neogene and Quaternary basins that contribute to record the activity of recent structures. Multichannel seismic reflection data obtained along the coast during the GASALB cruise in November 2011, together with available data, allows to characterize the differences of the Rif and foreland Neogene-Quaternary basins. Offshore results are compared with field observations, that detailed cover several areas. In the Rif Cordillera (Al Hoceima area), recent basins open towards the Alboran Sea are formed by the active roughly N-S oriented faults in this seismogenic area. They are mainly normal in onshore area and becomes strike-slip offshore connecting with sinistral Al-Idrisi fault zone. In contrast, in the foreland represented by the Trois Fourches area, onshore N-S faults are inactive and are developed above a very well exposed folded detachment. Paleostress data in this area support the activity of the exhumed low-angle faults with NE-SW extension and a late radial extension. These new data allows underline the different stresses and age of deformation in the Rif and its foreland and support a westward displacement of deformation along recent time. Then, the most active and hence higher seismic hazard along Moroccan coast, also related to possible tsunamogenic faults, are located offshore Alhoceima area.