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Seismic Activity and lithospheric structure in NW of West African Craton: Case of the Moroccan Atlas Mountains

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This study presents the outcomes of the local earthquake tomography applied in NW of West African Craton at the Moroccan Atlas domains. The arrival times data used in this study were obtained by the Moroccan seismic network. The seismic data (P and S wave arrival times) have been collected by 36 seismic stations located in the Atlas–Meseta domain for the period between 1988 and 2010. A linearized inversion technique and 3D modeling are used for determination of local velocity structure.

The interpretation of tomography images results emphasizes a new and detailed lithosphere structure presented by a high velocity bodies inclined away from NW of West African Craton.

The first body beneath the Souss Basin located from 20- to 45-km depth dipping to the North and interpreted as a body that marks the border between the Moroccan Anti-Atlas and the Meseta –Atlas domains.

The second body with high velocity is detected beneath the Hercynian Tichka Massif from 10 to 50-km inclined away from Anti Atlas. This positive velocity anomaly can be interpreted as an old subduction making the limit between Meseta domain and West African Craton.

Finally in the eastern part of Anti Atlas, a high velocity body dipping northward from Jbel Ougnat at 15 to 40 km is detected.

The occurrence of tholeiitic magmatic activity in the Hercynien Tichka massif zone and in the Jbel Ougnat leads us to conclude that a remains subduction zone exist in these zones

