

## First images of the crustal structure across the central Algerian margin, off Tipaza (West Algiers) from deep penetrating seismic data: new information to constrain the opening of the Algerian basin

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**Authors** [Leprêtre, A\\*, UMR6538 Domaines Oceaniques, University of Brest, Plouzane, France](#)  
[Deverchère, J, UMR6538 Domaines Oceaniques, University of Brest, Plouzane, France](#)  
[Klingelhofer, F, Dep. Marine Geosciences, Ifremer, Plouzane, France](#)  
[Graindorge, D, UMR6538 Domaines Oceaniques, University of Brest, Plouzane, France](#)  
[Schnurle, P, Dep. Marine Geosciences, Ifremer, Plouzane, France](#)  
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The origin of the Algerian margin remains one of the key questions still unresolved in the Western Mediterranean sea. This is related to the unknown nature and kinematics of this Neogene basin. Whereas the westernmost margin is generally assumed to have been shaped as a STEP-fault (Subduction-Transform Edge Propagator, transcurrent) margin by the westward displacement of the Alboran block, the central Algerian margin is believed to have involved a NW-SE basin opening related to a southward slab rollback. This work sheds insight on this issue, using data acquired in the context of the Algerian-French program SPIRAL (Sismique Profonde et Investigation Régionale en Algérie): a cruise conducted on the 'R/V L'Atalante' in October-November 2009. It has provided 5 new combined onshore-offshore wide-angle seismic profiles and an extensive multi-channel seismic dataset spread along the margin, from Oran to Annaba. In this work, the available structural information on the ~N-S wide-angle transect of Tipaza is presented, where the margin broadens due to the presence of a bathymetric high (the Khayr-Al-Din bank) which is assumed to represent a remaining titled block of the passive margin. Along the transect, 39 OBS and 13 landstations recorded 751 low frequency airgun shots. Travel-time tomography and forward modelling were computed using the software developed by Zelt and Barton (1998) and Zelt and Smith (1992), to obtain the velocity structure in the region. A set of multi-channel seismic reflection profiles including two coincident profiles with the wide-angle data allows a combined interpretation and extend the deep structure in the Bou Ismail Bay. MCS data outline the sedimentary sequence filling the Algerian basin depicting an intensive salt tectonic associated with the Messinian Salinity Crisis and allowing to image locally below the salt layer. The deep penetrating data SPIRAL allow to image the sedimentary sequence in the Algerian basin off Tipaza (West Algiers) and the crustal structure at the continent-ocean boundary. In the Algerian basin off Tipaza, the Moho discontinuity is identified using wide-angle modelling at 11-12 km depth which corresponds in two-way travel-time to 7-8 s. Wide-angle seismic modelling imaged a major thinning of the crust from more of 15 km in the upper margin (KADB) to only 5-6 km in the deep basin. This thinning also marks the rapid transition from a thinned continental crust at the Khayr-al-Din bank to an oceanic crust in the Algerian Basin, revealing a narrow transition zone (20-30 km) between the two domains. This work presents the deep structure of the margin West of Algiers from wide-angle and multichannel seismic data in order to discuss models of opening for the Algerian basin.

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