



The deep Algerian margin structure revisited by the Algerian-French SPIRAL research program, stage 2 : Wide-angle seismic experiment

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During the second leg of the Algerien - French SPIRAL (Sismique Profonde et Investigation Regionale du Nord de l'ALgerie) cruise conducted on the R/V Atalante in October and November 2009 an extensive wide-angle seismic data-set was acquired on 5 regional transects off Algeria, from Arzew bay to the west, to Annaba to the east. The profiles are between 80 and 180 km in length and around 40 ocean-bottom seismometers were deployed on each profile. A 8350 cu. inch tuned airgun array consisting of 10 Bolt airguns was used to generate of deep frequency to allow for a good penetration. All profiles were extended on land up to 150 km by land-stations to better constrain the structure of the margin and the nature of the ocean-continent transition zone. Coincident reflection seismic, gravity and magnetic data were acquired on all profiles during the first leg of the cruise. The resulting data quality is very good with deep penetrating arrivals on most of the instruments. Only on very few instruments a deep salt layer inhibits deeper penetration of the seismic energy. Two instruments were lost and all other yielded useful information on geophone and hydrophone channels. Instruments located close to the coast show arrivals from thick sedimentary layers. Instruments located on oceanic crust indicate a relatively thin crust overlying a mantle layer characterised by seismic velocities of 8 km/s. Forward and inverse modelling of the wide-angle seismic data will help constrain the deep structure of the margin, the nature of the crust and might help to constrain possible existence of a detached slab in the upper mantle. Integration of the wide-angle seismic data with multichannel seismic, gravity and magnetic data will enable us to better understand the tectonic history and the structure of the Algerian margin.