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Investigating the sedimentary structure of the Baza Basin (Southern Spain) using seismic reflection profiling

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The Baza Basin is an intra-mountain evaporitic basin in Southern Spain. It is the largest of the Late Neogene continental basins of the Betic Cordillera. During the last 7 million years the basin alternately was flooded and fell dry. Therefore, up to 2.5 km thick lacustrine and ancillary continental deposits are found which provide an unique archive of climatic changes and paleo-climatic events. An ICDP drilling project (LARSEI – LAcustrine Record of SE Iberia) proposes to drill the Baza Basin and to analyze the sedimentary record with regard to the paleo-climate in the Mediterranean as well as on a global scale.

In preparation for the future drilling activities, controlled-source seismic measurements are used to investigate the structure of the Baza Basin and to find local zones of neo-tectonic deformation bounding the basin to the west (Baza fault). The aim of the seismic work is to provide structural information for the planned scientific drilling project.

End of October 2013 a seismic reflection experiment was carried out in the center of the Baza Basin. A net of three 2D seismic profiles was arranged crossing the basin and the bounding fault system. A vibroseis source (two vibrators with 200 kN peak force each) was used with a source point distance of 60 m along each of the 18 km long profiles. Eight sweeps with a frequency range of 8 – 100 Hz were conducted at each source point. The seismic wavefield was recorded by a cable-free acquisition system of more than 330 continuously operating digital data recorders. The receivers were spread along the currently active profile with a spacing of 20 m. They were moved in a roll-along-configuration to mainly cover the near-field offsets of the source points.

The seismic data of the three profiles were conventionally processed so far. We present current results of the ongoing seismic reflection processing with regard to the structure of the Baza Basin and the Baza fault system.