

Seismological and geophysical study across the active segment of the Ventaniella fault: understanding its role during the Cantabrian Mountains building up

Gabriela Fernández-Viejo, Javier A. Pulgar, Carlos Lopez-Fernandez, Javier Olona, and Sergio Llana-funez
University of Oviedo, Dept. of Geology, Oviedo, Spain

The Ventaniella fault is a crustal structure that runs NW-SE through the Cantabrian mountains and margin in the Northern Iberian Peninsula. The fault has a very long cartographic expression exceeding 300 km onshore and 150 offshore, where it is also called the Cantabrian fault. The current structure inland acts mainly as a strike-slip structure with some reverse component elevating the northern block. In some parts along its trace it reworks Mesozoic normal faults that are suitably oriented to accommodate north-south shortening during the alpine cycle. However, its role in the development of the Cantabrian mountain chain is not fully understood. The existence of lingering seismicity at two segments, one offshore and another one onshore, and the suggestion that separates different geodynamical domains offshore, provides good arguments for further investigation of this fault.

A focused seismic network of 10 stations within 20 km of radius from the fault trace inland has been deployed within the seismically active southern segment to analyze seismicity, ambient noise and integrate with other neighboring seismic networks and former deep geophysical studies. More than 25 small events (magnitude <1.5) have been registered and located since the network was deployed within a period of 18 months. The events occur mostly at mid-crustal depths. Ambient noise analysis from more than 3 months will also be incorporated in the tomography to unravel the structure of the fault zone at depth. The aim of the study is to propose a model for the continental crust in this part of the Cantabrian mountains.