15 Pre - Geology, Geomorphology in active zones, Archaeology in active zones

Excursion Leaders: Fawzi Doumaz, Said Maouche, Sabah Ferdi,

Proposed Excursion Date: 10 July 2023

Draft Itinerary: From Algiers, Tipasa is about 70 kilometers far, the site is Fold related reverse fault. We will make some stops for geomorphological and geological descriptions.

Definitive cost per head: € 50

Minimum number of participants: 15

Maximum number of participants: 30

Accommodation arrangements: Hotel

Proposer Contact Details:

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Description

A shallow and damaging earthquake struck the region of Tipaza located on the coast, 70 km to the west of Algiers (north-central Algeria). The main shock was felt as far as 200 km from the epicentral area and particularly in the urbanized zone of Algiers. The main shock epicentre determined by CRAAG is on Mt Chenoua, close to the coastline. Coseismic surface breaks with 4.0 km of fault length and 7.0 cm of vertical displacement appeared on the southern side of Mt Chenoua. They consist of cracks and fissures on vertical bedding planes that belong to a Neogene flexure. The aftershock activity was recorded for several weeks and comprised more than 100 seismic events per day, with $1 < M < 5$. Aftershocks are distributed in a ENE-WSW to NE-SW zone extending offshore. A NW-SE cross-section indicates that seismic events affect the crust to a maximum depth of 20 km, showing a complex fault-plane geometry dipping to the NW. For the main shock, the focal mechanism solution obtained from the readings of first motion polarities of seismograms yields an ENE-WSW reverse fault dipping to the NNW, which is in good agreement with both field observations and the aftershock distribution at depth.The occurrence of the Mt Chenoua-Tipaza moderate-sized event in a previously identified active zone improves the seismotectonic characterization of this part of the Tellan Atlas mountains. This thrust and fold geological domain also shows active folds capable of producing larger earthquakes. Since only a small portion of the Sahel anticline ridge has been reactivated, a serious seismic hazard must be urgently recognized in the Algiers region.

This is an abstract of a well-known Paper by M. Meghraoui

Blind reverse faulting system associated with the Mont Chenoua-Tipaza earthquake of 29 October 1989 (north-central Algeria) July 2007Terra Nova 3(1):84 – 92 DOI:10.1111/j.1365-3121.1991.tb00847.x

The paper introduces very well the scope of the field trip. An active Fold-Faulted structure offers so many patterns for very didactic readings of geomorphic evidences of an active zone capable of very violent earthquakes. Fold, blind fault, marine terraces, erosion, hydrography, tilted deposits, Archaeological site and many other parameters that lead to almost smell the active tectonic. The structure is very close to Algiers and constitutes a huge danger. Along the trip we will have many stops to show and explain things that are often invisible to an unexperimented observer in such active compressional zones. We will go on the top of the fold and show the two environments that interact with this active fold, The coastal zone with typical marine terraces, archaeological proofs of a still active structure and many more on another side the continental southern zone that shows different neo-tectonic patterns such as a frontal sedimentary basin that records all the tectonic history.