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## **► To cite this version:**

Lea Vidil, Elia d'Acremont, Laurent Emmanuel, Sara Lafuerza, Fabien Caroir, et al.. Late Quaternary fault activity of the southern part of the Al Idrissi strike-slip fault system, Alboran sea: an integrated multi-proxy approach. EGU General Assembly 2025, Apr 2025, Vienne, Austria. 2025, <10.5194/egusphere-egu25-13085>. <insu-05127789>

**HAL Id: insu-05127789**

**<https://insu.hal.science/insu-05127789v1>**

Submitted on 26 Jun 2025

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EGU25-13085

EGU General Assembly 2025

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## Late Quaternary fault activity of the southern part of the Al Idrissi strike-slip fault system, Alboran sea: an integrated multi-proxy approach

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The Alboran Sea, located in the western Mediterranean is crossed from Spain to Morocco by a significant active fault system known as the Al Idrissi Fault System (AIFS). This predominantly sinistral strike-slip fault system formed to accommodate the oblique convergence between the African and Eurasian plates. It is characterized by moderate earthquakes ( $M_w > 6$ ) aligned along NNE-SSW-oriented fault segments. The AIFS is considered a unique example of an emerging intracontinental plate boundary.

Along the AIFS, fault characteristics and long-term earthquake recurrence remain poorly understood. The ANR ALBANEEO project aims to study the activity of key fault segments to advance our understanding of this strike-slip system. It will focus on the dynamic interactions between fault block displacement and sedimentation and seismic activity over time.

To achieve these objectives, various geological, geophysical, and geotechnical tools were used during the ALBACORE oceanographic campaign (R/V Pourquoi pas?, 2021, <https://doi.org/10.17600/18001351>). The data analyzed include (i) sediment calypso cores, (ii) piezocone penetration tests (CPTu), (iii) multibeam bathymetric data, and (iv) seismic reflection and sub-bottom profiles. This multi-proxy dataset, collected along a transect perpendicular to the Al Idrissi Fault System, provided detailed seismostratigraphy calibrated using identified seismic horizons, CPTu data, and sediment core dating.

Our study focuses on the northern part of the Al Idrissi volcano, where the Al Idrissi fault system has propagated southwards. In the study area, deformation is distributed as follows (i) the active Al Idrissi fault zone, characterized by a damage zone over 1.5 km wide, which disrupts the seafloor and offsets the volcano, and (ii) on the eastern fault compartment, a series of normal faults sealed by recent sedimentary layers. Interpretation, calibration, and correlation of the available data highlight that the cessation of activity in the eastern fault block was synchronous with the deposition of horizons H4 and H5, dated to 50 ka and 70 ka  $\pm$  7 ka, respectively. One of these inactive faults can be used to assess pre-70 ka paleoseismicity. At least five co-seismic displacements have been identified, which can be dated using an average sedimentation rate

obtained from the sedimentary deposit and AMS dates obtained on the first meters of the cores.

Alongside fault activity, significant erosion has affected the eastern fault block, as evidenced by truncation surfaces seen atop units U5, U4, U3, and U2, spanning over 1.5 km. Horizon H1 marks the end of this erosional period, dated to prior to the Younger Dryas (14.4 ka). We hypothesize that this erosion was influenced by the dynamics of deep-water masses, influenced by climatic shifts during the Last Glacial Maximum (LGM) and the vertical displacements linked to the main Al Idrissi fault's activity.

**Albacore-Albano teams:** Alonso B., Benmarha O., Besso R., Brouillet J.F., Campderros S., Casas D., Chamot-Rooke N., Corbera G., Cubas N., Dano A., De la Fuente M., Ercilla G., Estrada F., Frigola J., Galindo-Zaldivar J., Gorini C., Ketzer M., Le Roy P., Lopez-Gonzalez N., Migeon S., Oliveira de Sa A, Palomino D., Poort J., Praeg D., Ratzov G., Scalabrino B., Sheremet Y., Souloumiac P., Tendero Salmeron V., Thomas M., Vazquez J.T.