unconstrained. Further research will focus on constraining the Late Quaternary evolution of the deformation and the seismic events related to the frontal AMF branch in the studied site.

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SEISMIC CRISIS REVEALS THE DEVELOPMENT OF AN INCIPIENT CONTINENTAL FAULT SYSTEM IN THE ALBORAN SEA

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Large continental faults extend for thousands of kilometres to form tectonic boundaries between plates, often associated with prominent topographic features. In these active areas, well-defined faults produce large earthquakes, and thus imply a high seismic hazard. These paradigms are called into question in the Alboran Sea, which hosts an allegedly complex diffuse boundary between the Eurasia and Nubia plates, and we discovered one of the few examples worldwide of the initial stages of these key tectonic structures. On the 25th January 2016, a magnitude Mw 6.4 submarine earthquake struck the north of the Moroccan coast, the largest event ever recorded in the Alboran Sea. The quake was preceded by an earthquake of magnitude Mw 5.1 and was followed by numerous aftershocks whose locations mainly migrated to the south. The mainshock nucleated at a releasing bend of the poorly known Al-Idrissi Fault System (AIFS). Here we combine newly acquired multi-scale bathymetric and seismic reflection data with a resolution, together with seismological data of the 2016 Mw 6.4 earthquake offshore Morocco – the largest event recorded in the area – to unveil the 3D geometry of the AIFS. We found that the AIFS is a crustal-scale boundary. We report evidence of left-lateral strike-slip displacement, characterize their fault segments and demonstrate that the AIFS is the source of the 2016 events. The occurrence of the Mw 6.4 earthquake and previous events of 1994 and 2004 supports that the AIFS is currently growing through propagation and linkage of its segments. The AIFS provides a unique model of the inception and growth of a young plate boundary. (Waiting for acceptance in NATURE COMMUNICATIONS, 2019).

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SLIP RATE DISTRIBUTION ALONG THE NORTHERN TERMINATION OF THE ALHAMA DE MURCIA FAULT

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The NE sector of the Alhama de Murcia fault (Eastern Betic Shear Zone, SE Iberia) has been commonly considered as a fault section with hardly any Quaternary tectonic activity. The lack of geomorphological evidence showing a recent activity results in an absence of slip data estimated at the northern termination of the Alhama de Murcia fault. Approximately between Alhama de Murcia and Alcantarilla (~ 24 km), the Alhama de Murcia fault controlled the evolution of the Mula sedimentary sub-basin during Middle Miocene. The estimation of slip rates has been approached through the interpretation of seismic reflection profiles of the basin. Stratigraphic markers deformed by the fault have been used to restore the subsequent coseismic displacement owing to transpressive reactivation of the Alhama de Murcia fault in Upper Miocene. Through sequential restoration, a dip-slip rate of 0.16 – 0.26 mm/yr has been estimated (last 7.6 – 4.8 Ma), corresponding with a shortening rate of 0.08 – 0.13 mm/yr. 3D vertical displacement analysis along the fault trace also shows a decrease of throw from the Alhama de Murcia area towards the northeast, being negative at Alcantarilla. The slip rate seems to be higher than expected near Alhama de Murcia town (0.17 – 0.59 mm/yr) and is possibly lessened towards the NE by the transfer of deformation with nearby faults of the EBSZ (Carrascoy fault system, Bajo-Segura faults) in recent times. The historical seismic catalog contains references to EMS VI-VII earthquakes spatially associated with this Alhama de Murcia fault section, hence the net slip rates and seismic parameters derived from this research should be considered in hazard assessments, paying particular attention to the proximity of the Murcia city.