A new relevant seismic source of the Eastern Betic Shear Zone with Holocene activity: Los Tollos Fault (Murcia, SE Spain).

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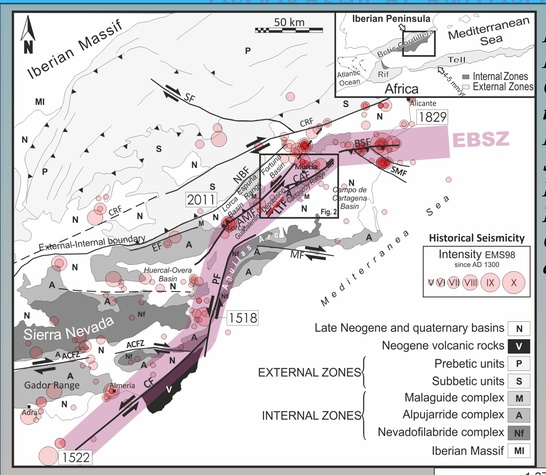
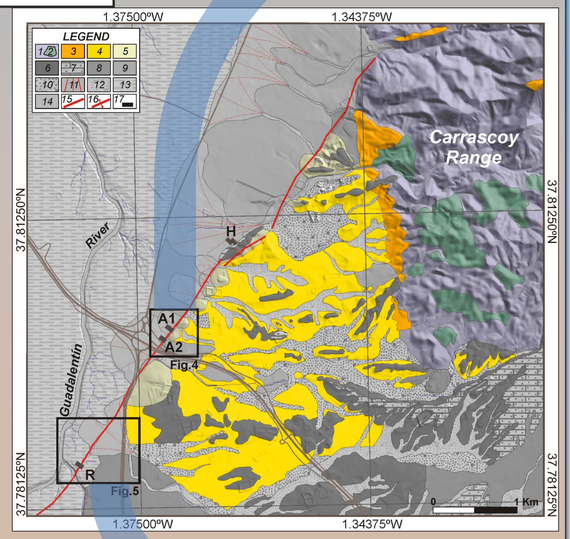
Geophysical Research Abstracts Vol. 16, EGU2014-10601, 2014

GEOGRAPHICAL AND GEOLOGICAL SETTING

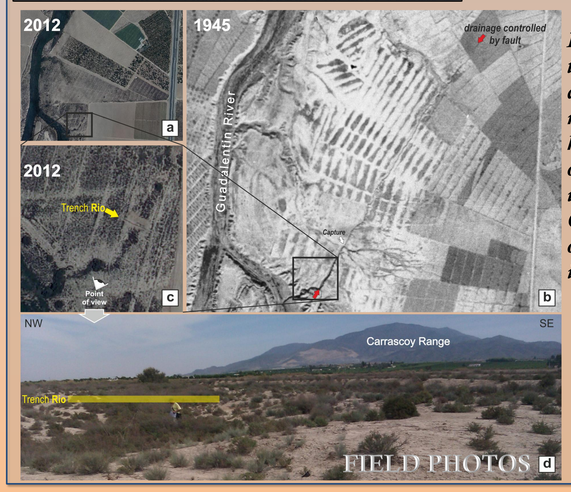


Los Tollos Fault forms part of the EBSZ: Easter Betic Shear Zone. BSF: Bajo Segura Fault; CAF: Carrascoy Fault; LTF: Los Tollos Fault (in red trace); AMF: Alhama de Murcia Fault; PAF: Palomares Fault; CF: Carboneras Fault; SF: Socovos Fault; CRF: Crevillente Fault; SMF: San Miguel de Salinas Fault; NBF: North Betic Fault; MF: Las Moreras Fault; ACFZ: Alpujarras Corridor Fault Zone. The year of the main earthquakes are displayed.

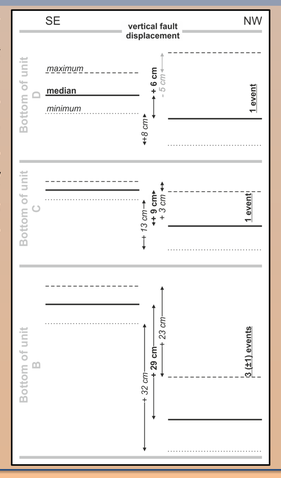


Geological map of the study area over digital elevation model. 1: Alpujarride Complex; 2: Metabasites and amphibolites ; 3: Tortonian; 4: Messinian; 5: Pliocene – Early Pleistocene deposits; 6: Early-Middle Pleistocene alluvial fan deposits; 7: Early-Middle Pleistocene calcretes; 8: Middle Pleistocene alluvial fan deposits; 9: Upper Pleistocene – Holocene alluvial fan deposits; 10: Upper Pleistocene – Holocene alluvial-colluvial deposits; 11: Holocene alluvial fan deposits; 12: Holocene alluvial-colluvial deposits; 13: Holocene flood plain deposits; 14: Holocene torrential channel deposits; 15: Active fault; 16: Active anticline; 17: Trenches. The location of the trenches is displayed: H: Hueso trench; A1: Acopios 1 trench; A2: Acopios 2 trench; R: Rio trench.

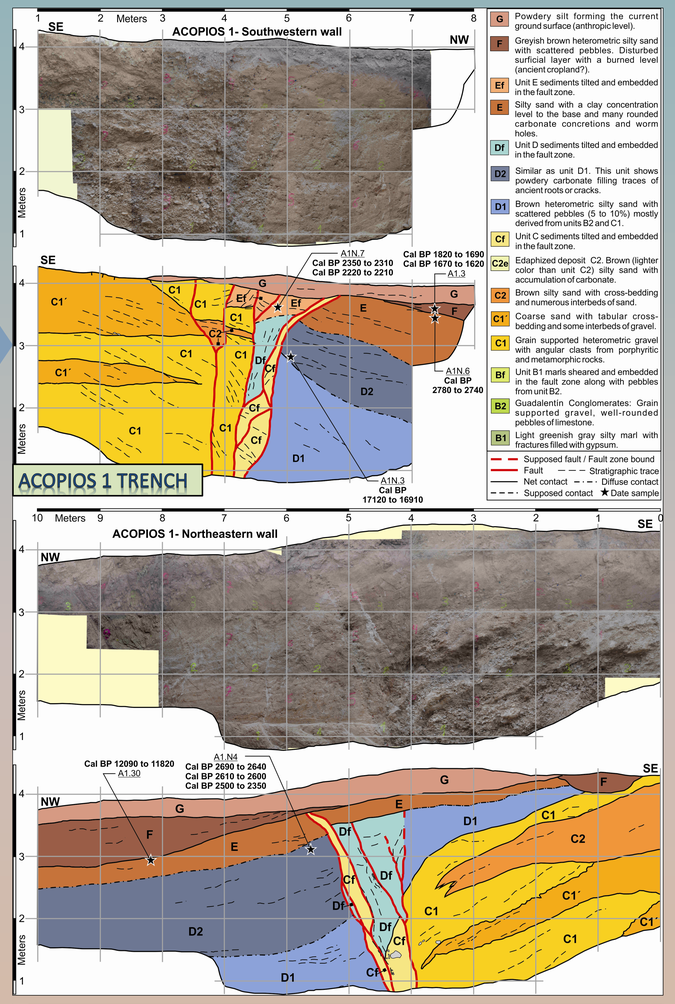
FAULT VERTICAL DISPLACEMENT IN RIO TRENCH

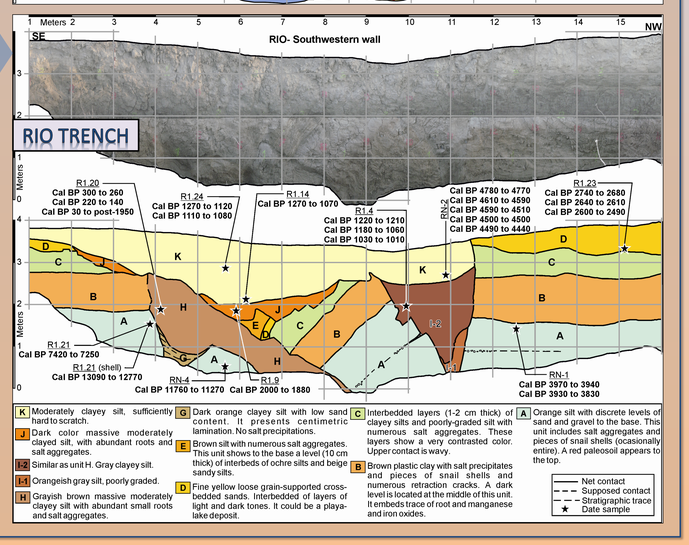


Estimation of the vertical fault displacement regarding the height position of the top of the units A, B and C at both sides of the fault zone in trench Rio.



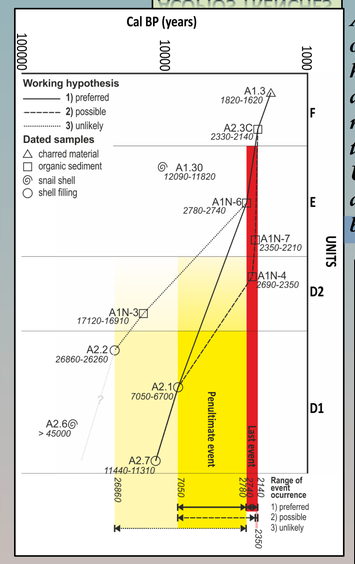
PALEOSEISMOLOGICAL STUDY





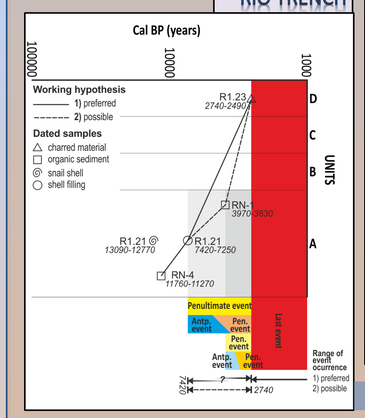
SEISMIC EVENTS DETERMINATION

ACOPIOS TRENCHES



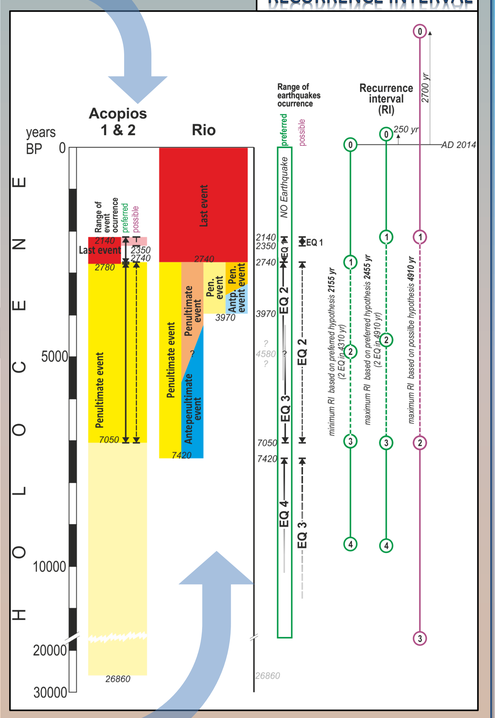
Age and stratigraphic position of the dated samples of Acopios 1 and Acopios 2 trenches. Three working hypothesis, 1-preferred, 2-possilbe and 3-unlikely, are displayed. By considering the rupture relationship of the fault with the stratigraphic, since the Unit F is not affected by any earthquake, the Unit E is affected just by one, and the Unit D2 is affected by two, at least, two seismic events can be bounded.

RIO TRENCH



Age and stratigraphic position of the dated samples of trench Rio. Two or three seismic events have been bounded

RECURRENCE INTERVAL



Time range of seismic events occurrence considering together the estimations in Acopios 1 & 2 and Rio trenches. EQ1: the last earthquake, EQ4: the oldest earthquake. The circles represent seismic events spaced depending on the considered RI. Event 0 refers to the next earthquake to occur in the future.

CONCLUSIONS

Insua-Arévalo et al. (2014): Geomorphology (in revision)

- **Los Tollos Fault is a left-lateral reverse fault dipping to the SE and that it has no apparent connection to the Carrascoy Fault.**
- **Data analysis from 4 trenches dug across the fault has revealed the occurrence of at least four paleo-earhtquake events within the Holocene.**
- **The most recent event is dated in between 2350 and 2140 years BP (4th to 2nd centuries BC) at the end of the Carthaginian period or in the early Roman times in the region.**
- **The size of the paleo-events is estimated in more than M_w 6.2, consistently with empirical regressions both on the average displacement per event, and on the length of LTF.**
- **The recurrence interval between events is estimated in 2200-2445 years, which means that the fault may be close to produce a new major earthquake.**

ACKNOWLEDGMENTS: *This work is part of the research activities carried out in the FASEGEO Project (CGL2009-09726)*