

Onshore-Offshore active tectonics along the Carboneras fault Zone (Eastern Betic Cordilleras)

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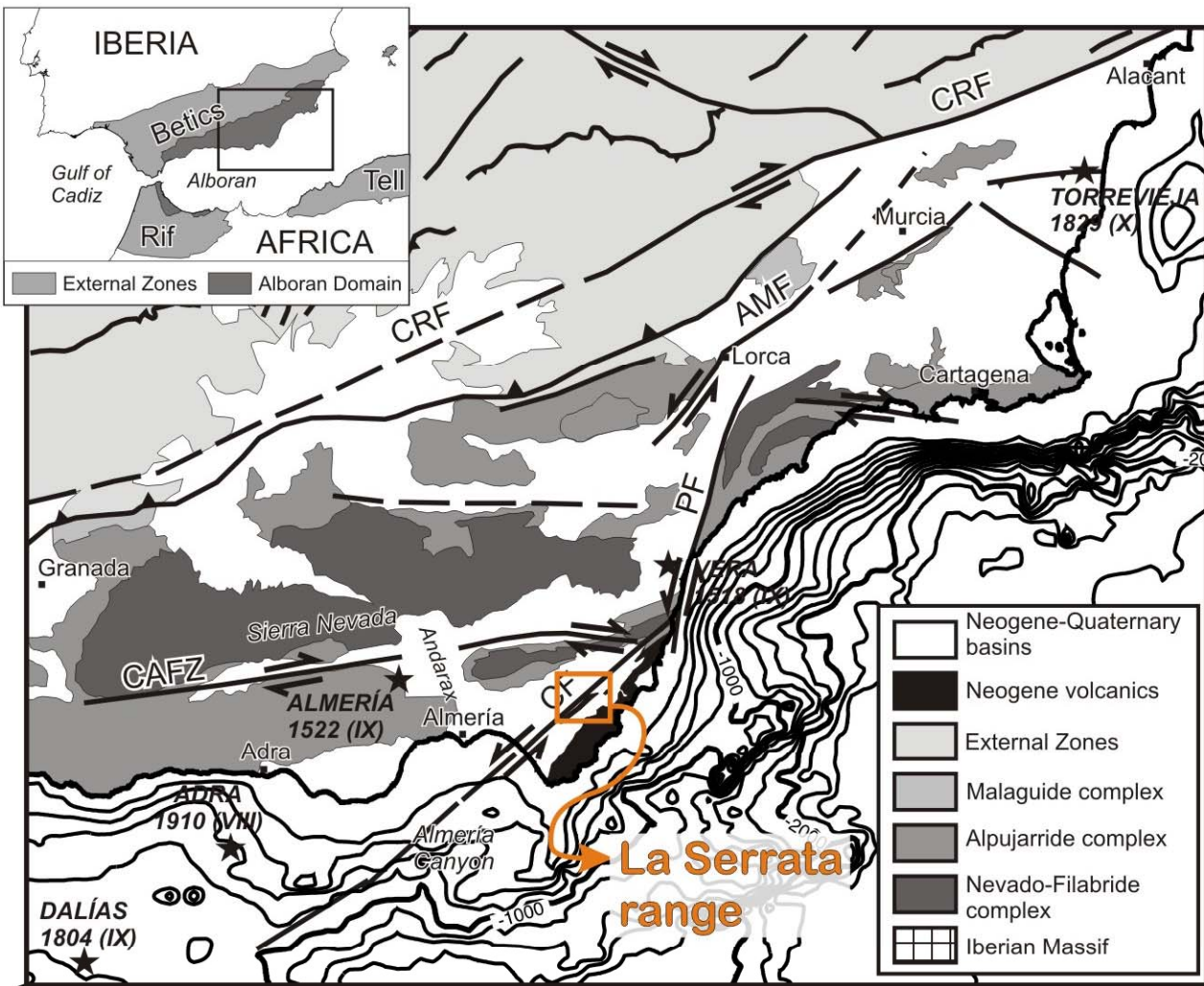
Geodynamic and Seismic Settings

SE Spain straddles by the slow convergent plate boundary between Africa and Iberia (4-5 mm/yr) which is characterised by a 400 km wide, E-W trending zone of moderate and diffuse seismicity. In the Eastern Betics, this shortening is accommodated by a left-lateral strike-slip fault system referred to as **Eastern Betics Shear Zone (EBSZ)** of low to moderate seismicity.

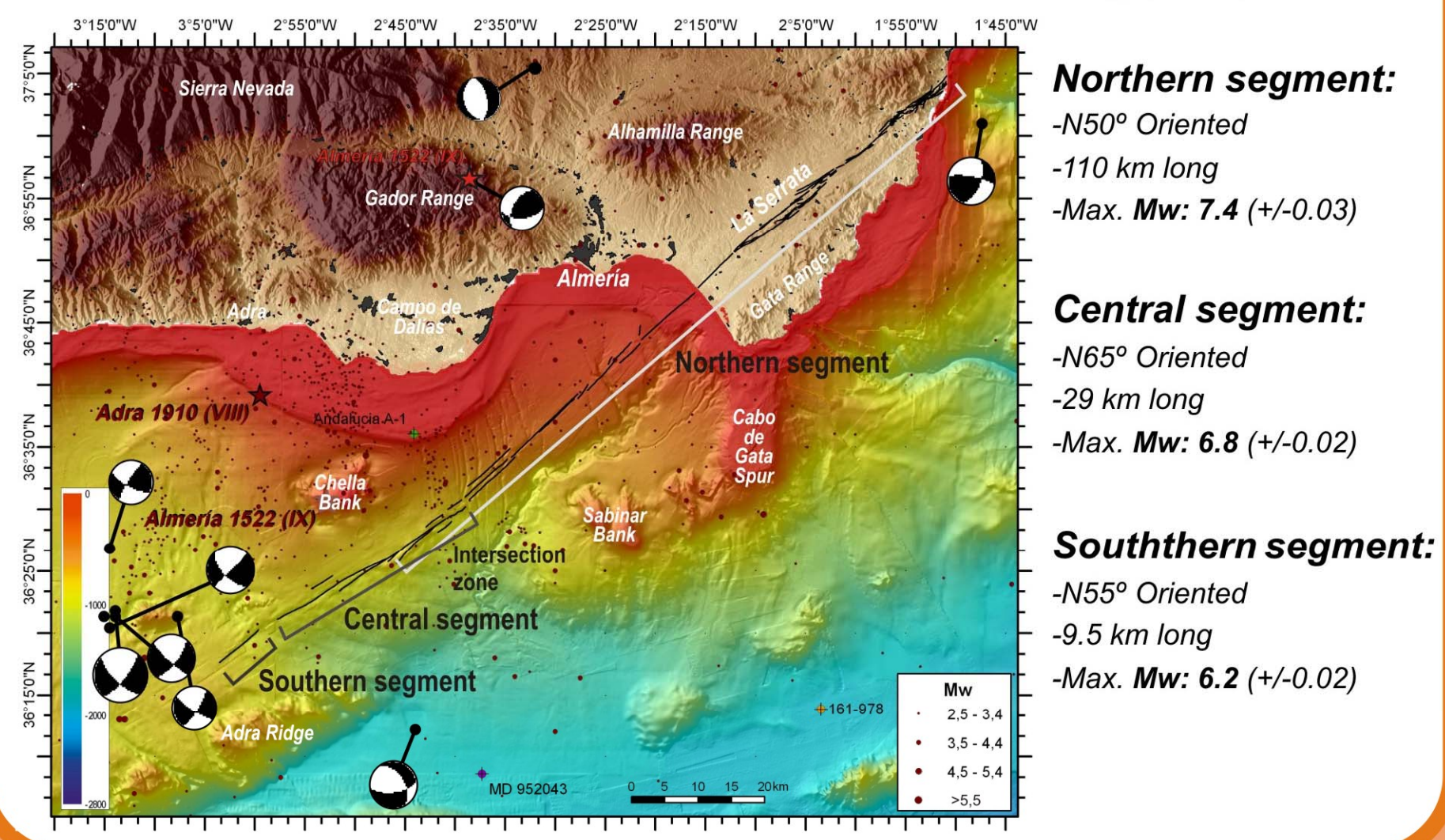
The **Carboneras Fault zone** with a length of almost 50 km onshore and more than 100 km offshore is one of the longest structures of the EBSZ. Despite the very low seismicity associated to this fault, its geomorphology reveals certain young activity, suggesting long recurrence (10⁴ years) behaviour as found in adjacent structures

We present here results of an integrated onshore-offshore paleoseismic study which aims to establish the seismic potential of the Carboneras Fault. Onshore, the La Serrata segment was studied using geomorphological, microtopographic, trenching and dating analyses. Offshore, high-resolution geophysical analysis, coring and dating were carried out.

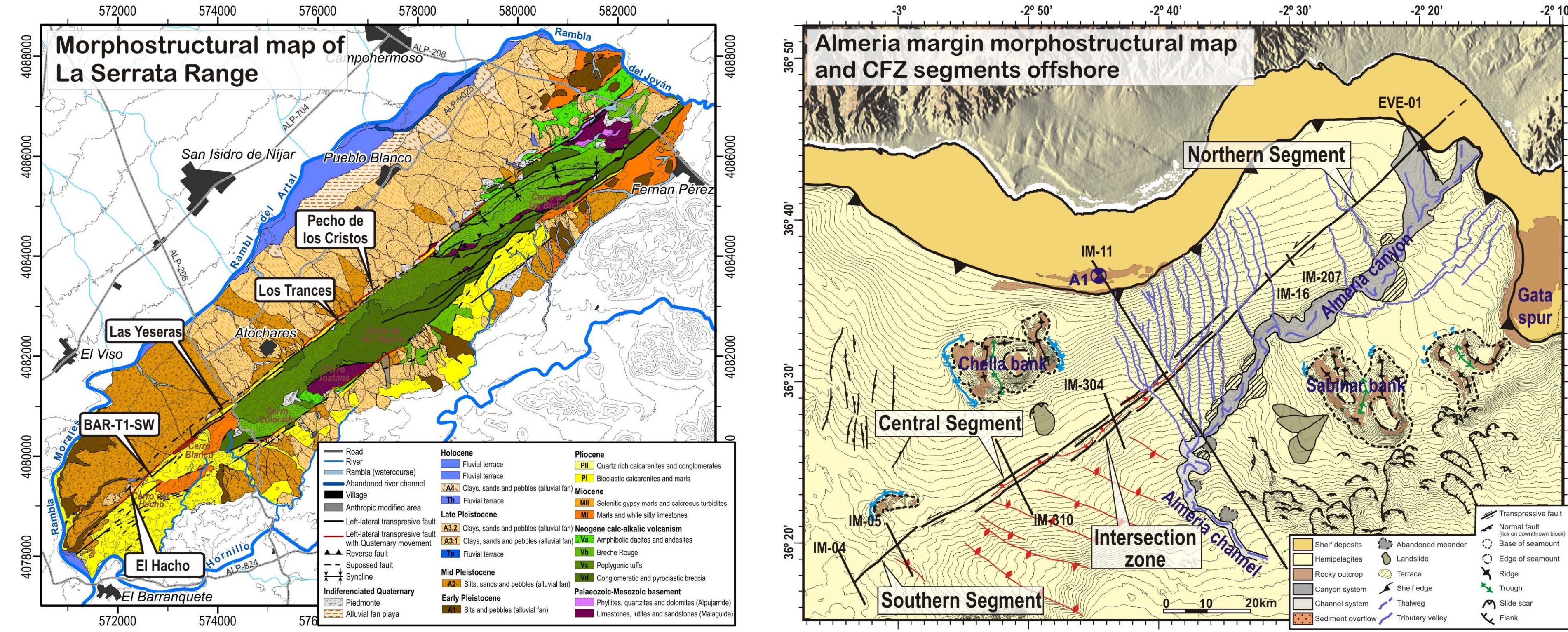
Fig. Geologic map of the Eastern Betic Shear Zone (EBSZ). The largest historical earthquakes (MSK Intensity > IX) are depicted by black star (from IGN online data base and Gràcia et al., 2006). CRF: Crevillente Fault, AMF: Alhama de Murcia Fault, PF: Palomares Fault, CAFZ: Corredor de las Alpujarras Fault Zone, CF: Carboneras Fault. CRF: Crevillente Fault, AMF: Alhama de Murcia Fault



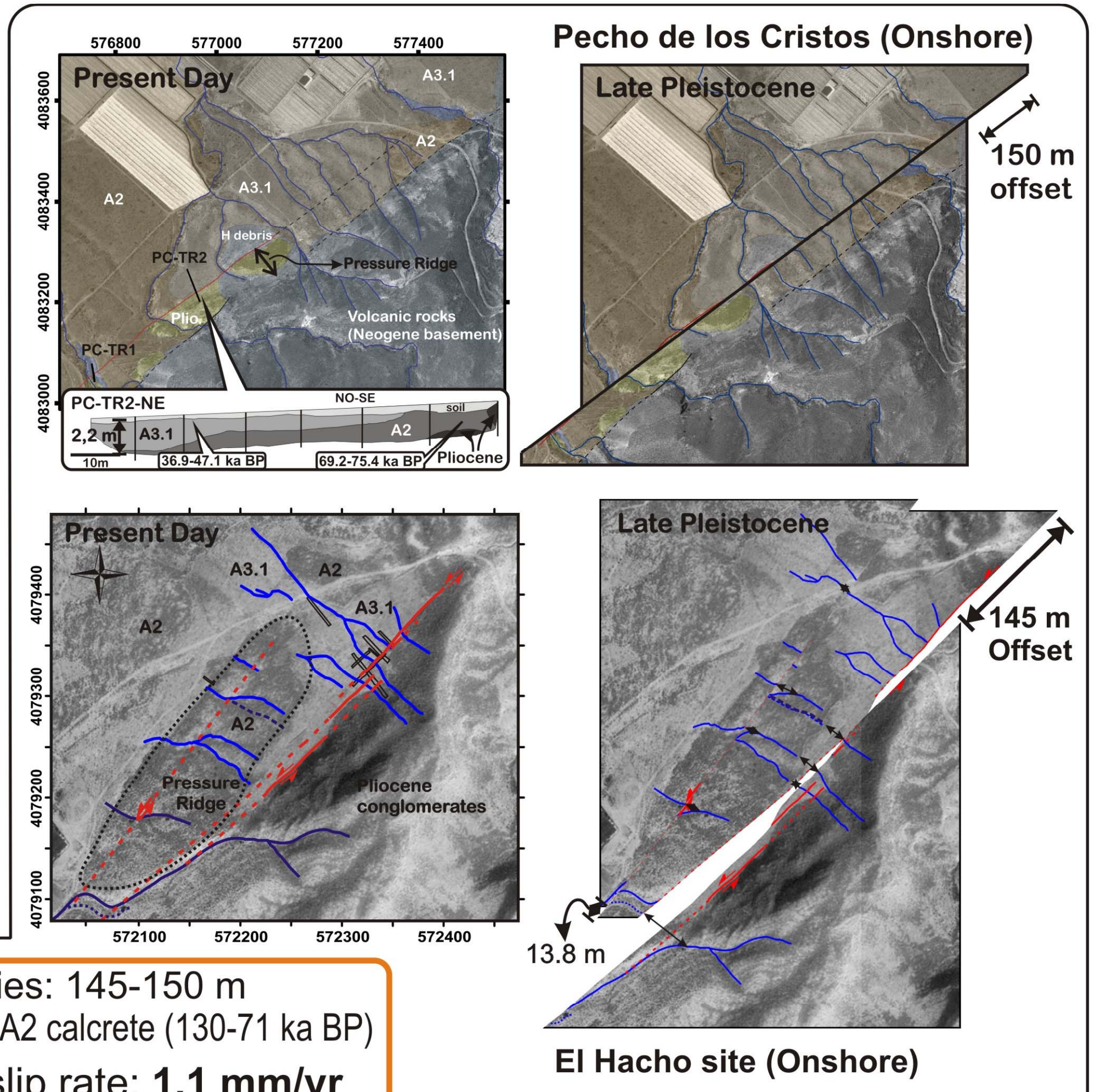
Maximum magnitude: Surface Rupture Length vs Magnitude (SRL/M)



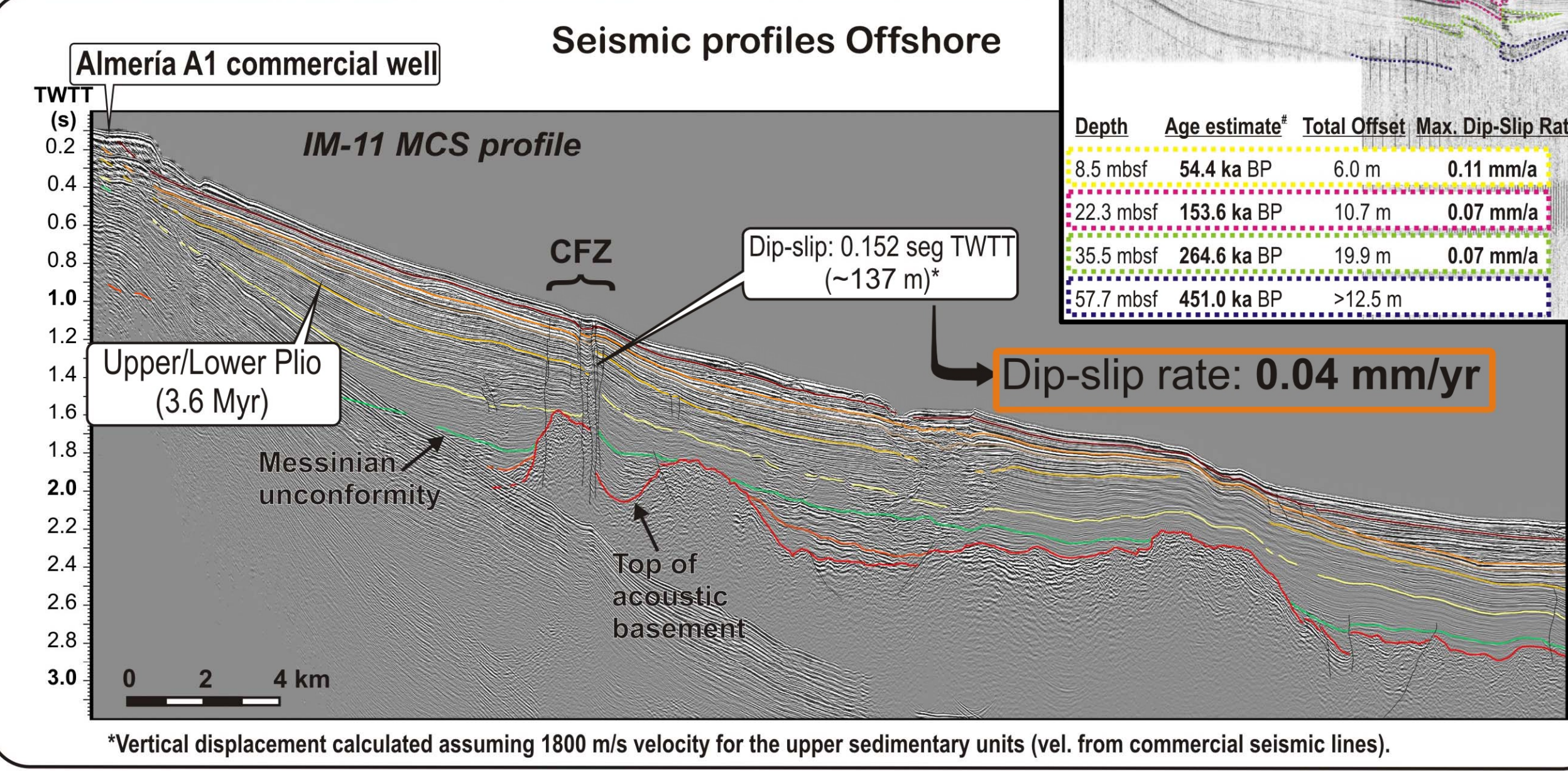
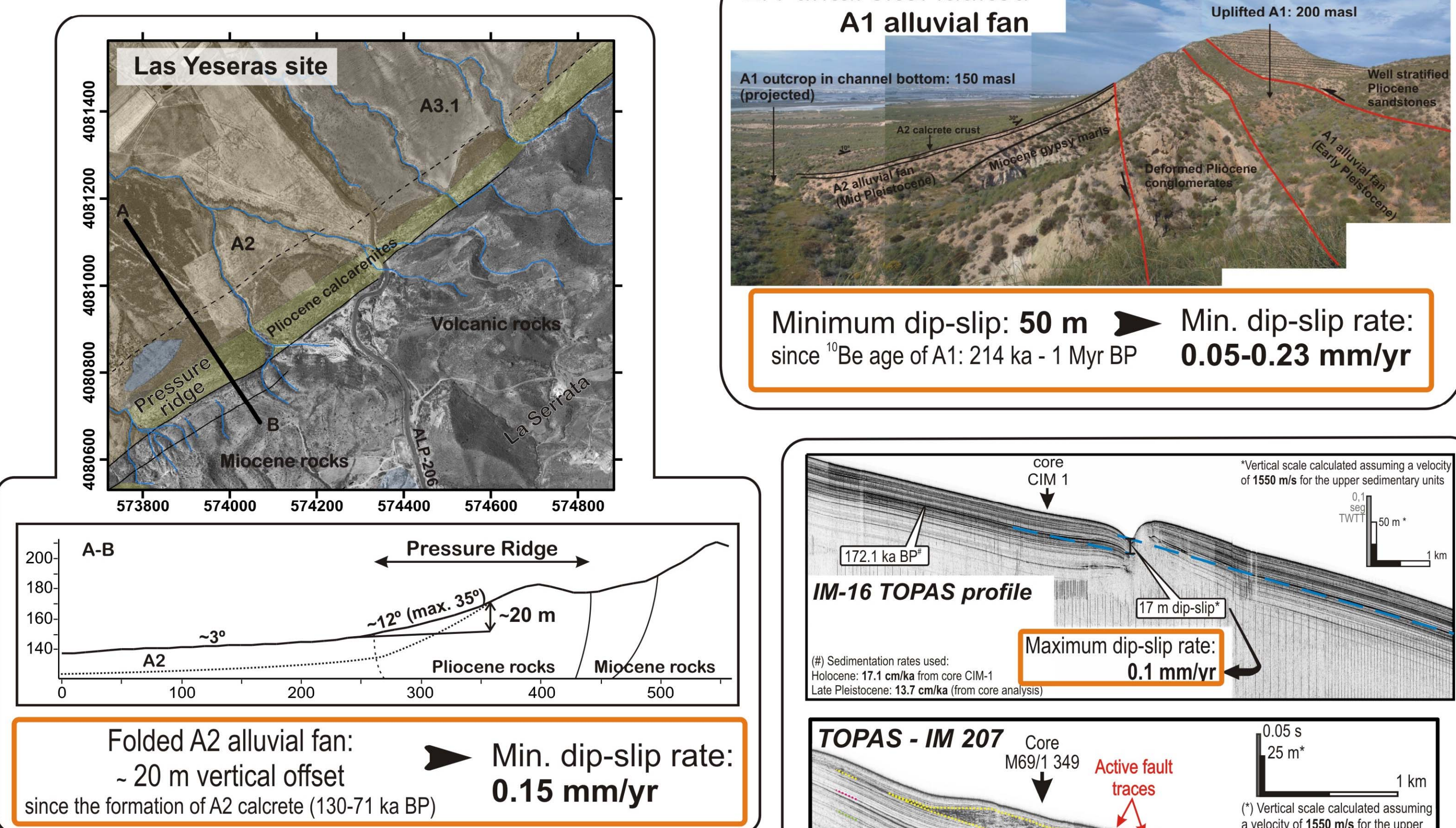
Morphology and structure of the CFZ and location of sites and profiles



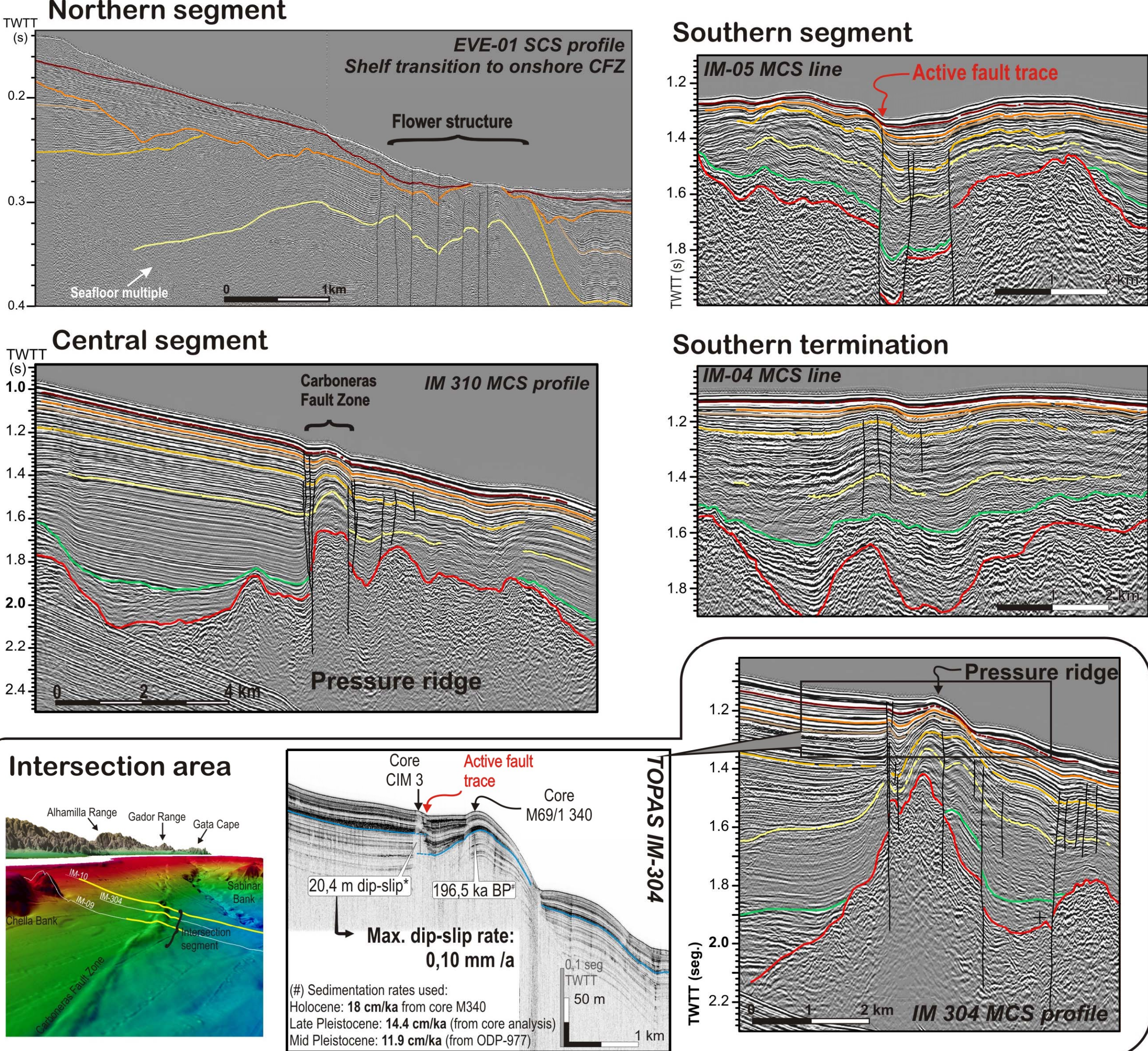
Strike-slip rate results:



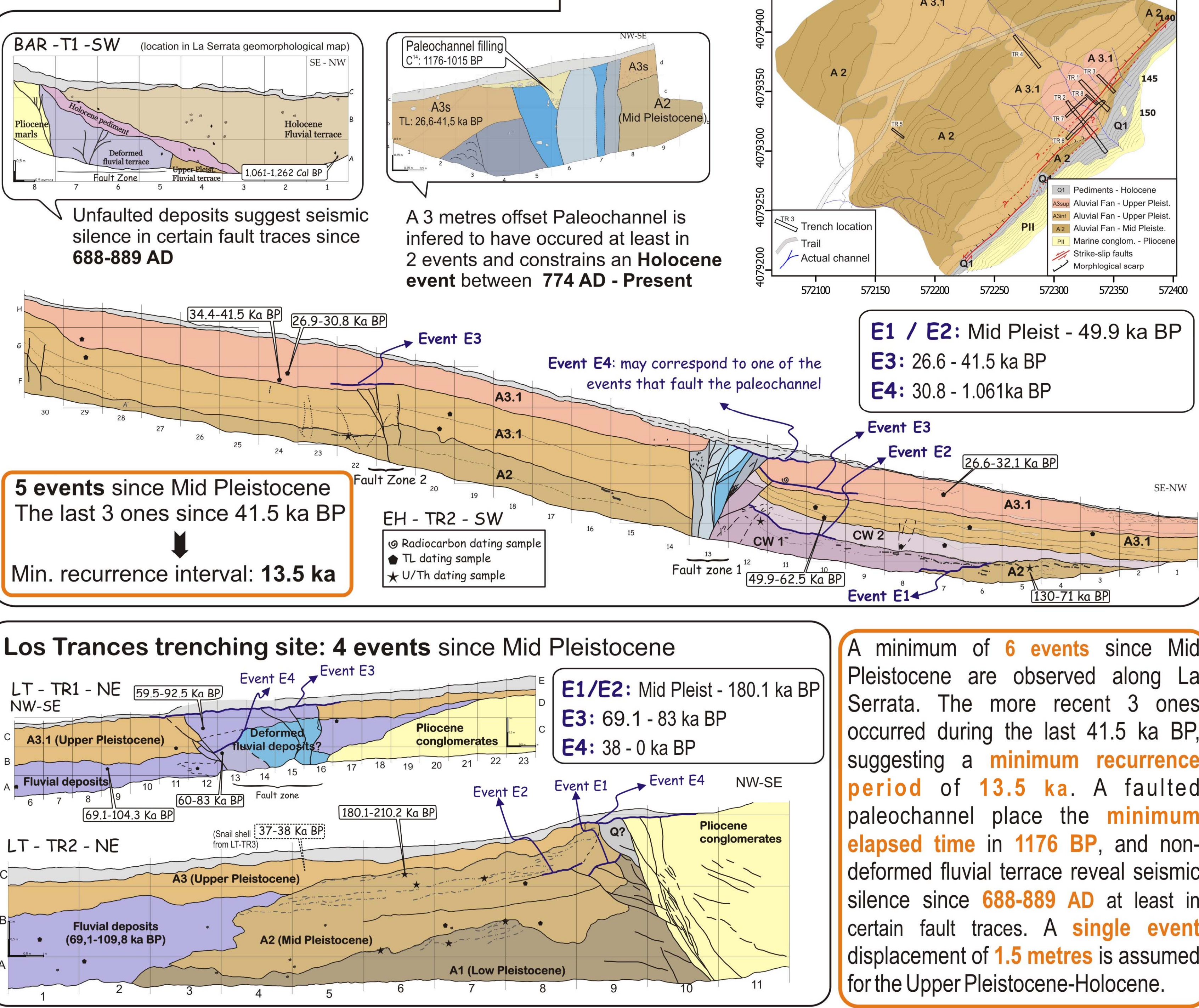
Dip-slip rate results:



Internal architecture of the CFZ



Event Results



A minimum of **6 events** since Mid Pleistocene are observed along La Serrata. The more recent 3 ones occurred during the last 41.5 ka BP, suggesting a **minimum recurrence period** of **13.5 ka**. A faulted paleochannel place the **minimum elapsed time** in **1176 BP**, and non-deformed fluvial terrace reveal seismic silence since **688-889 AD** at least in certain fault traces. A **single event** displacement of **1.5 metres** is assumed for the Upper Pleistocene-Holocene.