

INTERACTION BETWEEN INTERPLATE TOPOGRAPHY AND TSUNAMIGENIC STRUCTURES AT THE SUBDUCCION ZONE OFFSHORE W MEXICO

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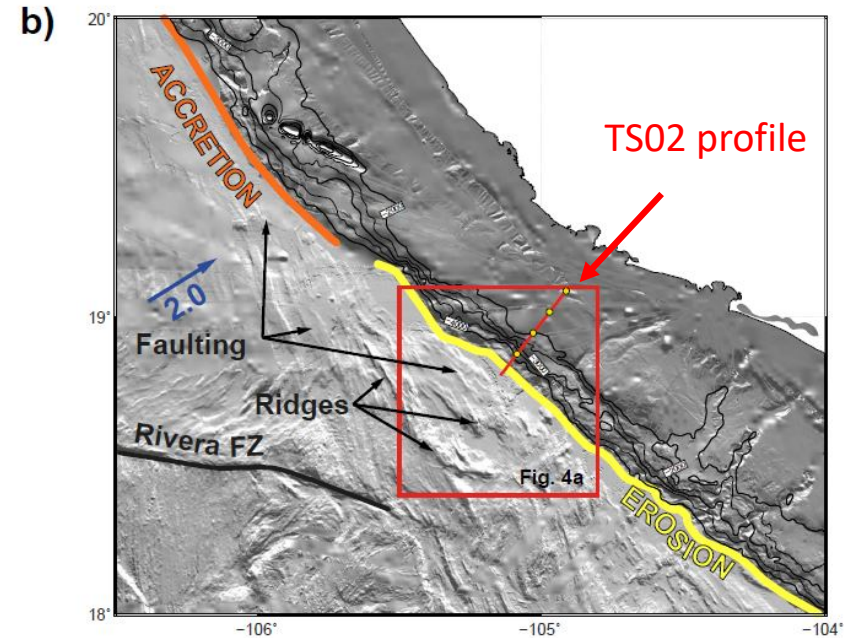
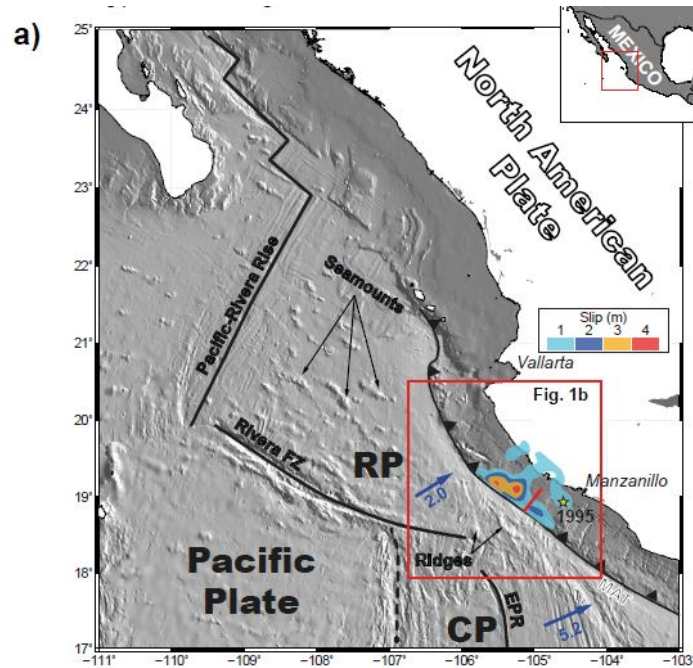
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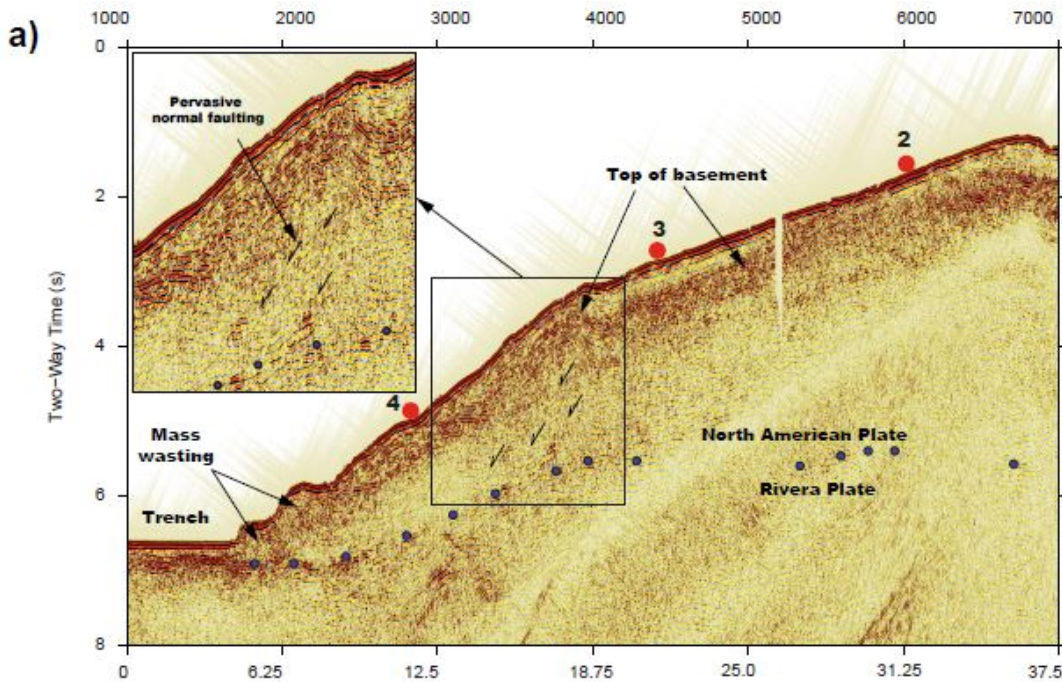


GOAL OF THE WORK:

Study of the megathrust topography role in the generation of tsunamis, by conditioning the tsunamigenic structures of the overriding plate
We use line TS02 that have been acquired with multichannel seismic and ocean bottom seismometers in 2014, perpendicular to the margin

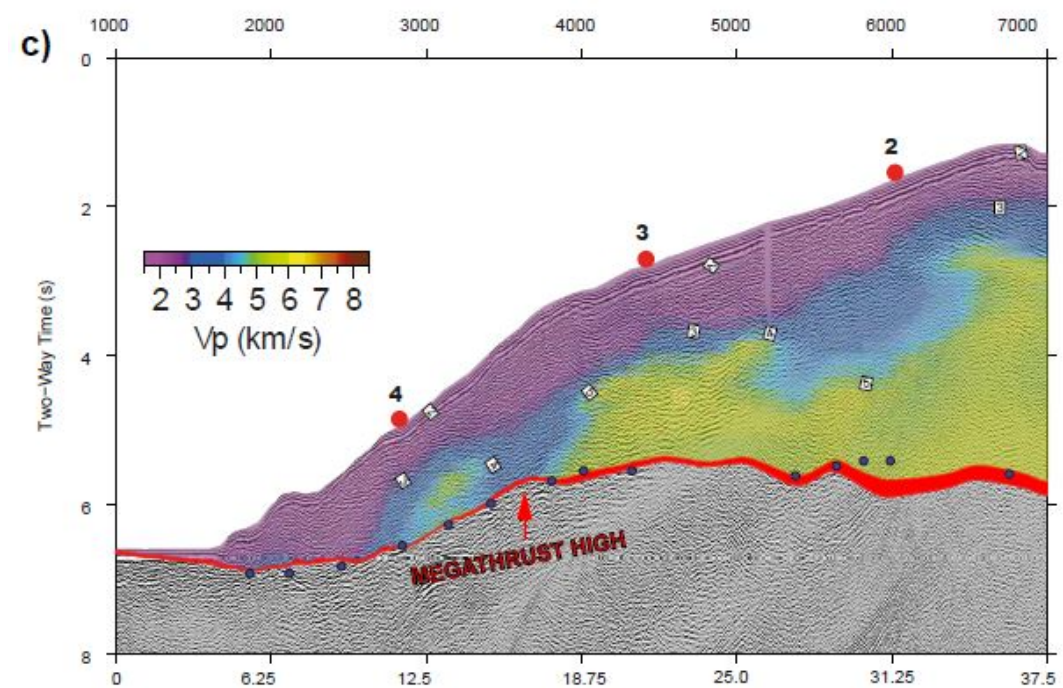
TECTONIC SETTING :

1. The Rivera subduction zone (W Mexico) hosts large megathrust tsunamigenic earthquakes ($M_w > 7.5$) and rarely known tsunamigenic structures
2. Tectonic structures with several sizes and shapes as ridges and seamounts are located in the plate seafloor travelling towards the trench



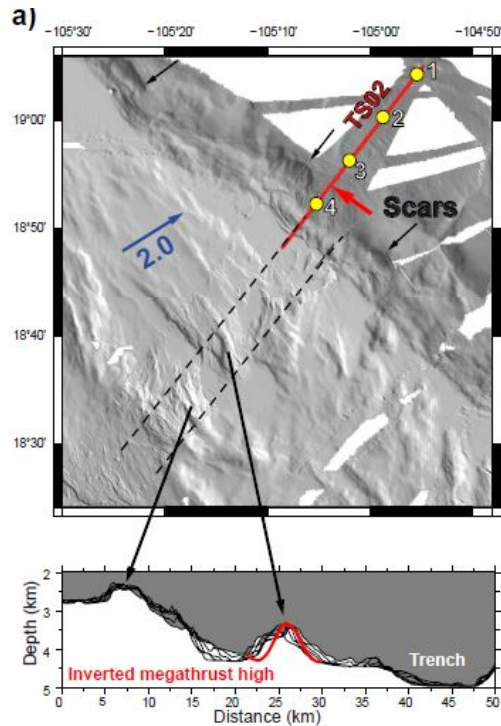
TECTONIC STRUCTURE:

- a) No accretionary prism: subduction erosion type of margin
- b) Seismic profiles imaging pervasive normal faulting in the overriding North American Plate



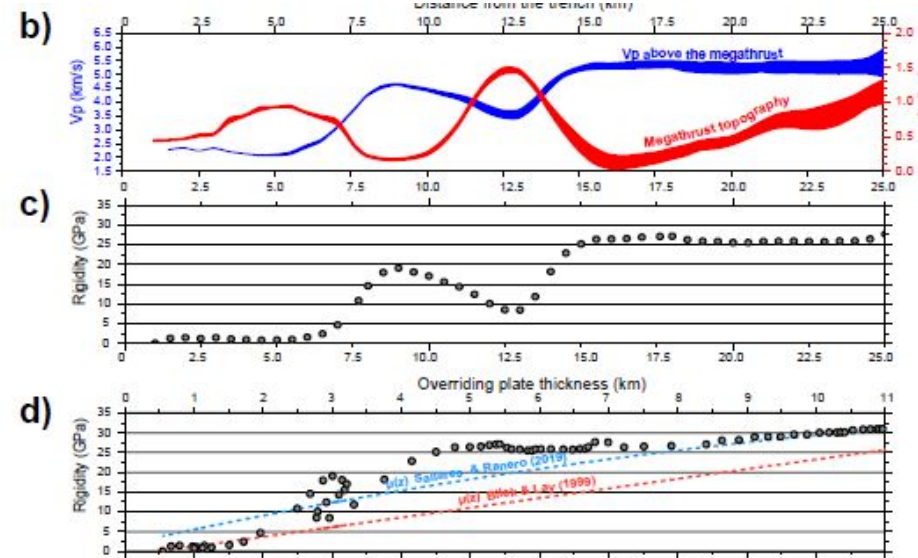
TOMOGRAPHIC P-WAVE MODEL ON TOP MCS SECTION:

- a) Red band is the inverted megathrust interface using jointly reflected travel-times from MCS field data and OBS data
- b) Megathrust high is present at CMP 3500



RESULT #1:

The inverted megathrust high in the shallow domain is comparable in size and shape with some of the incoming ridges observed in the bathymetry of the Rivera Plate



RESULT #2:

P-wave low velocity anomalies of the tomographic model corresponds with highly faulted areas in the seismic image

RESULT #3:

The shallow area of the megathrust is the most affected zone by local topographic variations of the incoming plate

CONCLUSIONS:

Our work demonstrates the strong control that megathrust topography has on:

1. the **convergent margin style** (subduction erosion)
2. the **tectonism** (normal faulting) in the overriding plate
3. the **elastic properties** (velocity and rigidity)

THEREFORE:

The megathrust topography favors tsunamigenesis (low rigidity and slope failure) in the Rivera Plate, offshore W Mexico

