

¿Qué sismos estamos esperando?

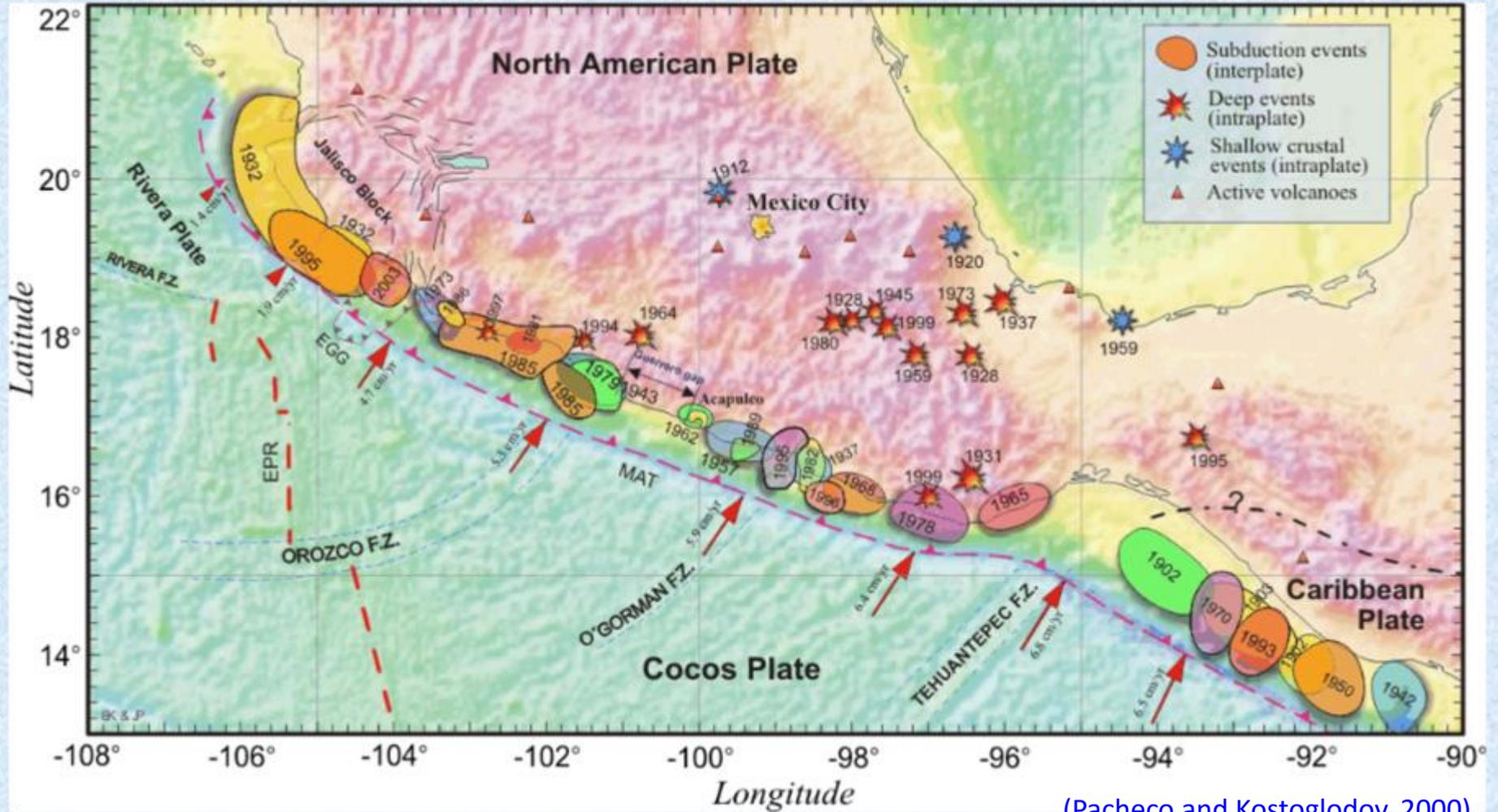
Gerardo Suárez

Instituto de Geofísica, UNAM

ALGUNAS DE ESTAS HIPÓTESIS EN 1985

1. El peligro sísmico mas importante era la Brecha de Guerrero
1. Las fuentes sísmicas que deben preocuparnos están únicamente a lo largo del Pacífico
1. La magnitud máxima de sismos en la zona de subducción de México es: Magnitud = 7.9 a 8.1
1. El sismo de 1985 fue un sismo extraordinario
1. Los sismos ocurren de manera regular en ciertos segmentos de fallas geológicas con la misma magnitud
1. Los tsunamis no representan un peligro en nuestro país

Sismos en México en los últimos 100 años



(Pacheco and Kostoglodov, 2000)

Reportes y Crónicas de Sismos Históricos

on mind' (as well as she could' for the hot day made her feel very sleepy and stupid'), whether the pleasure of making a daisy-chain would be worth the trouble of getting up and picking the daisies. White Rabbit with pink eyes ran close by her. There was nothing so very remarkable in that. Alice thinks it so very much out of the way to hear the Rabbit say to itself, 'Oh dear! Oh dear!' when she thought it over afterwards, it occurred to her that she ought to have wondered at this, but all seemed quite natural), but when the Rabbit actually took a watch out of its waistcoat-pocket and then hurried on, Alice started to her feet, for it flashed across her mind that she had never seen a rabbit with either a waistcoat-pocket, or a watch to take out of it, and burning with curiosity she ran across the field after it, and fortunately was just in time to see it pop down a large rabbit-hole under the hedge. In another moment down went Alice after it, never once considering how in the world she was to get up again. The rabbit-hole went straight on like a tunnel for some way, and then dipped suddenly down, so Alice had not a moment to think about stopping herself before she found herself falling down a very deep well. Either the well was very deep, or she fell very slowly, for she had plenty of time as she went down to look about her and to wonder what was going to happen next. First, she tried to look down and make out what

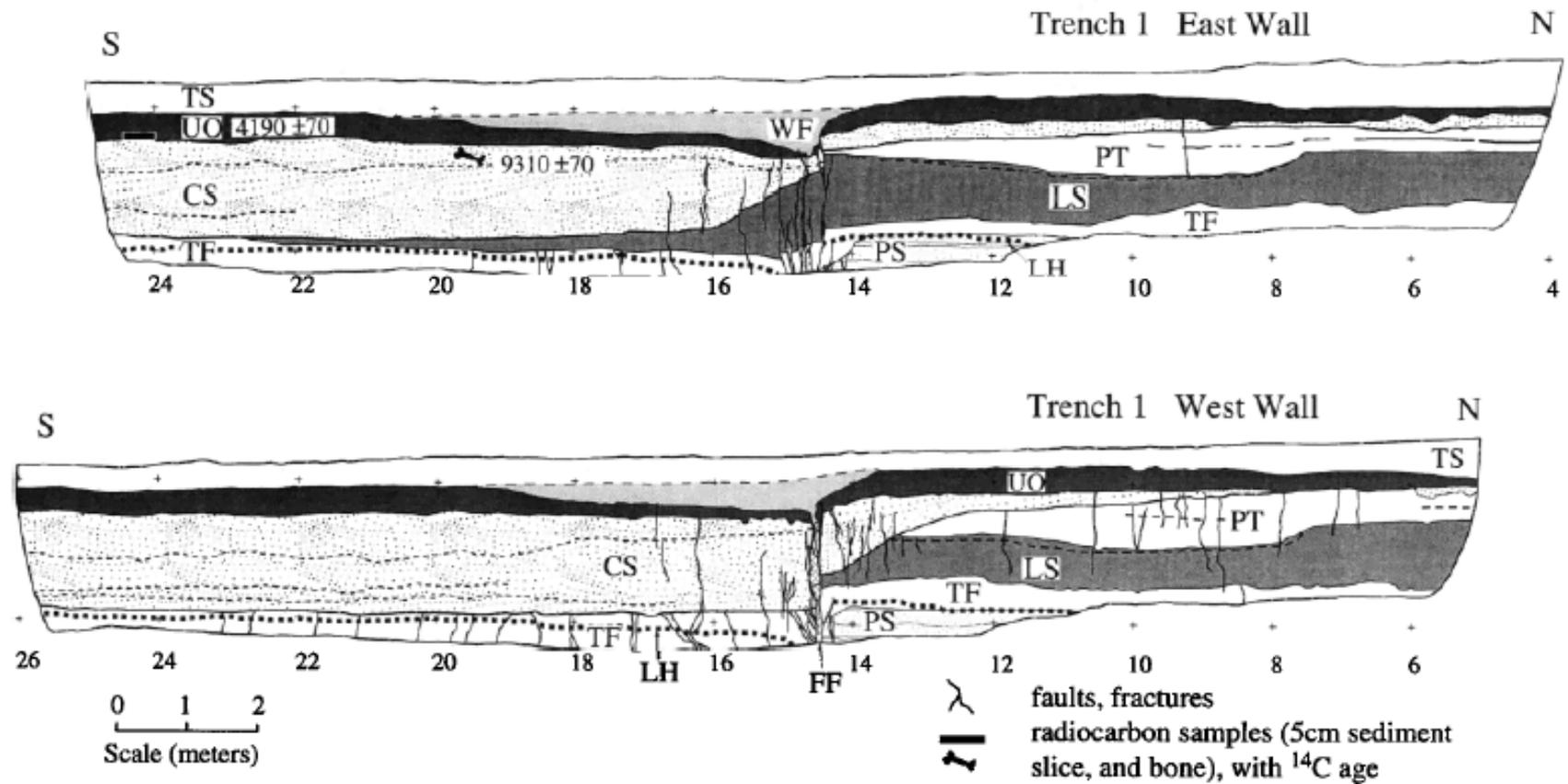
Estudio de Paleosismos

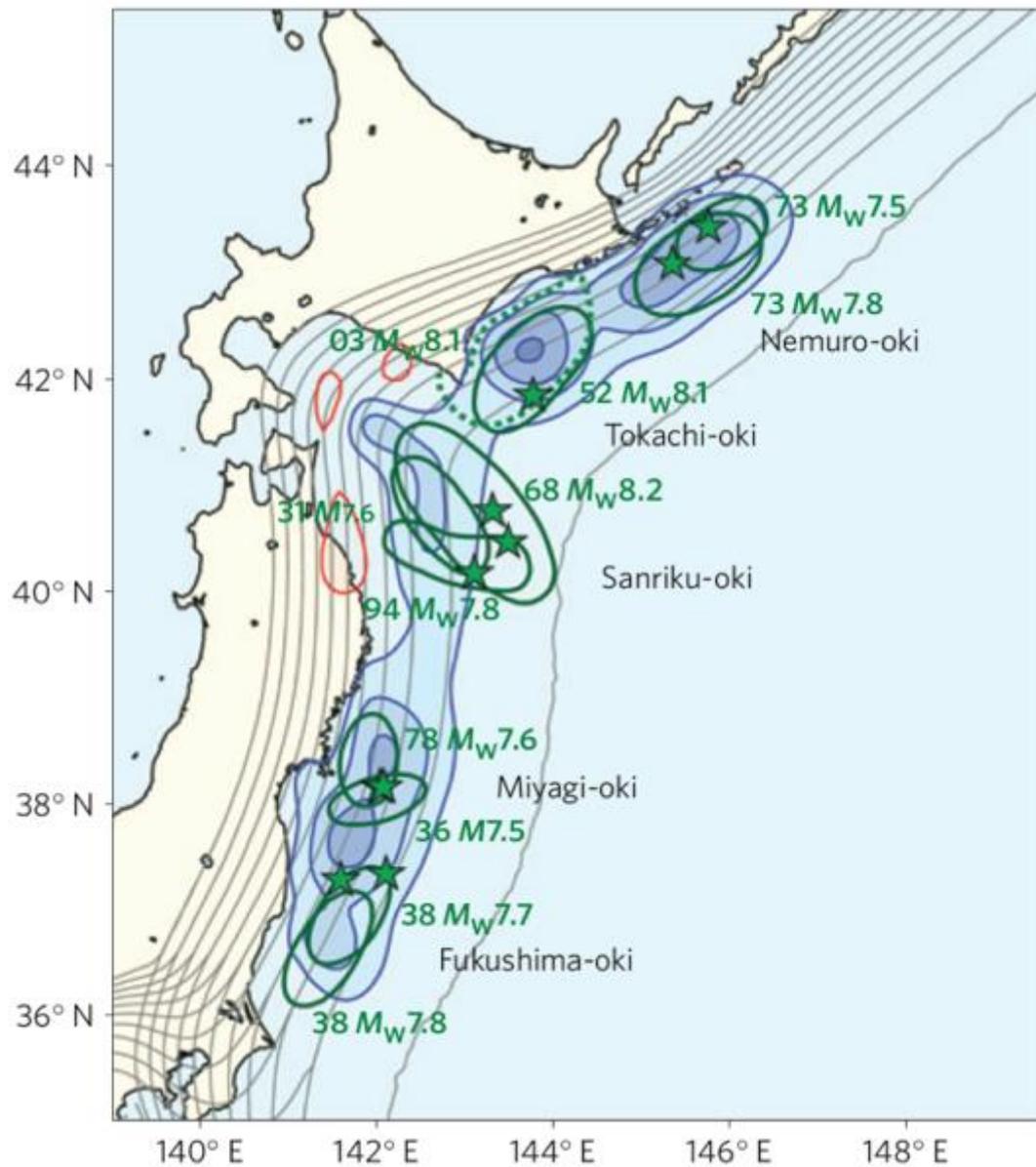


Evidencia Estratigráfica de Fallas prehistóricas en Acambay

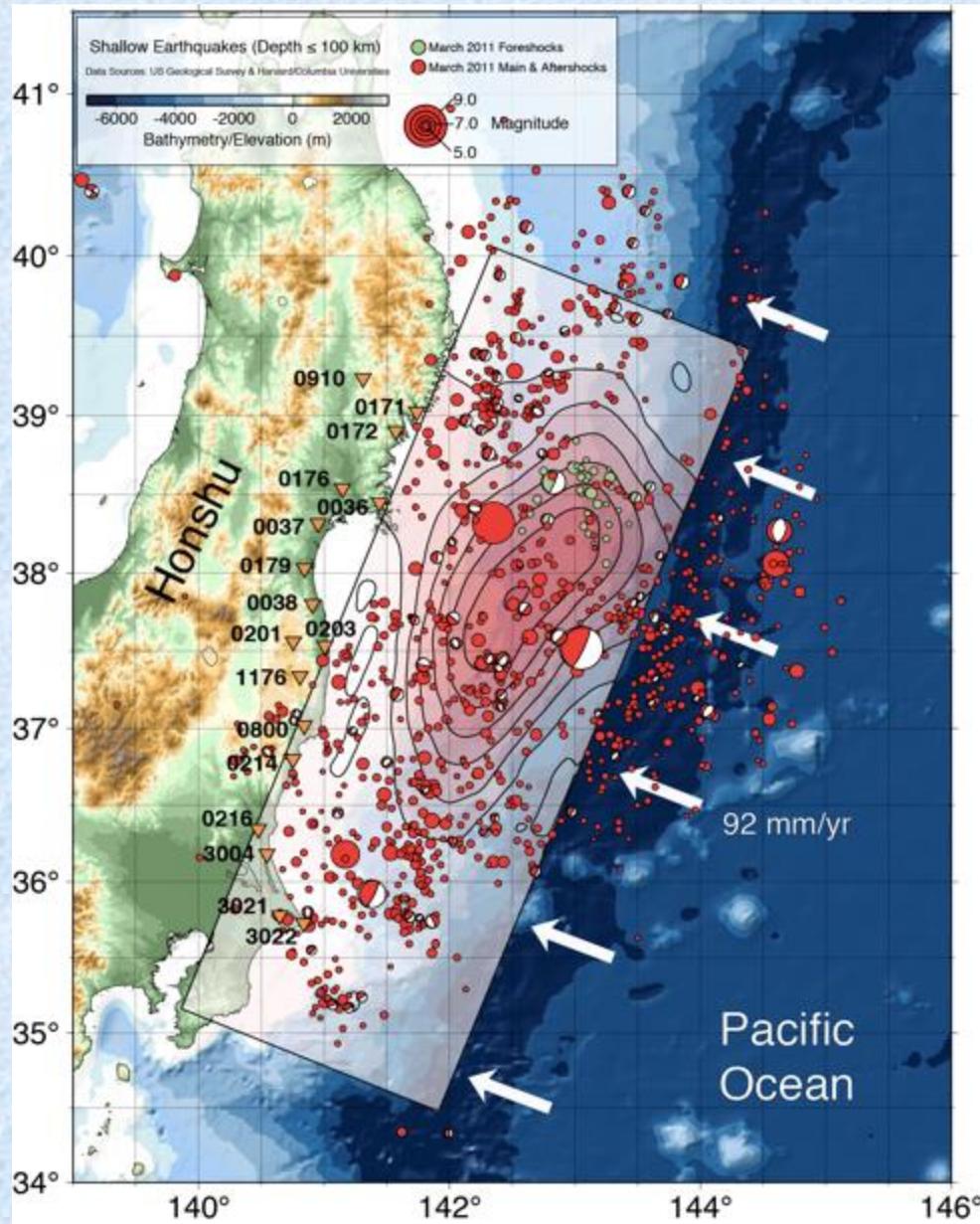
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LANGRIDGE ET AL.: PALEOSEISMOLOGY OF THE ACAMBAY-TIXMADEJÉ FAULT





Sismos
registrados
en el norte de
Japón
antes de 2011



Sismo de Japón de 2011

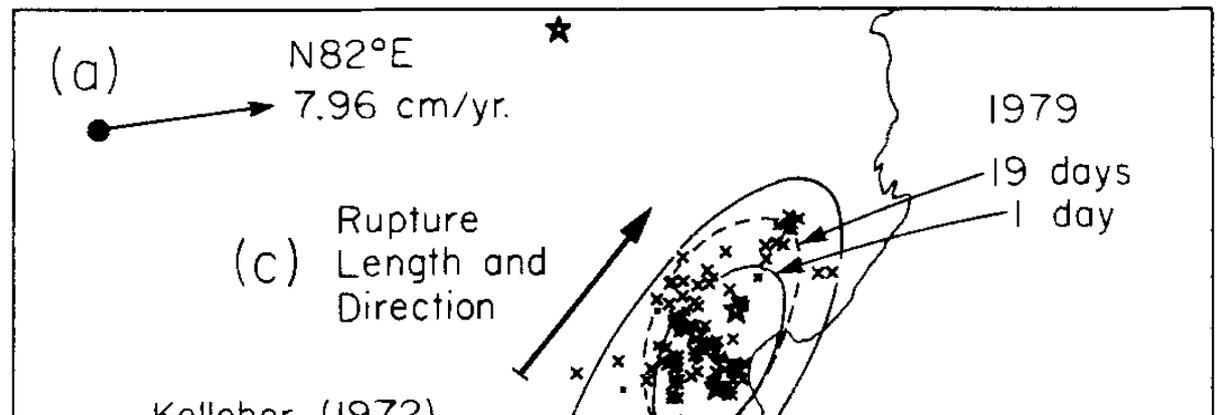
Longitud de ruptura de casi 600 km de largo

HIROO KANAMORI AND KAREN C. McNALLY

THE 1979 EVENT

Kanamori and Given (1981) made a detailed analysis of this event using waves recorded at seven IDA (International Deployment of Accelerometers) stations. Since the details are given in Kanamori and Given, we briefly summarize the results in the following.

Kanamori and Given (1981) inverted the Rayleigh-wave spectra at the IDA stations using a moment tensor source placed at a depth of 33 km. The moment tensor obtained was decomposed into the major and the minor double couples (Kanamori, 1980). The seismic moment of the minor double couple is 0.5



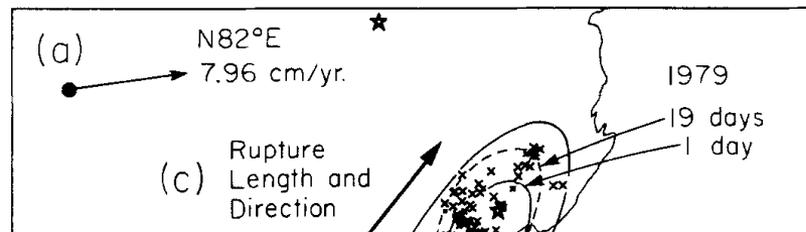
Ruptura Variable

HIROO KANAMORI AND KAREN C. McNALLY

THE 1979 EVENT

Kanamori and Given (1981) made a detailed analysis of this event using surface waves recorded at seven IDA (International Deployment of Accelerometers) stations. Since the details are given in Kanamori and Given, we briefly summarize the results in the following.

Kanamori and Given (1981) inverted the Rayleigh-wave spectra at 10 stations using a moment tensor source placed at a depth of 33 km. The moment tensor obtained was decomposed into the major and the minor double couples (Kanamori, 1980). The seismic moment of the minor double couple is 0.1

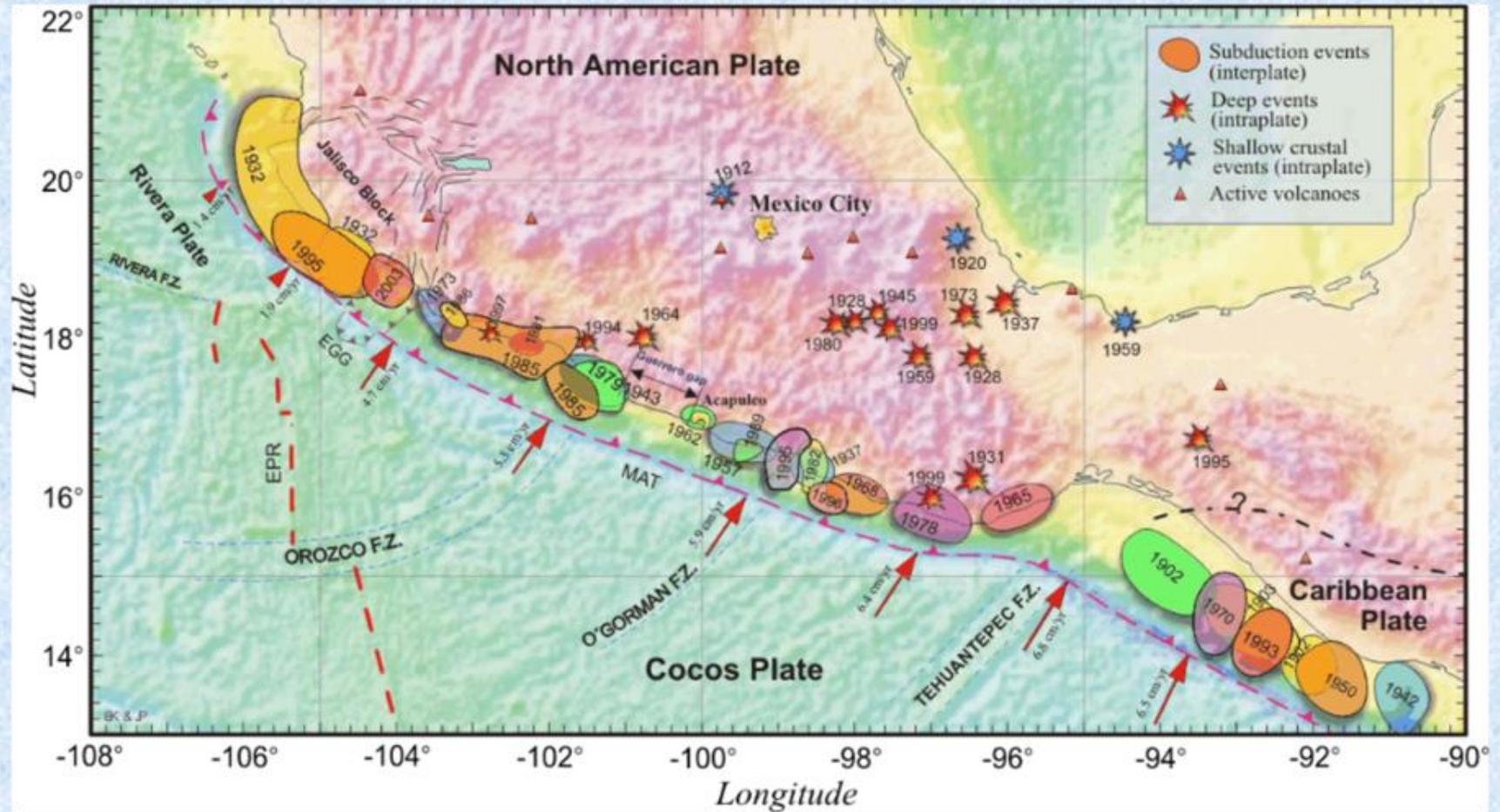


seismic displacement in a great earthquake was caused by a series of smaller earthquakes which occurred one after another. Sykes and Quittmeyer (1981) proposed a rupture model in which the stress drop

¿Cómo estimar la magnitud máxima esperada en la zona de subducción en México: en particular en Guerrero?

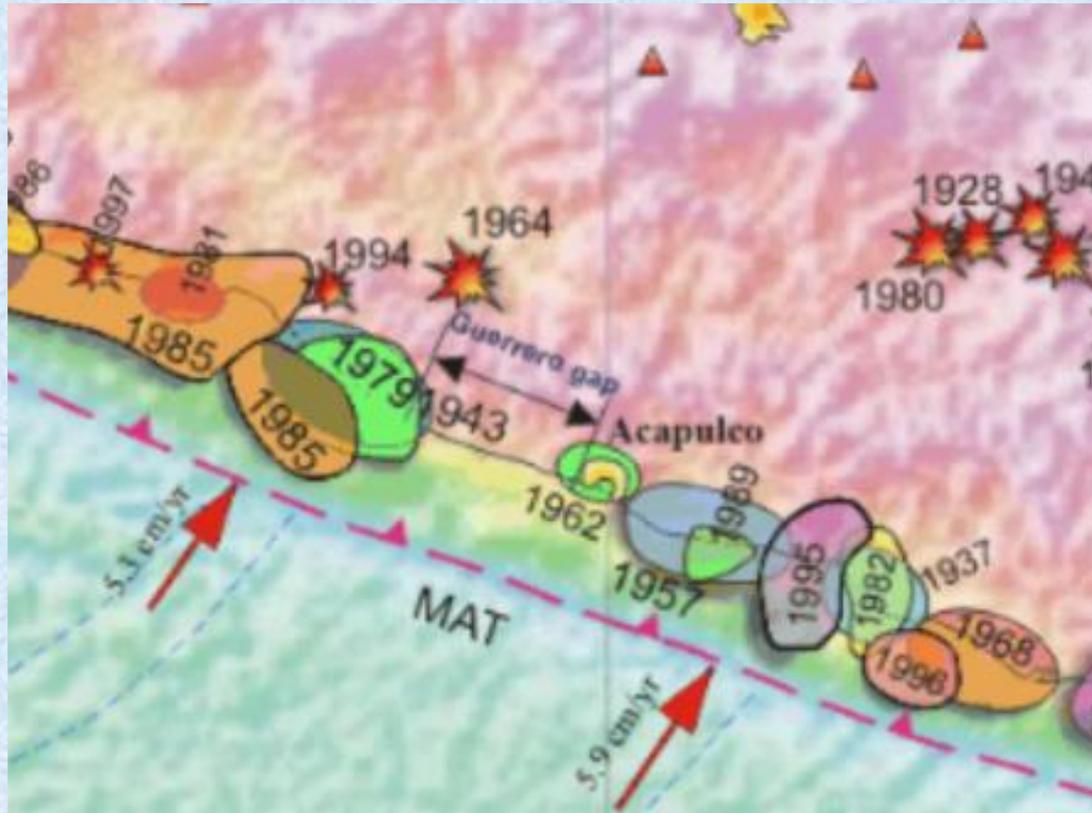
Pregunta Clave: ¿Es o no capaz de generar sismos mayores a 8.0?

¿Qué es el gap de Guerrero?

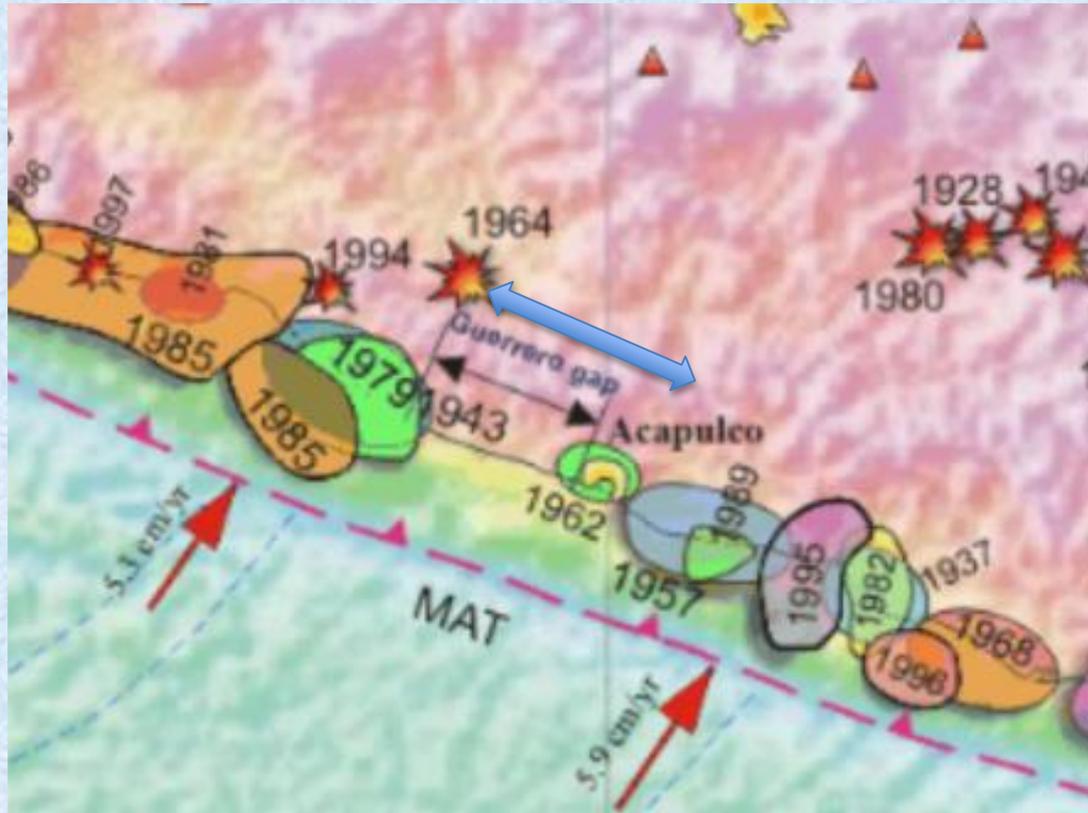


(Pacheco and Kostoglodov, 2000)

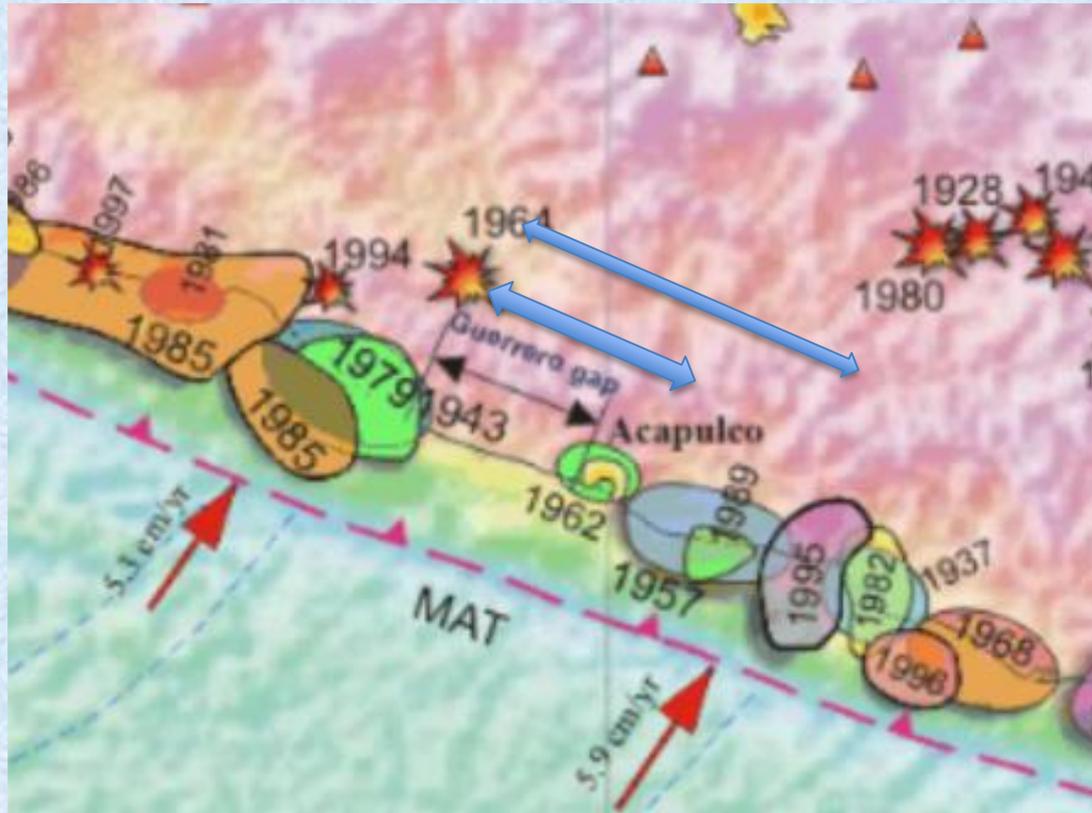
¿Magnitud 7.8?



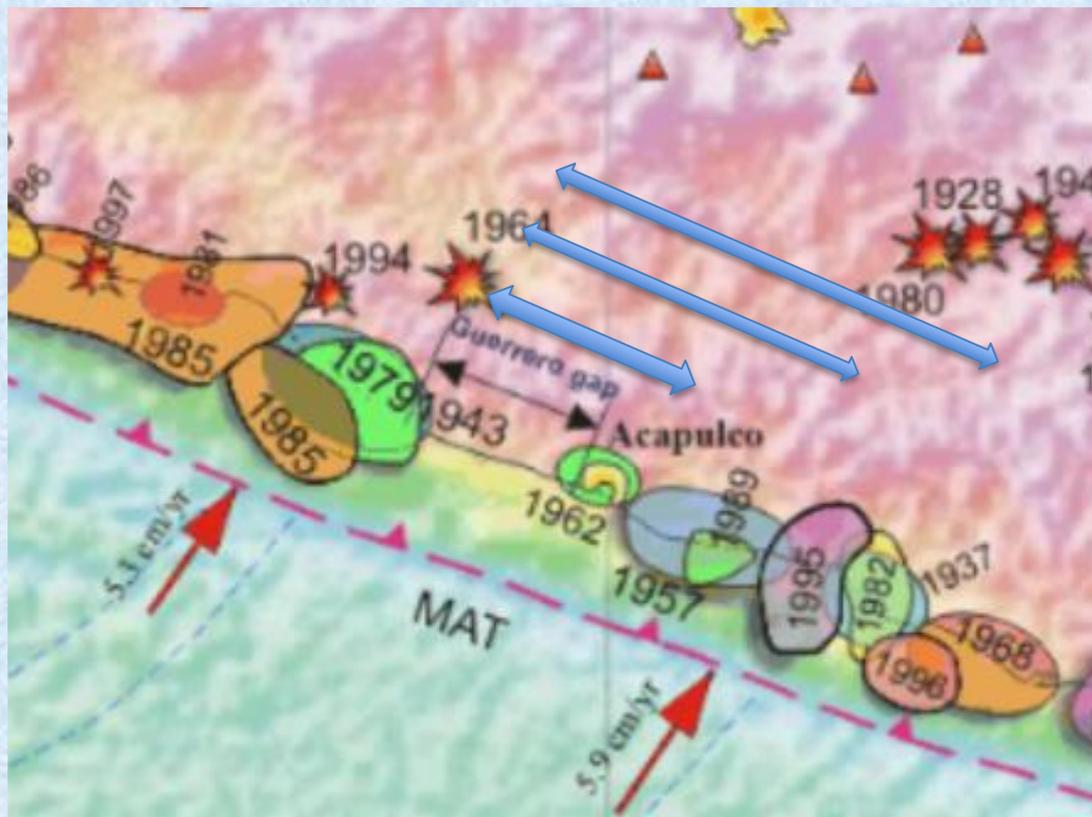
¿Magnitud 8.2?



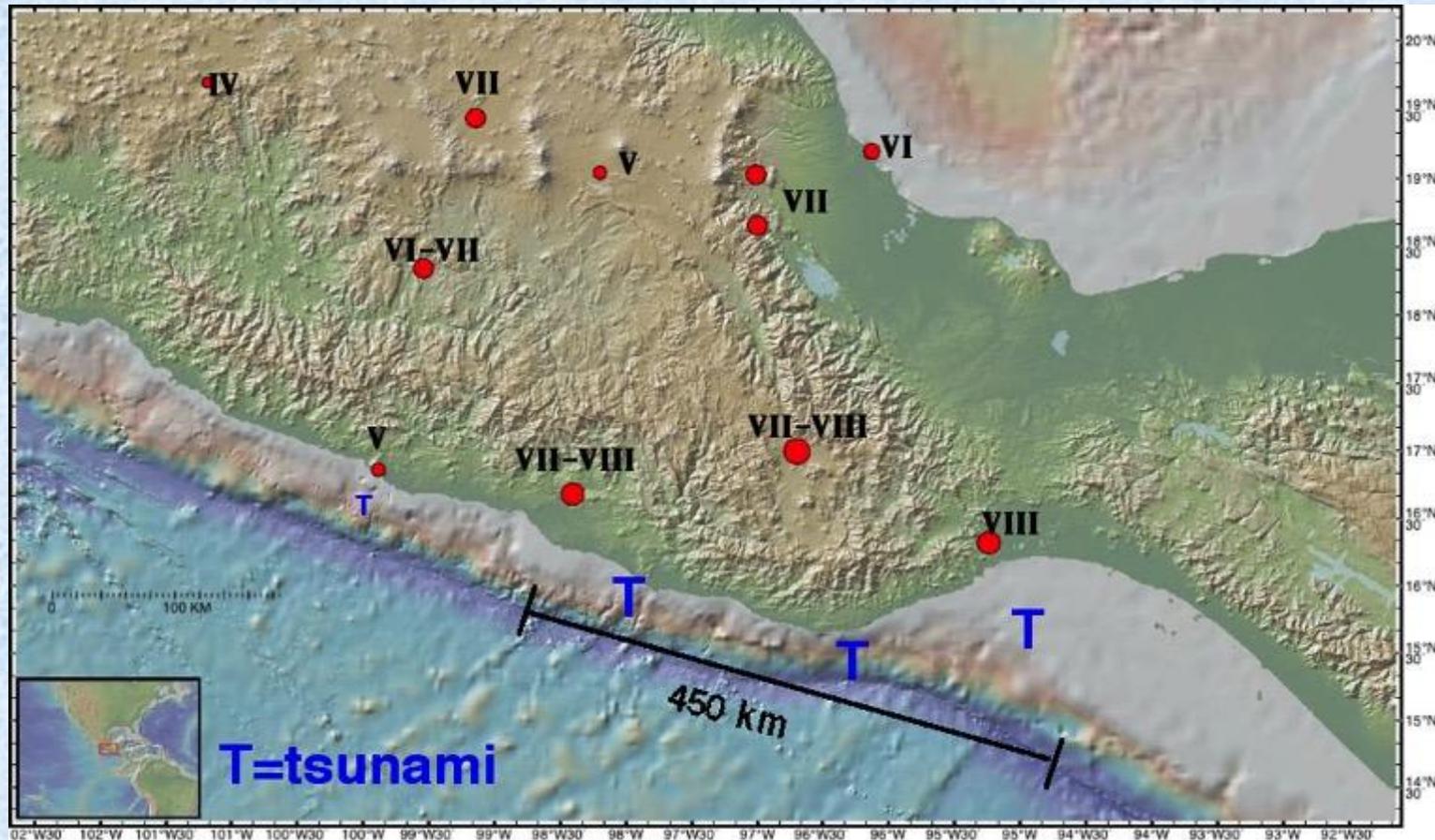
¿Magnitud 8.4?



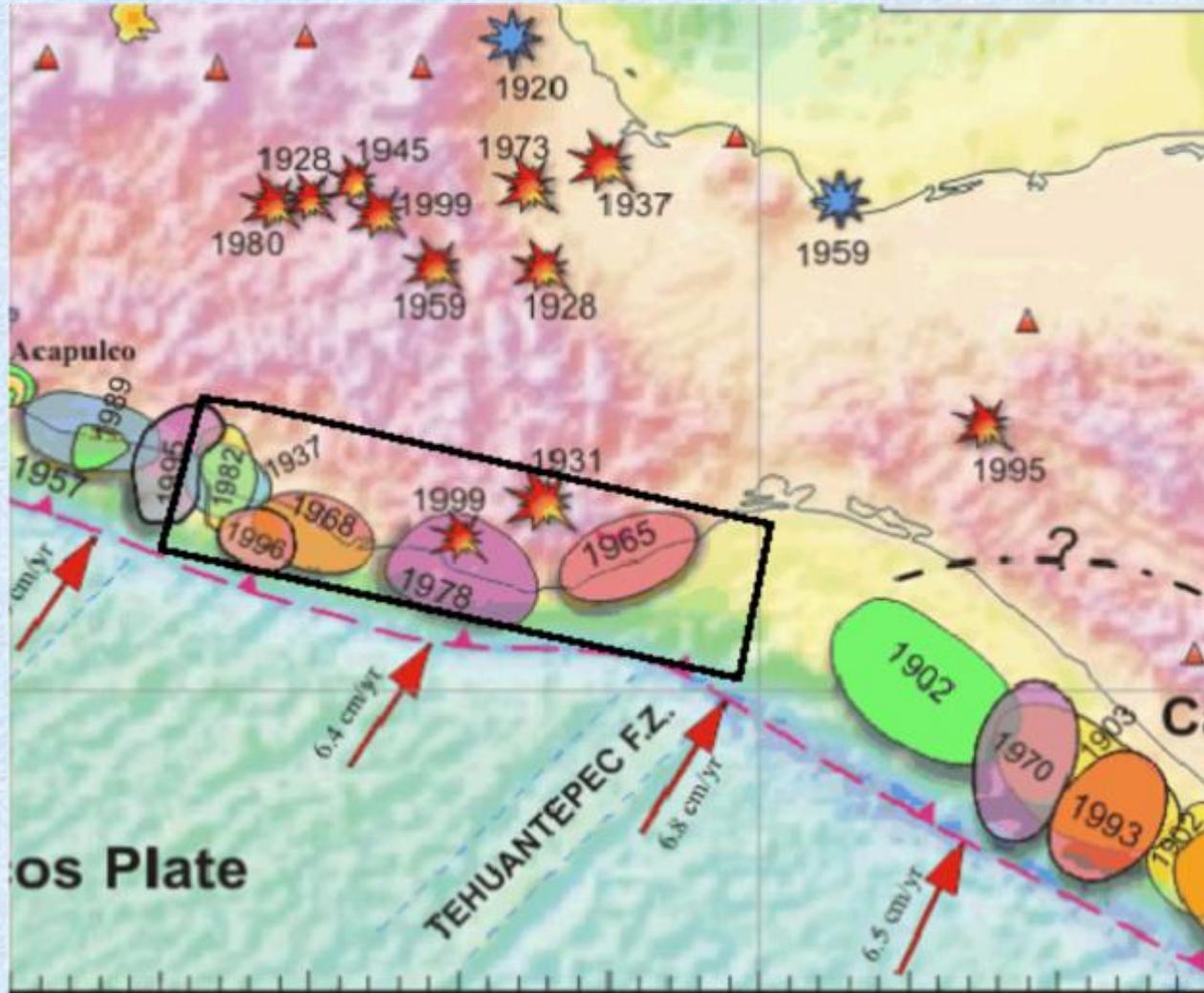
¿M 8.6?



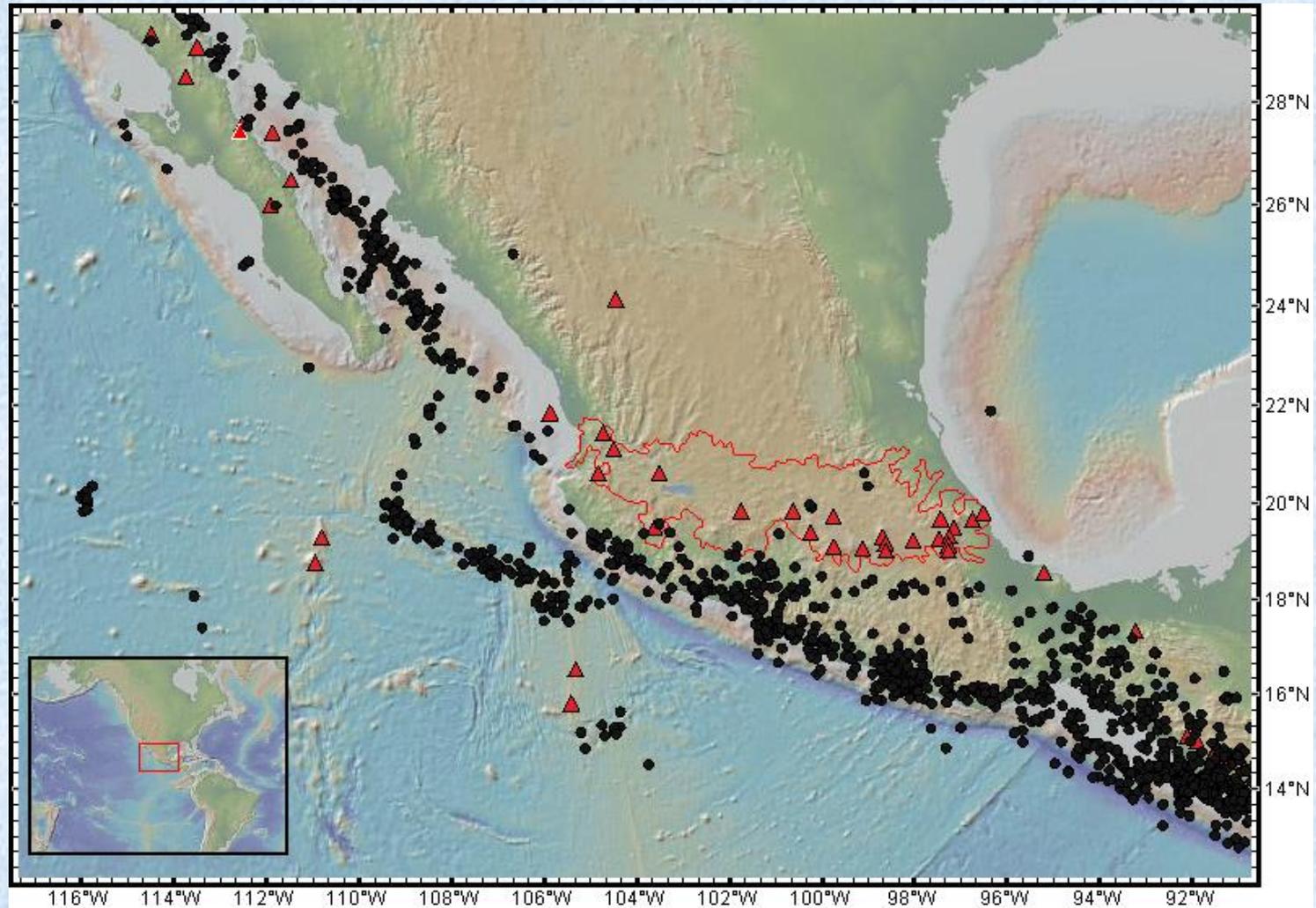
Sismo de 1787 en la costa de Oaxaca: Magnitud probable de 8.4-8.6

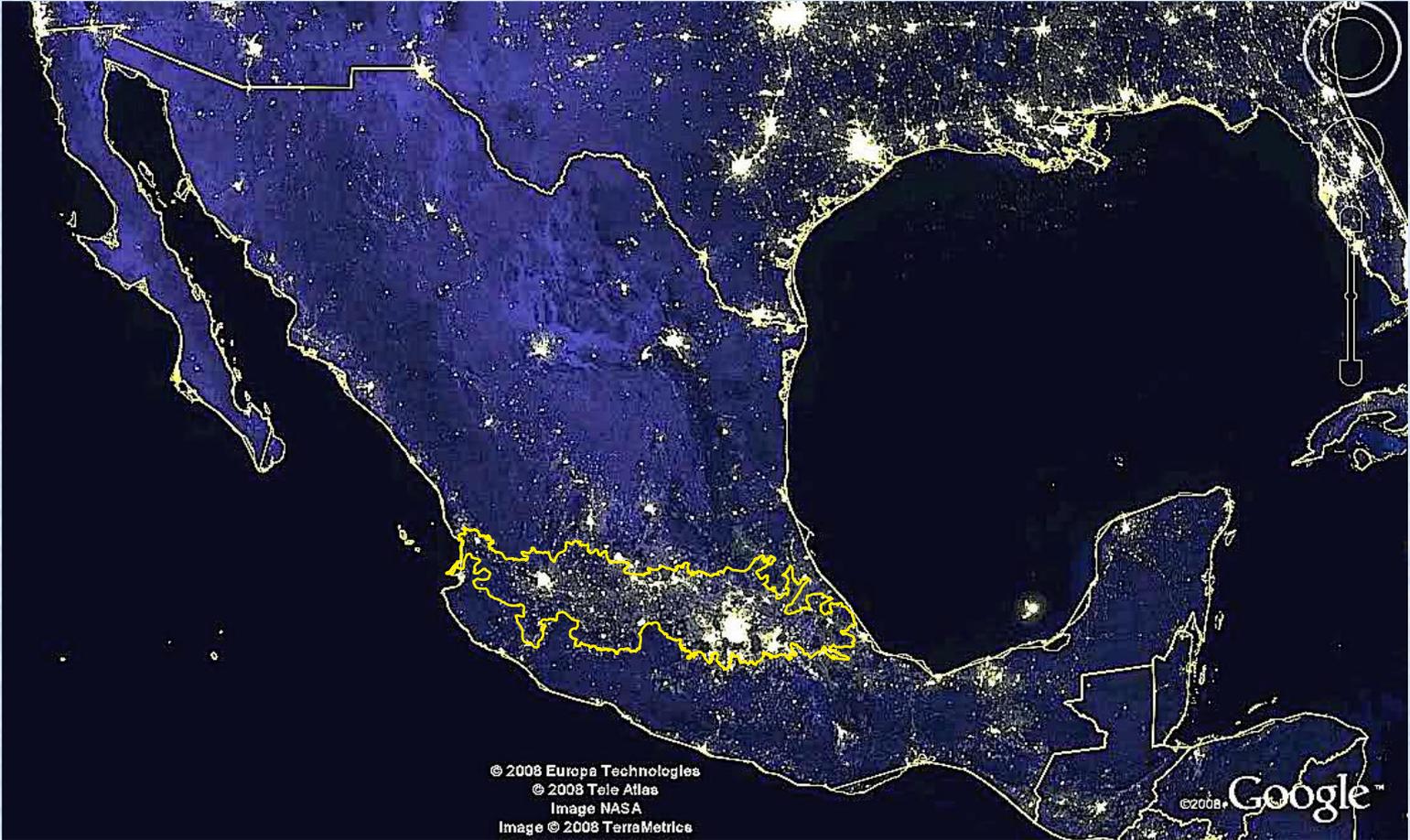


Sismo de 1787



Faja Volcánica Mexicana

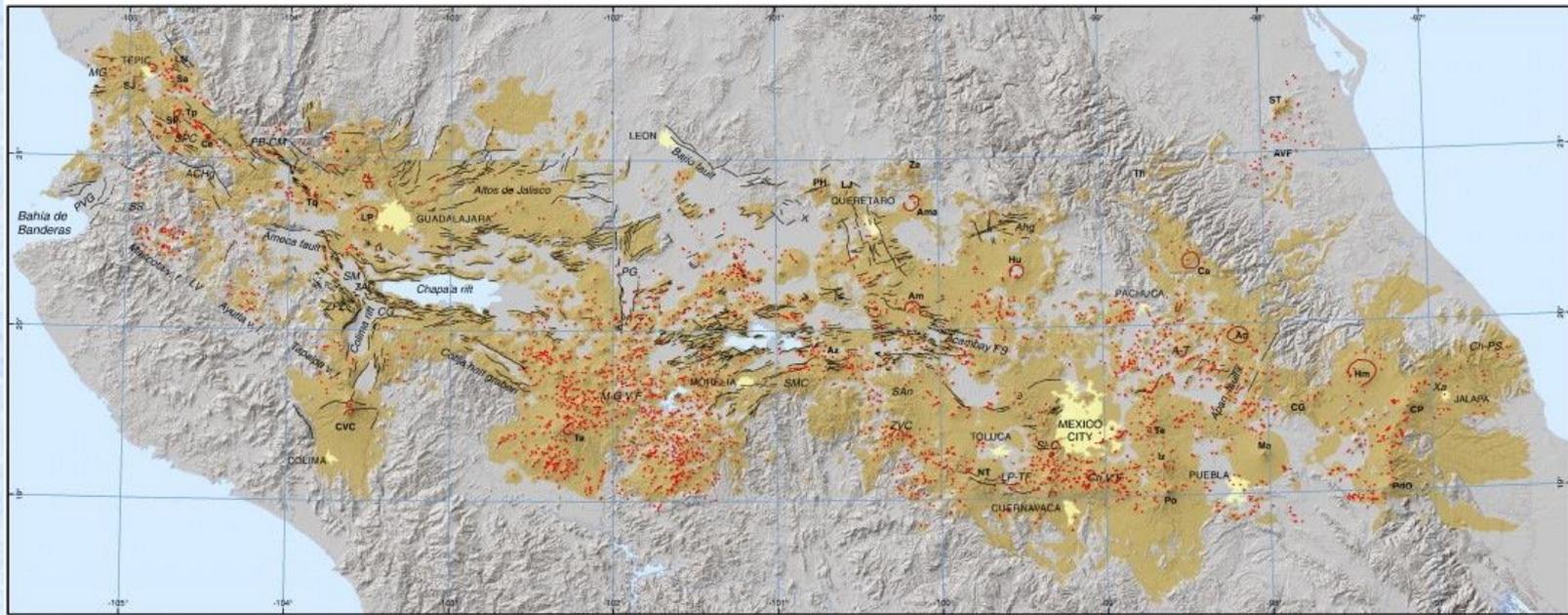




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El Eje Volcánico Mexicano



Ferrari et al., 2012=

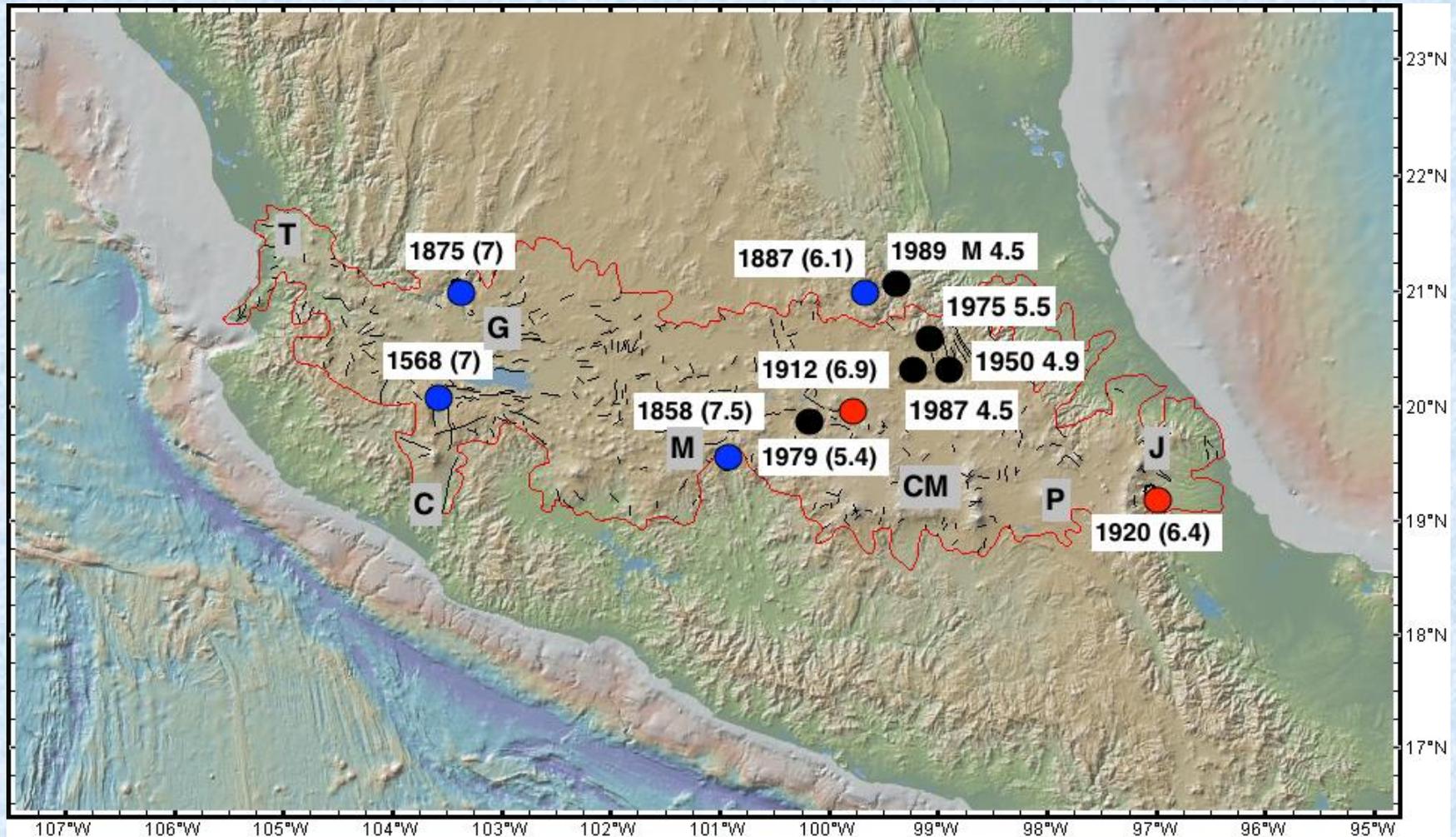


El daño causado por el evento de Murcia, España (Mayo 5 2011, $M_w = 5.1$) fue muy importante en la ciudad e incluyó la destrucción de una iglesia del siglo XV (foto de Miguel Santoyo).



La sismicidad de baja magnitud y largos periodos de retorno es generalmente ignorada en las estimaciones de peligro sísmico.

Sismos en el Eje Volcánico Mexicano



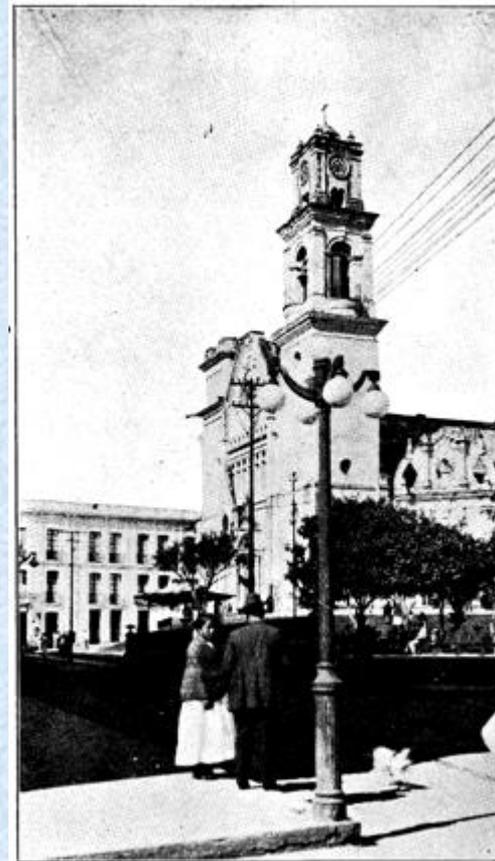
Daños en Acambay y Temascalcingo (1912)



Sismo de Xalapa, 1920



Cosautlán, Ver.



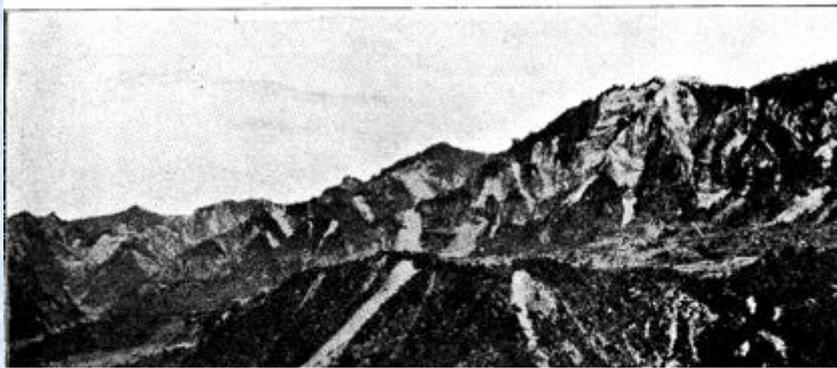
Xalapa,



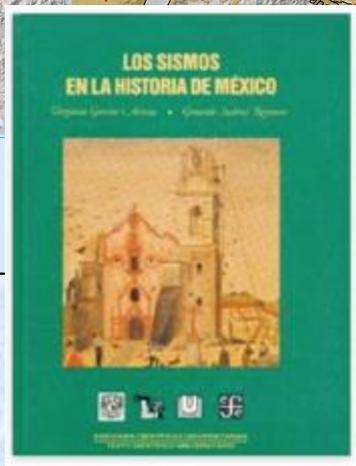
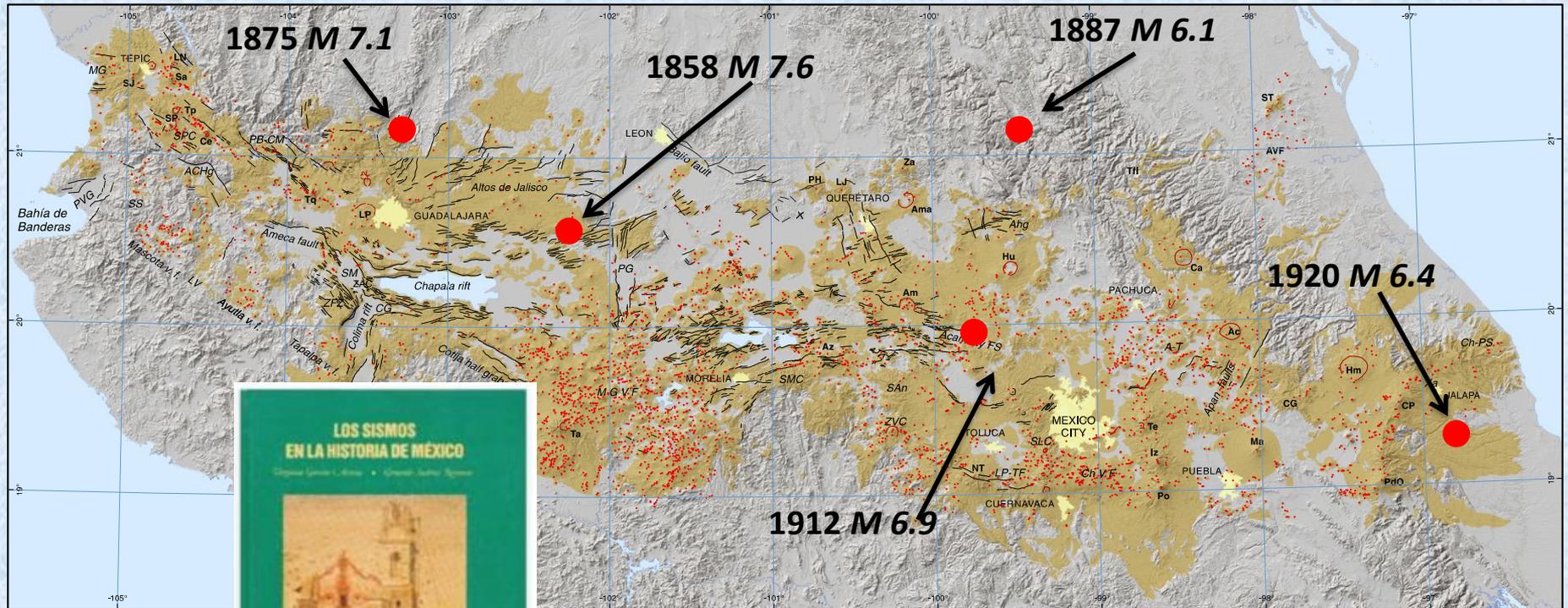
Teocelo, Ver.



Falla de Laderas durante el sismo de Xalapa 1920

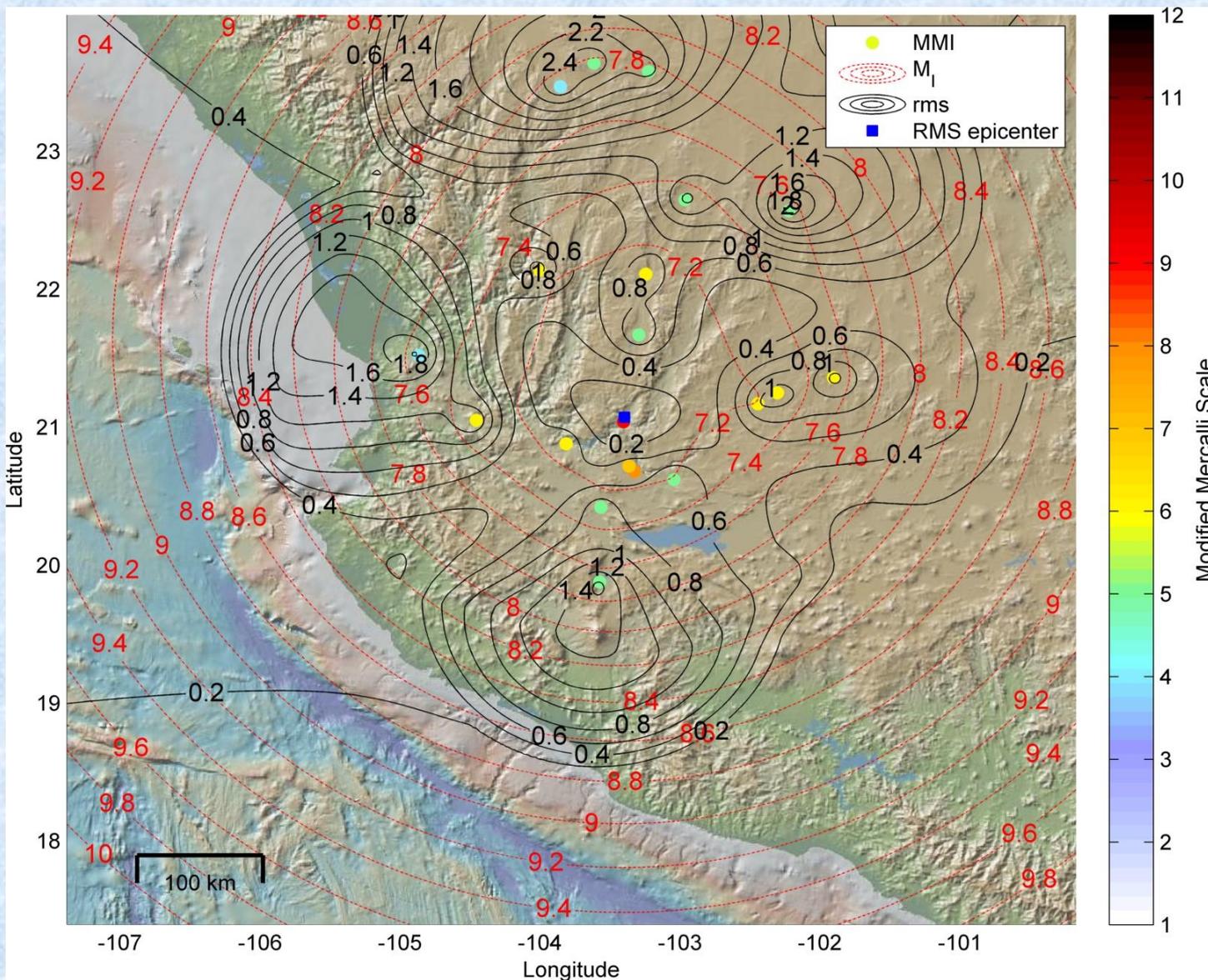


Sismos Históricos en la Faja Volcánica Mexicana



(modificado de Ferrari et al (2012)
y Suárez y Jiménez (2016))

SISMO DE JALISCO DE 1875



ALGUNAS REFLEXIONES FINALES

- El peligro sísmico más inmediato podría no ser necesariamente la brecha de Guerrero, ni la zona de subducción
- La magnitud esperada de la Brecha de Guerrero podría ser mayor a la esperada de $M \sim 7.9$. Podría ser un sismo mucho más grande aunque la probabilidad de que ocurra es menor
- Los sismos en la Faja Volcánica Transmexicana pueden representar una amenaza importante para la región más poblada del país
- No necesariamente los sismos en la Faja Volcánica tienen que tener una magnitud muy grande para causar importantes daños humanos y materiales

Muchas Gracias

