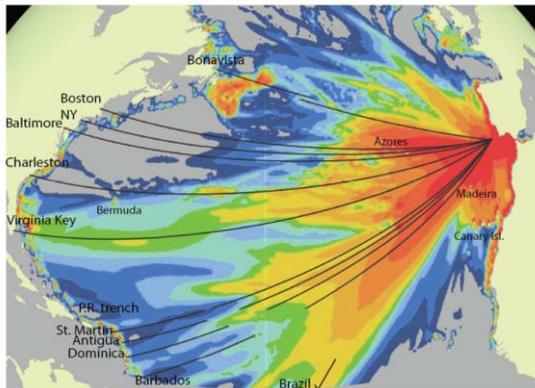


Evaluation of Tsunami Sources with the Potential to Impact the U.S. Atlantic and Gulf Coasts

An Updated Report to the Nuclear Regulatory Commission

By Atlantic and Gulf of Mexico Tsunami Hazard Assessment Group

2008

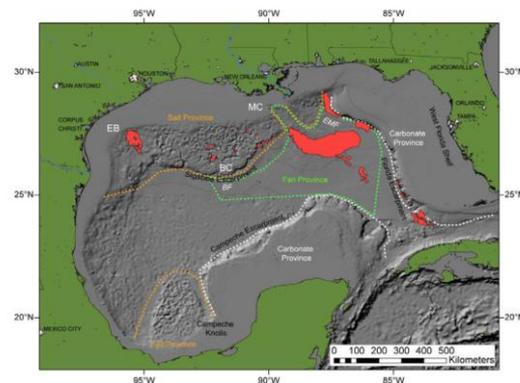


USGS research of tsunami sources in Caribbean, Atlantic, and Gulf of Mexico funded by the USGS and by the US-NRC with help from NOAA

Regional Assessment of Tsunami Potential in the Gulf of Mexico

Report to the National Tsunami Hazard Mitigation Program

2009



2009

USGS science for a changing world
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Accounts of Damage from Historical Earthquakes in the Northeastern Caribbean, to Aid in the Determination of their Location and Intensity Magnitudes

By Claudia H. Flores, Uri S. ten Brink, and William H. Bakun

Abstract

Earthquakes have been documented in the northeastern Caribbean since the arrival of Columbus to the Americas; written accounts of these felt earthquakes exist in various parts of the world. To better understand the earthquake cycle in the Caribbean, the records of earthquakes in earlier catalogs and

First posted February 1, 2012

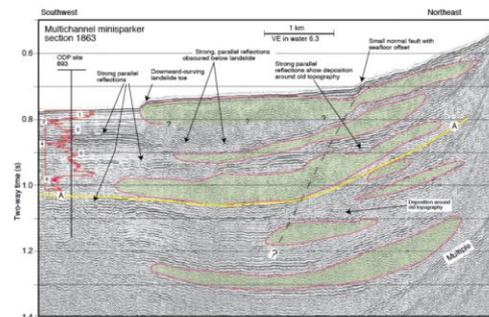
Report PDF (1.68 MB)



NRC/USGS Workshop Report: Landslide Tsunami Probability

Convened August 18-19, 2011 at the USGS Woods Hole Science Center, Woods Hole, MA

By Eric L. Geist and Uri S. ten Brink



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Administrative Report, 2012

U.S. Department of the Interior
 U.S. Geological Survey

Volume 38A, Issues 1-2 | 1 August 2009 | ISSN 0026-2275

MARINE GEOLOGY

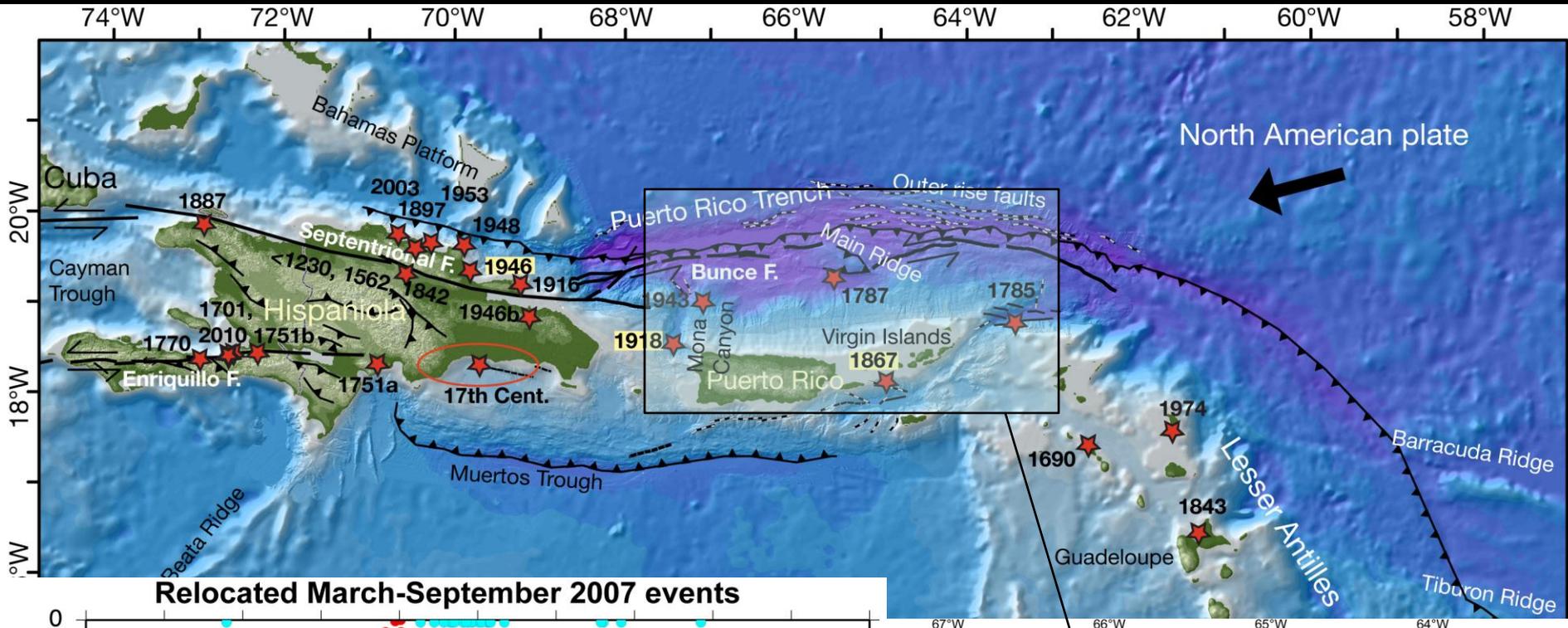
INTERNATIONAL JOURNAL OF MARINE GEOLOGY, GEOCHEMISTRY AND GEOPHYSICS

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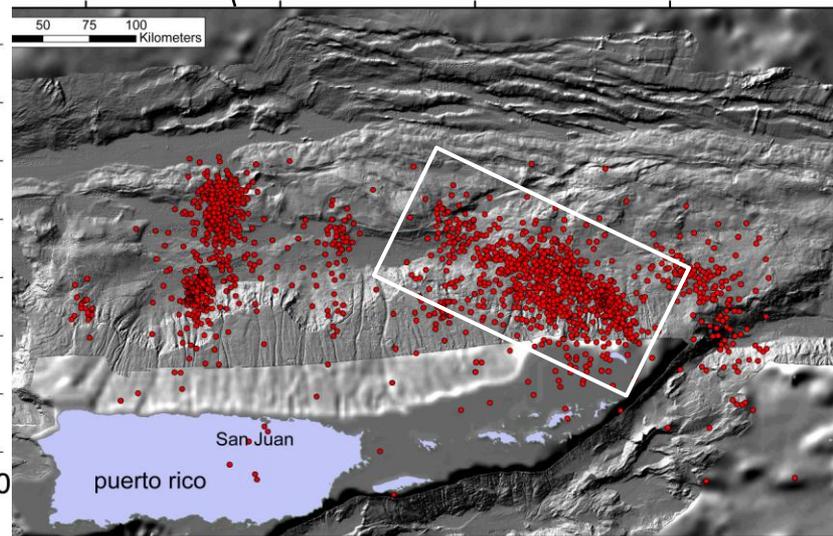
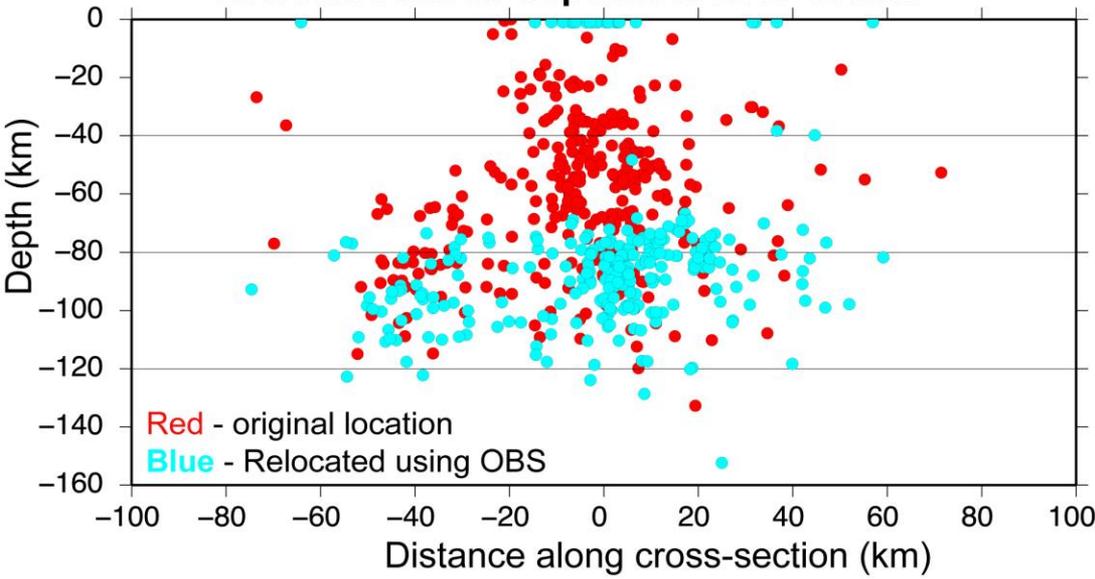
SPECIAL ISSUE: Truncated basalt along the U.S. Atlantic coast
 U.S. Inv. S. Brink (Editor)

Papers and reports can be downloaded from
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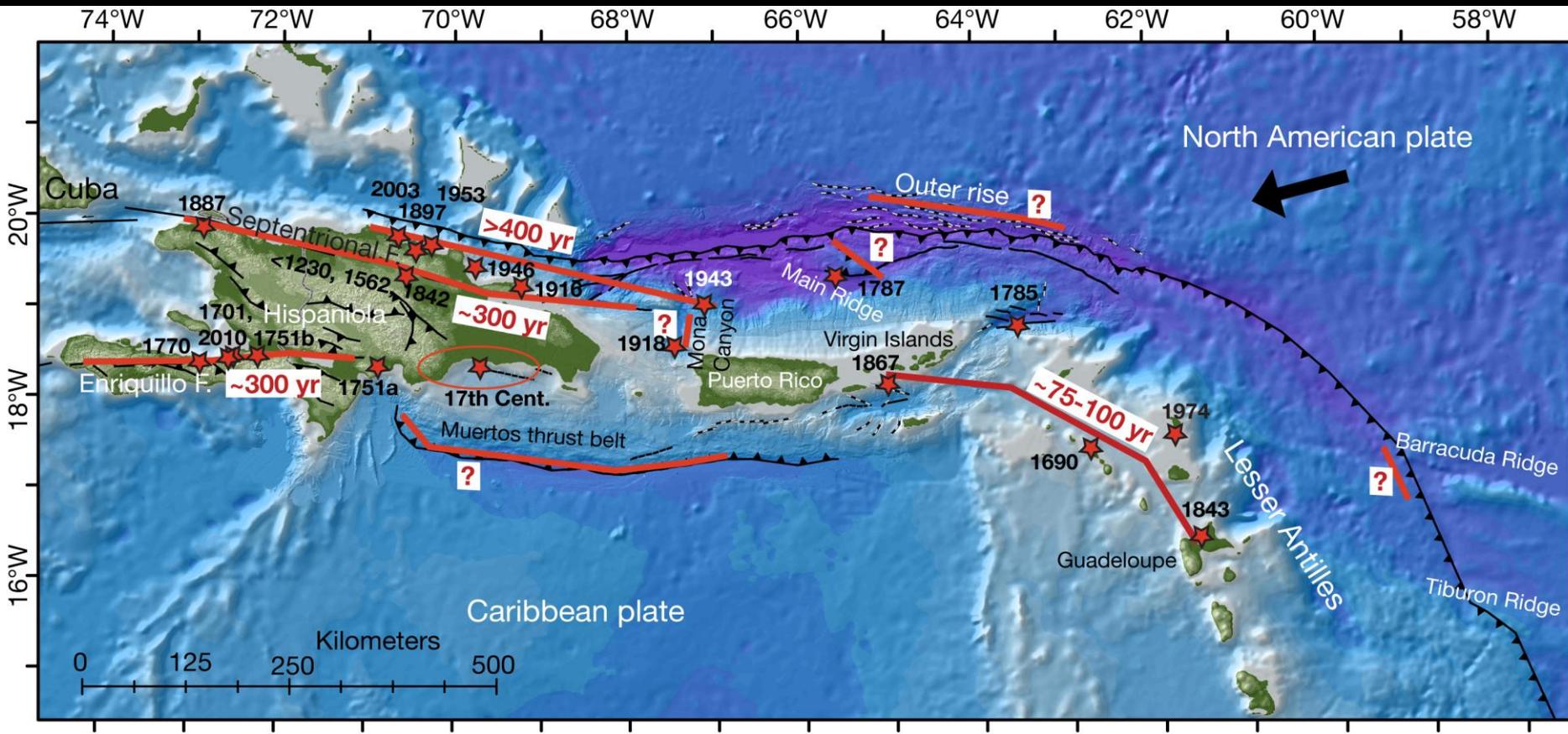
Caribbean potential tsunami sources – An update



Relocated March-September 2007 events



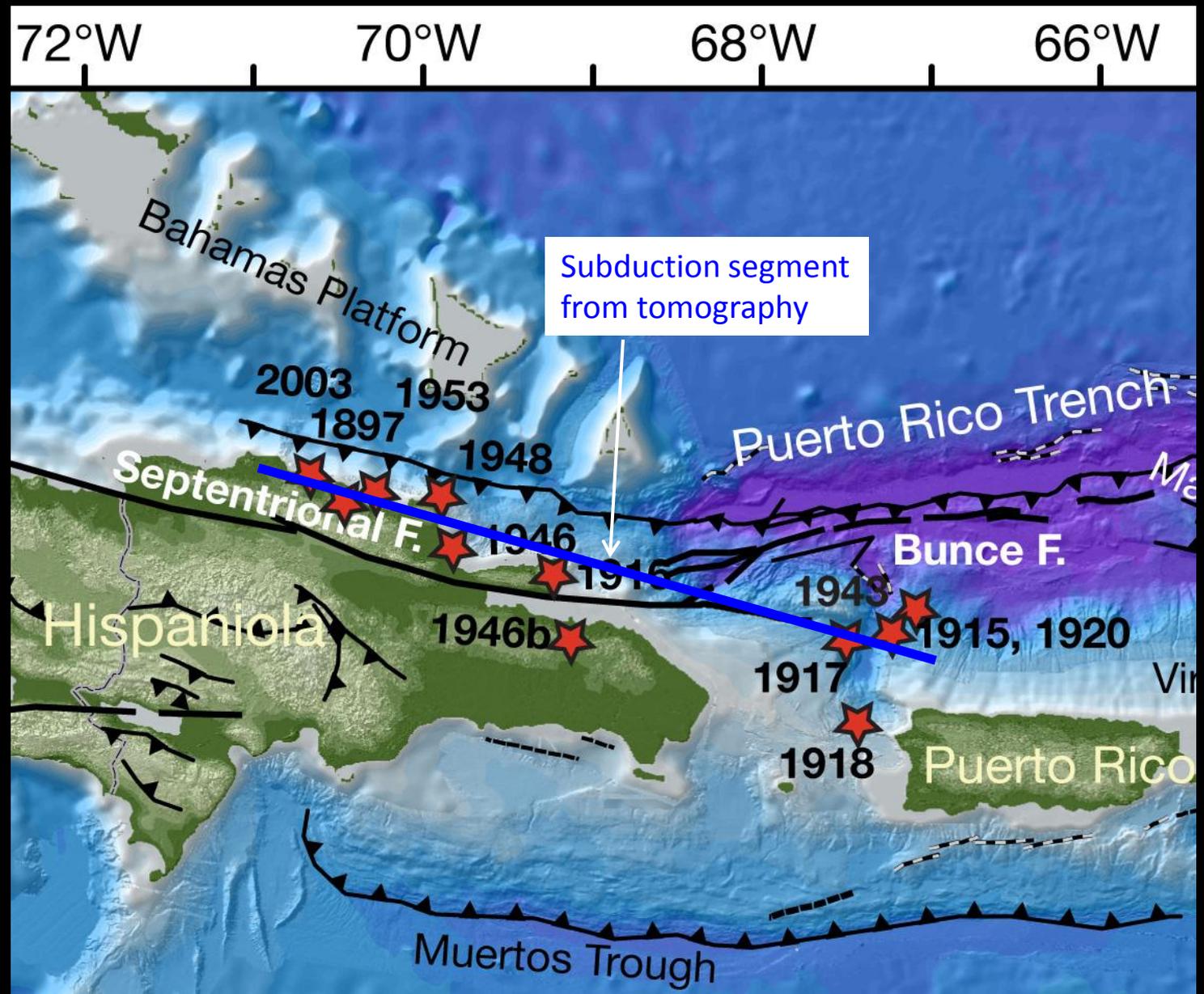
Recurrence interval based on analysis of historical earthquakes



Subduction zone-related earthquakes only in a 415-km-long segment

Year and magnitude
1897 6.5
1915 6.4
1916 6.8
1917 7.0
1918 7.3
1920 6.5
1943 7.8
1946 7.9
1946b 7.5
1946c 7.0
1948 7.3
1953 7.1
2003 6.4

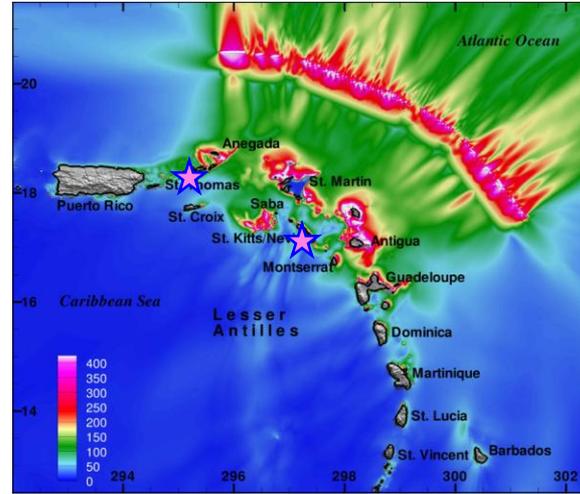
Total moment release = 400 yrs slip perpendicular accumulation at 4 mm/y



Subduction segment from tomography

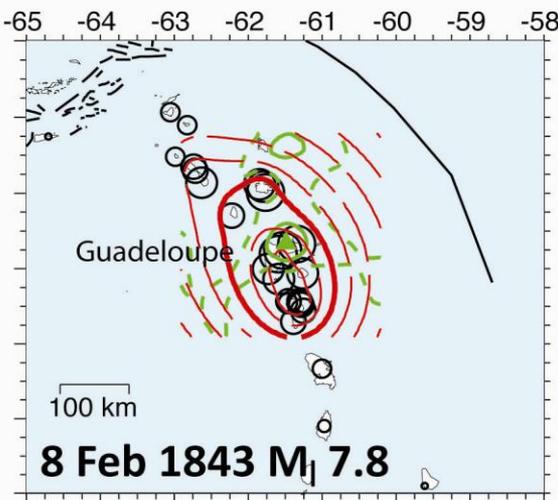
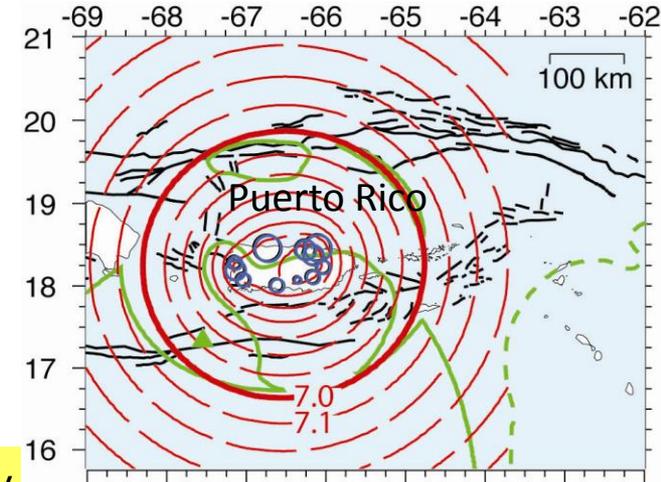
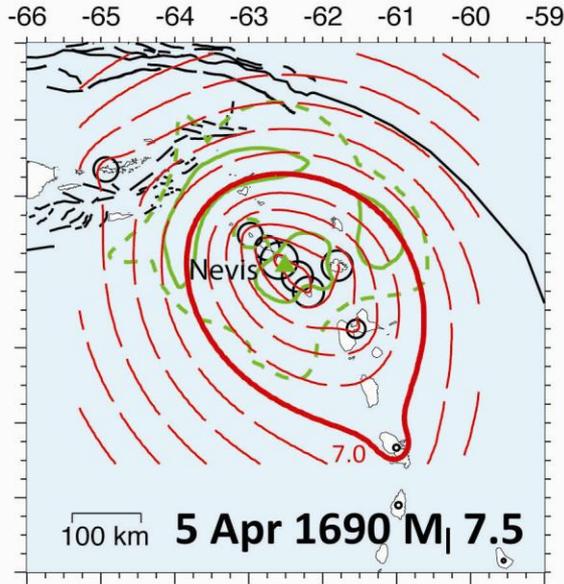
No known subduction earthquakes in Virgin Islands and Lesser Antilles

tsunami simulation from a subduction earthquake (Wei et al., in prep.)

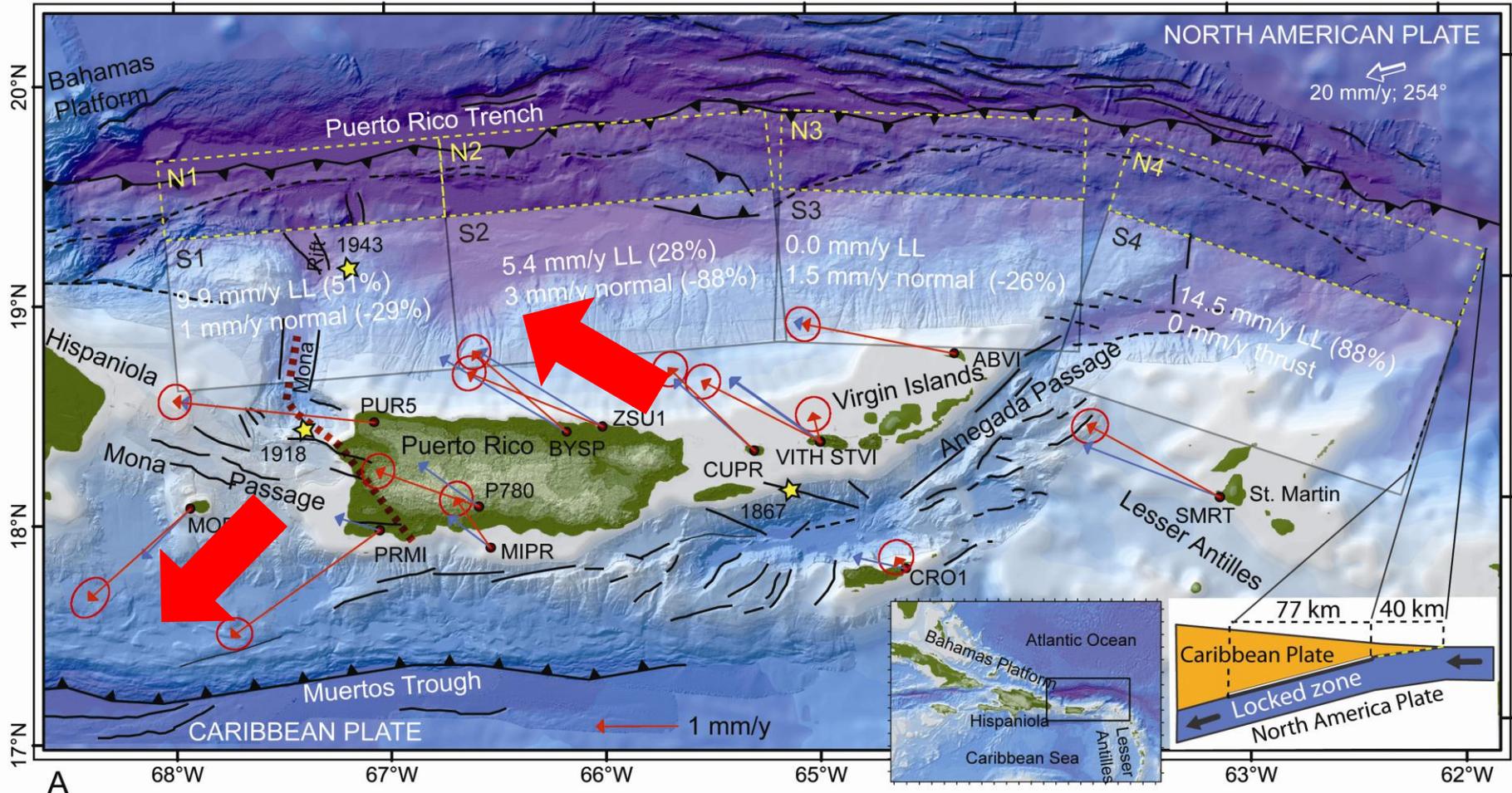


★ Reported tsunami from 1690 earthquake

- Location of reported intensity
- ▲ Preferred intensity center
- ▭ 68% location confidence
- - - Magnitude contours

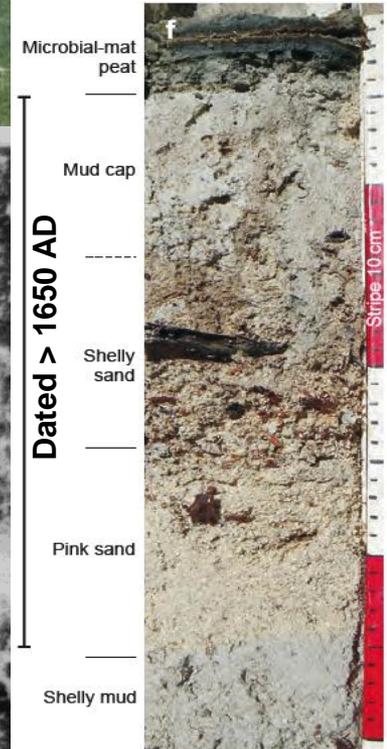
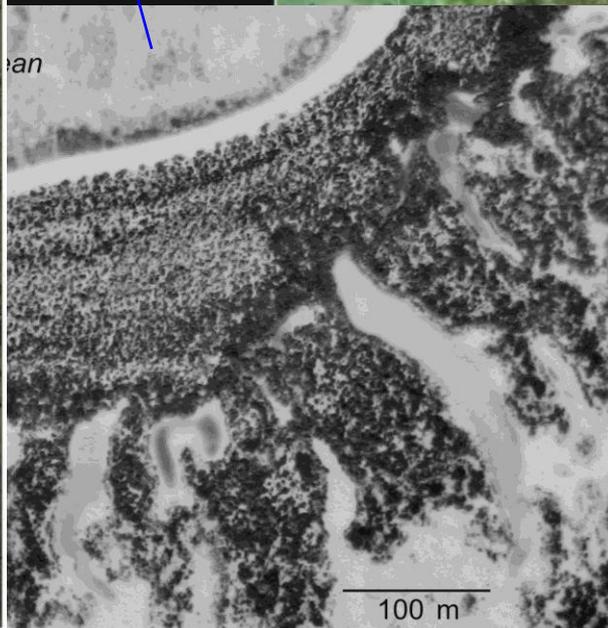
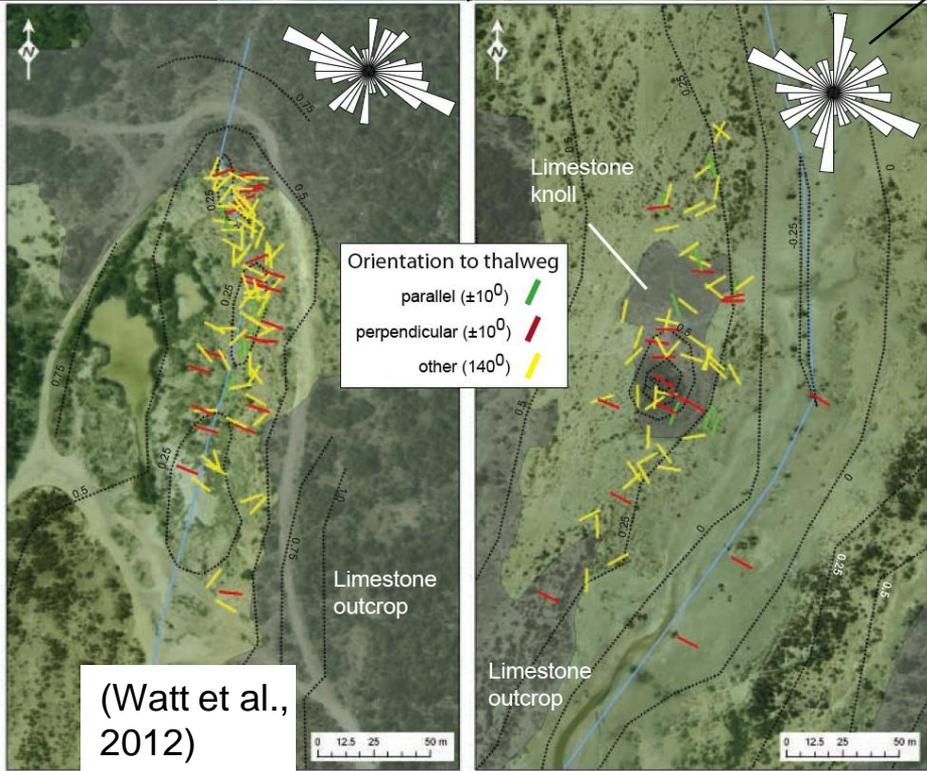
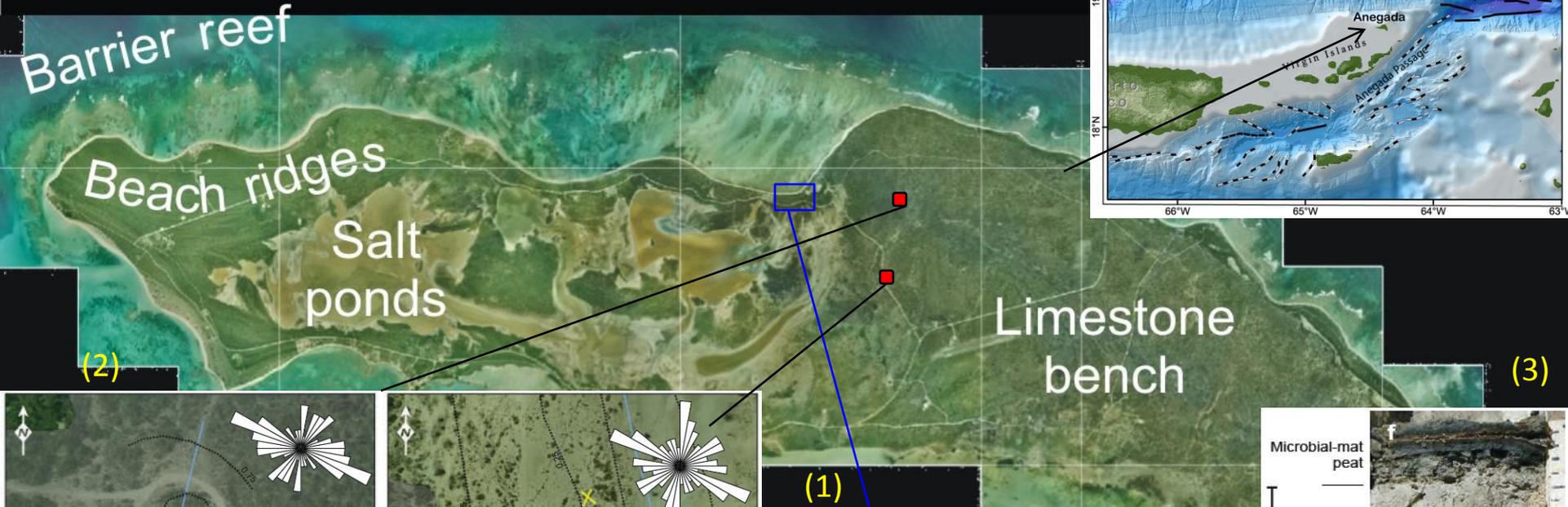


GPS measurements and models suggest NO strain accumulation toward a future mega-earthquake north of Puerto Rico and the Virgin Islands



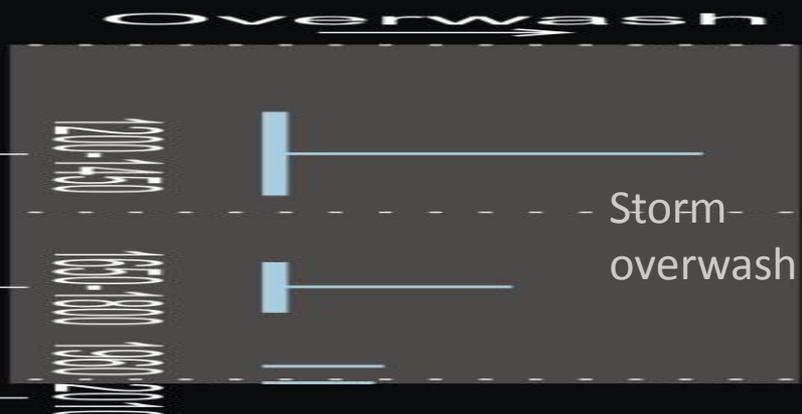
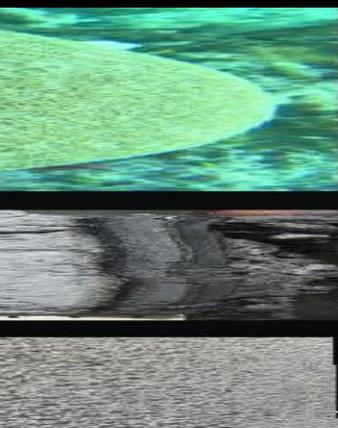
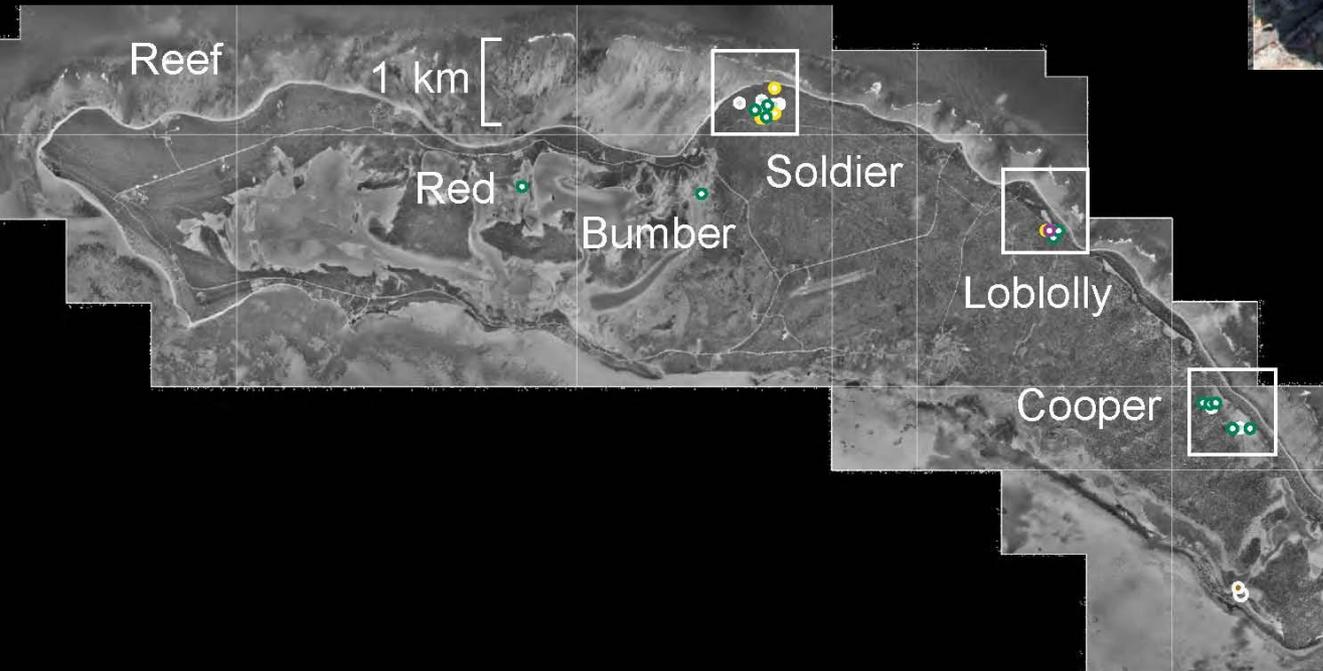
Small red arrows - Motion of GPS sites relative to interior Caribbean plate reference. Velocity measured continuously over 3-5 years. Blue arrows – model fit.

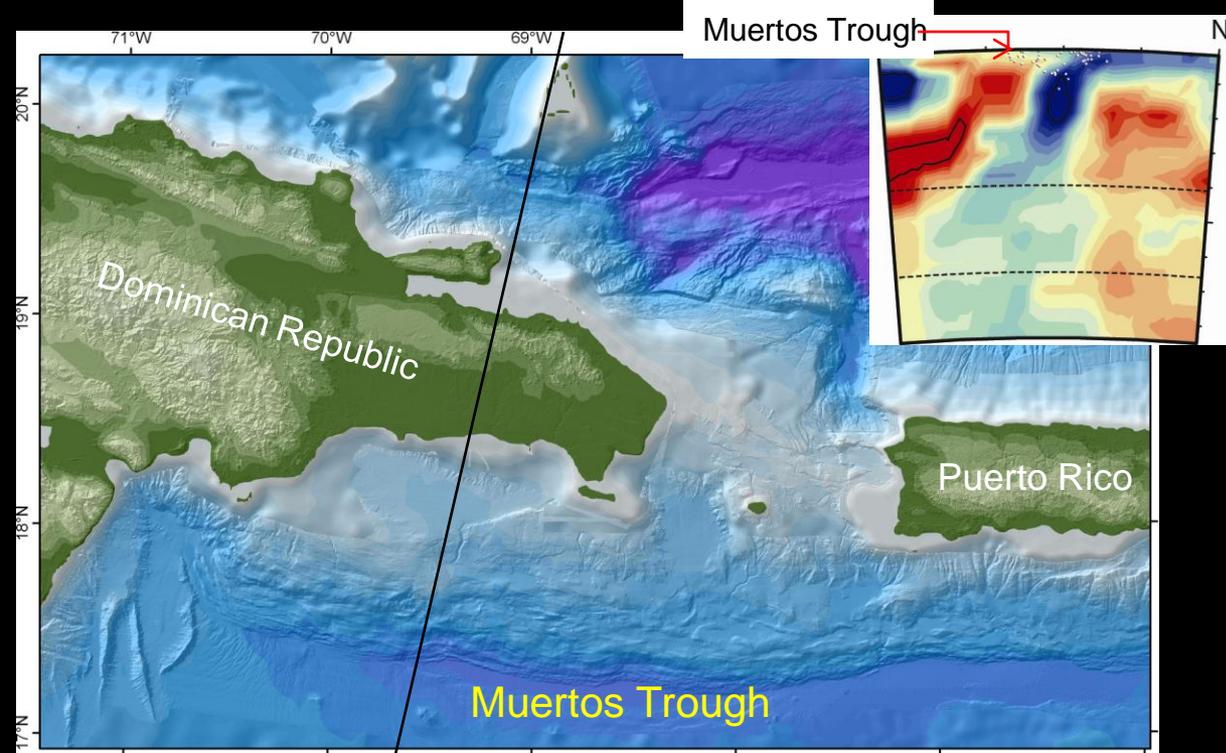
Evidence for tsunami overwash: (1) Remnants of breached sand ridges. Ridges are 3 m high; (2) Fields of cobbles and boulders up to 0.8 km from nearest shore; (3) Sand and shell layer extend 1.5 km south of ridges.



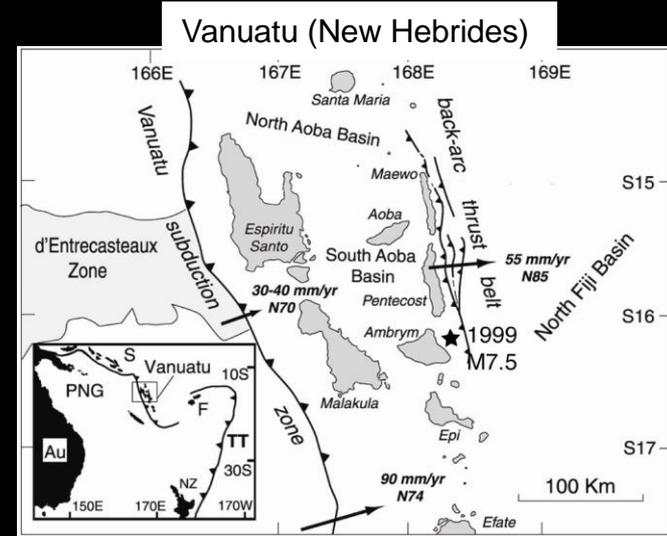
CORAL-BOULDER AGES

Group	¹⁴ C yr BP
• Younger	890±25 to 1020±25
• Older	1150±35 to 1240±20
• Outlier	1960±40

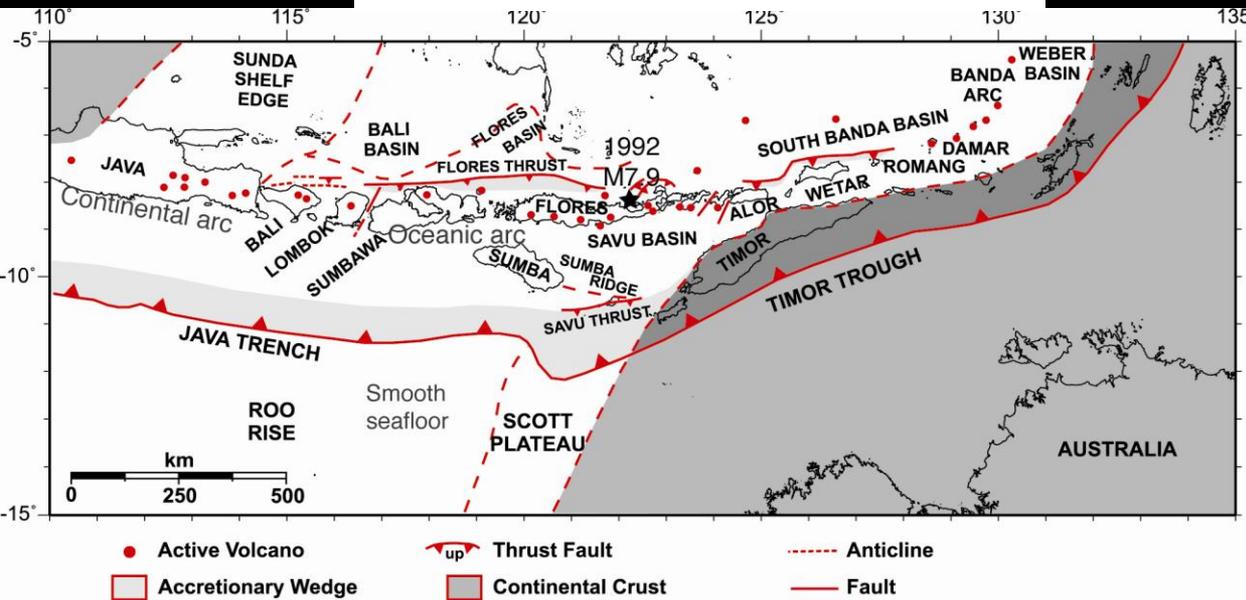




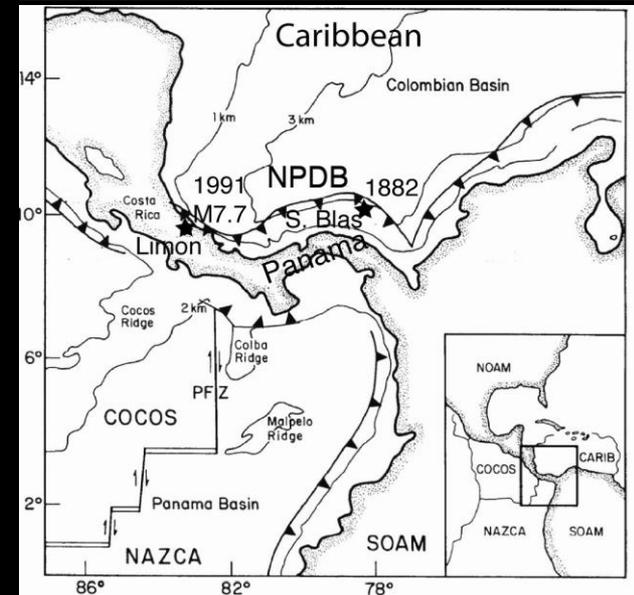
Tsunami potential from Muertos Trough



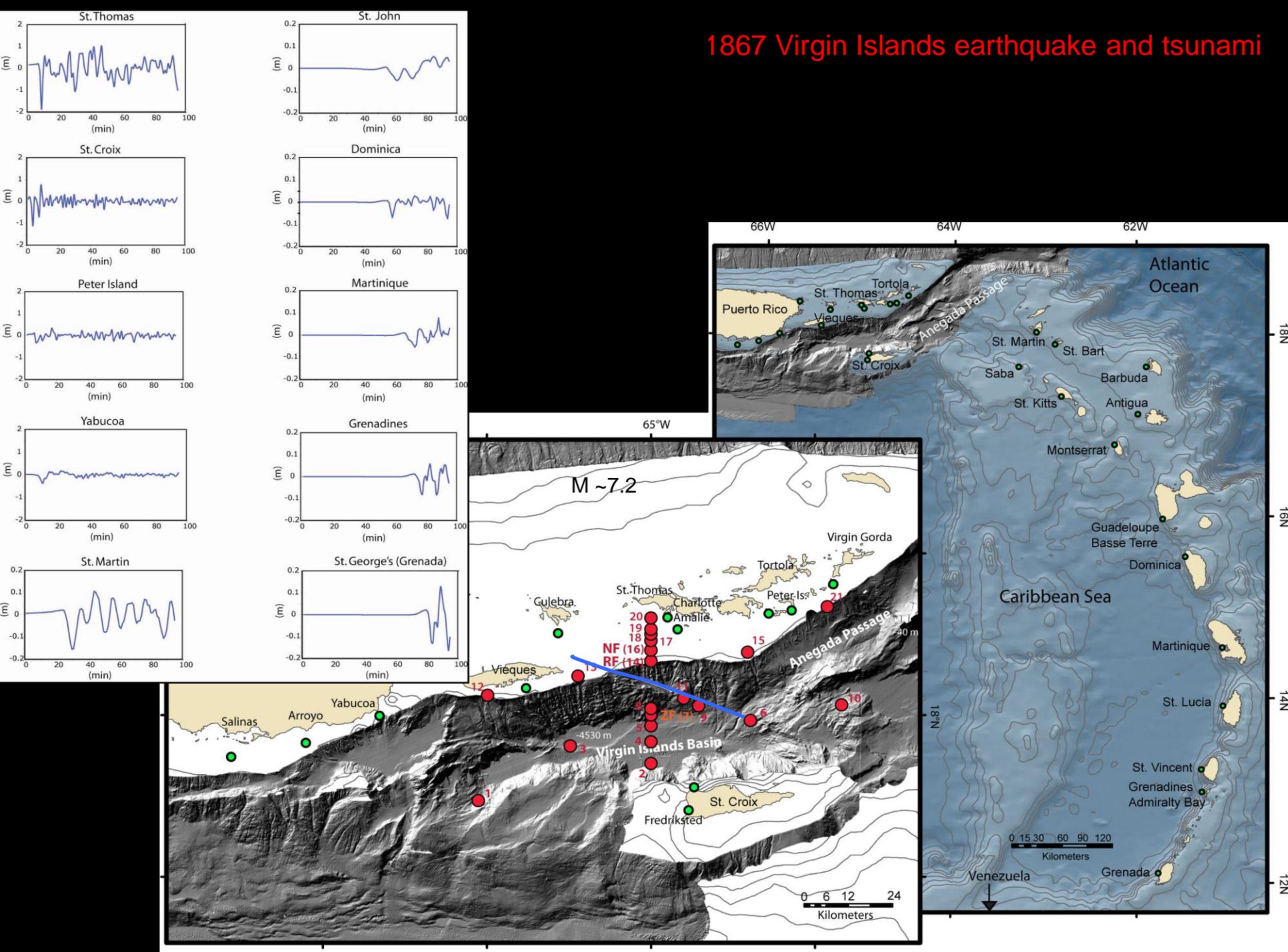
Flores and Wetar back-arc thrusts, Indonesia



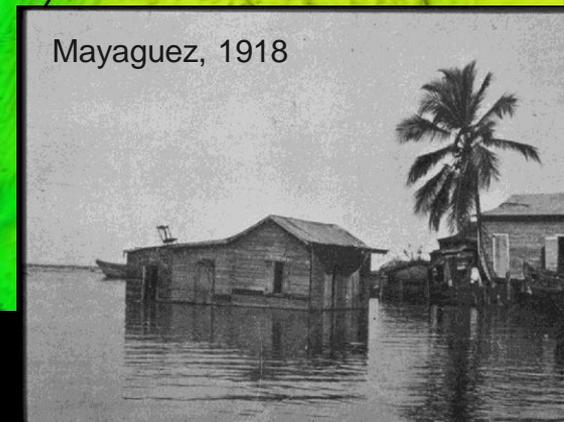
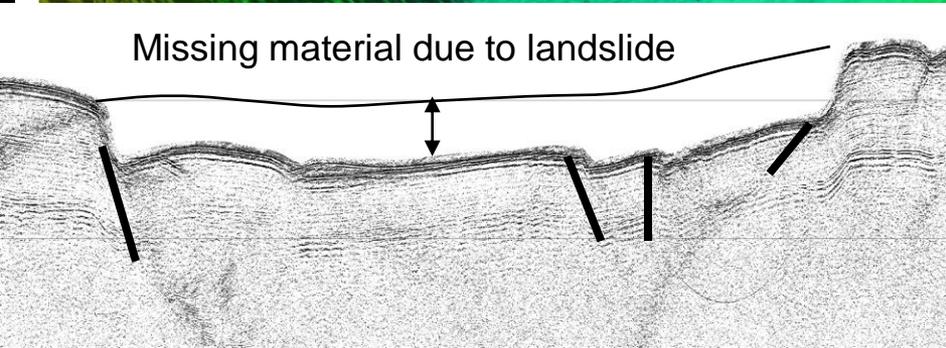
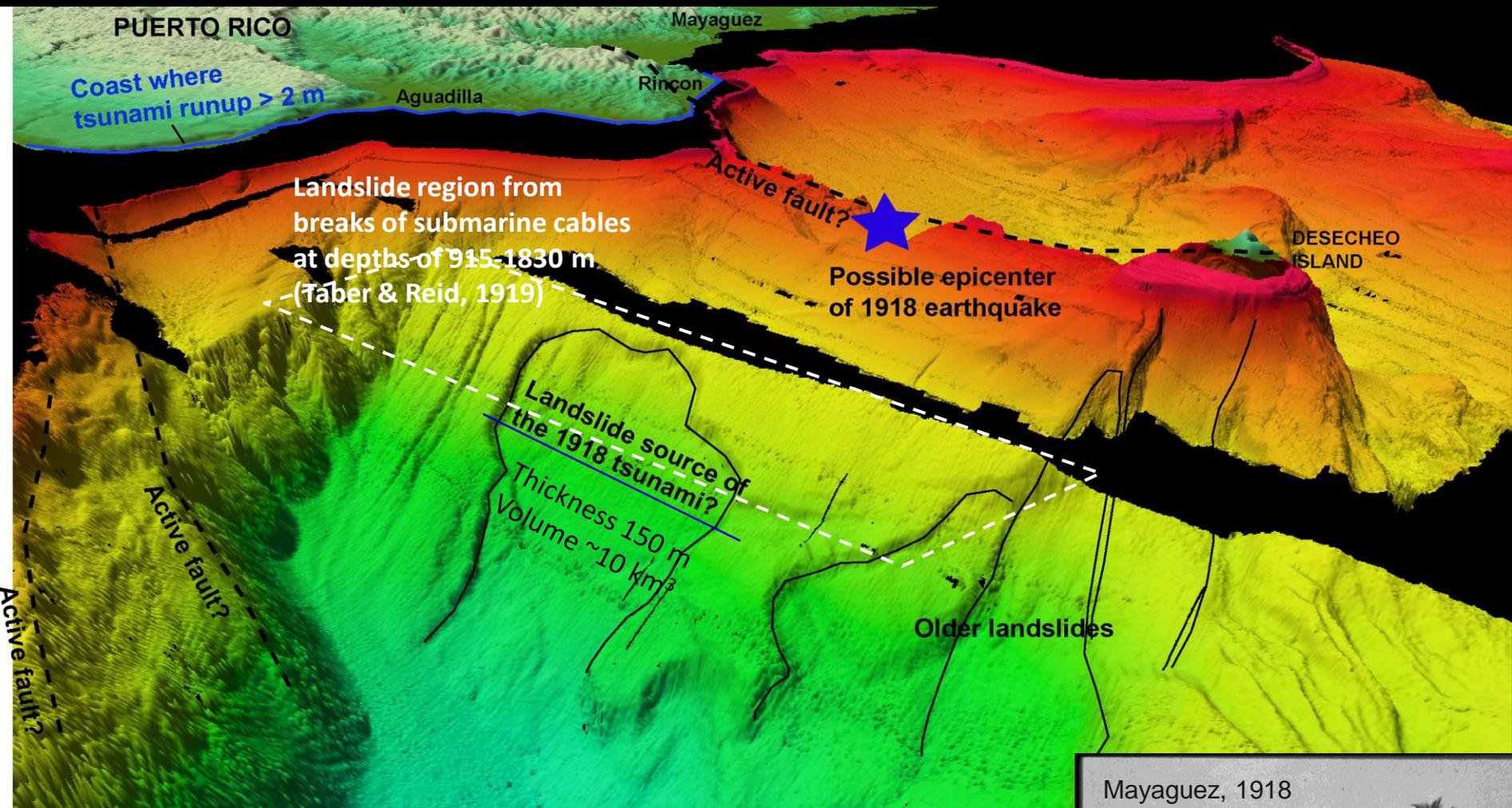
Northern Panama Deformation Belt (NPDB)



1867 Virgin Islands earthquake and tsunami

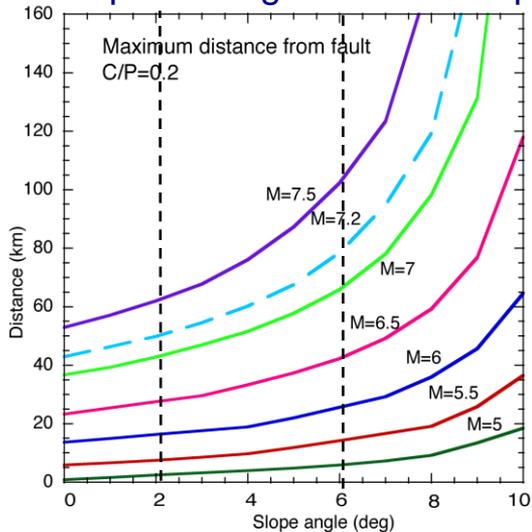


The source of the 1918 tsunami was previously thought to be an M7.2 earthquake



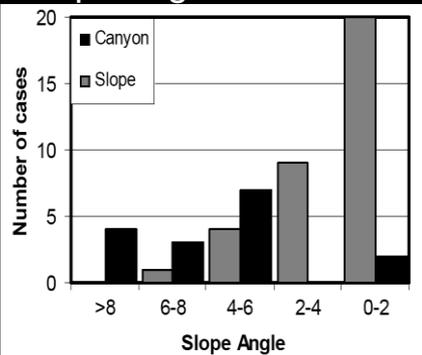
Atlantic Continental Margin: Where to watch out for earthquakes that can cause landslides

Calculated maximum distance to failure, r_{max} as a function of earthquake magnitude and slope

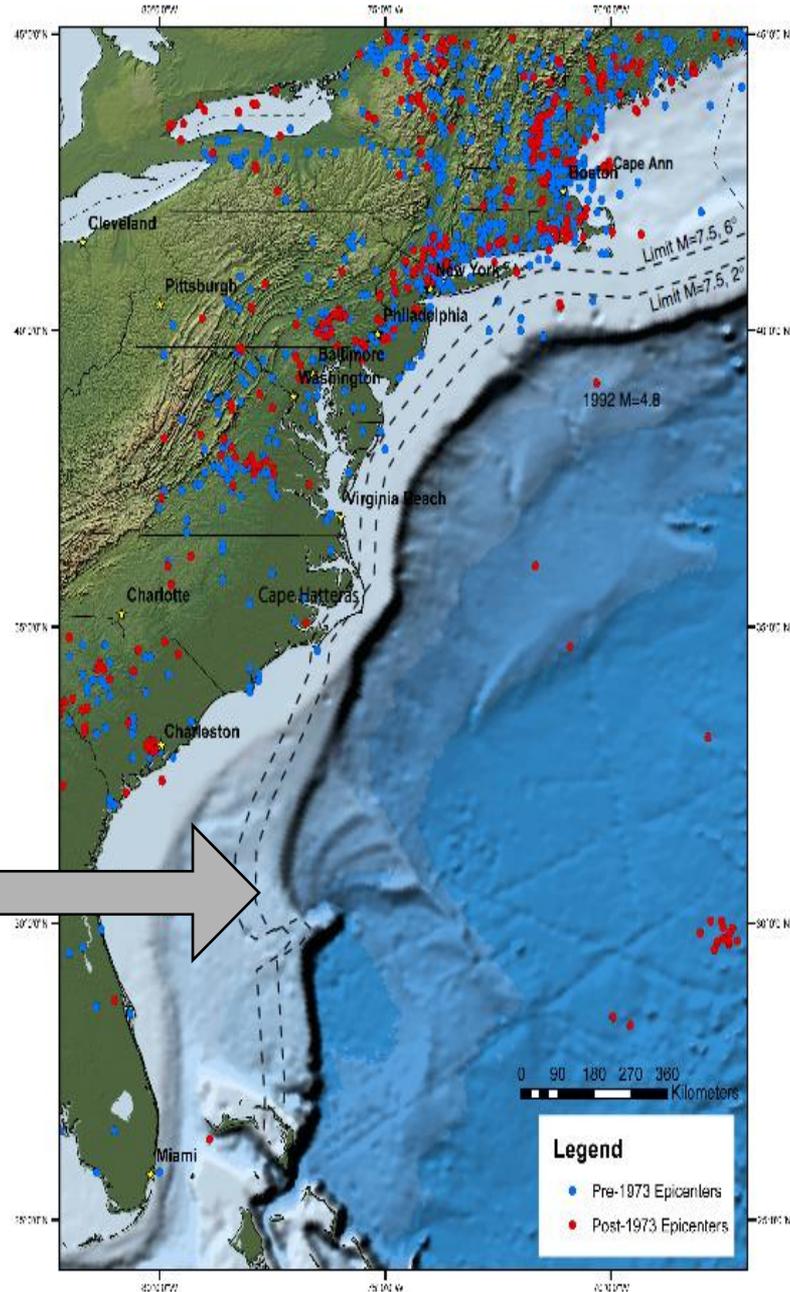


Earthquake region that can generate landslide tsunamis is limited to outer shelf and slope

Slope angle of landslides

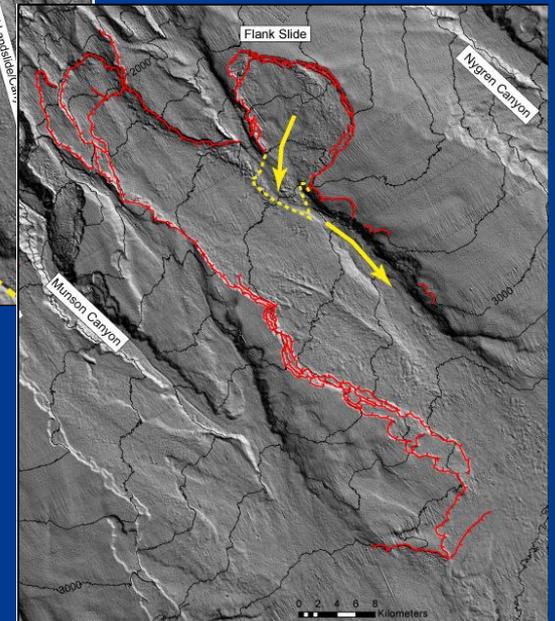
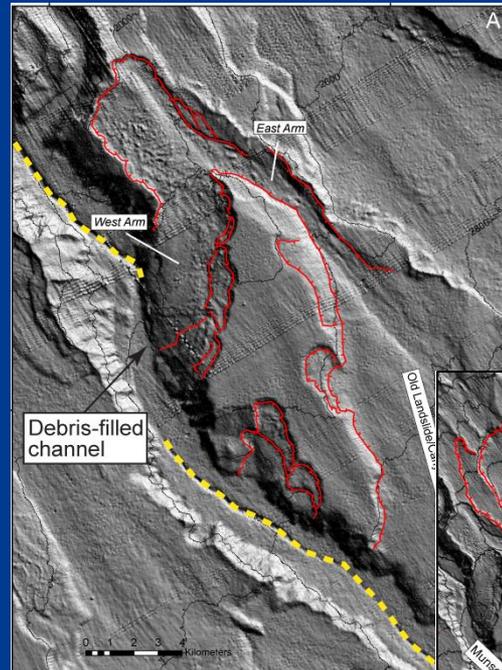
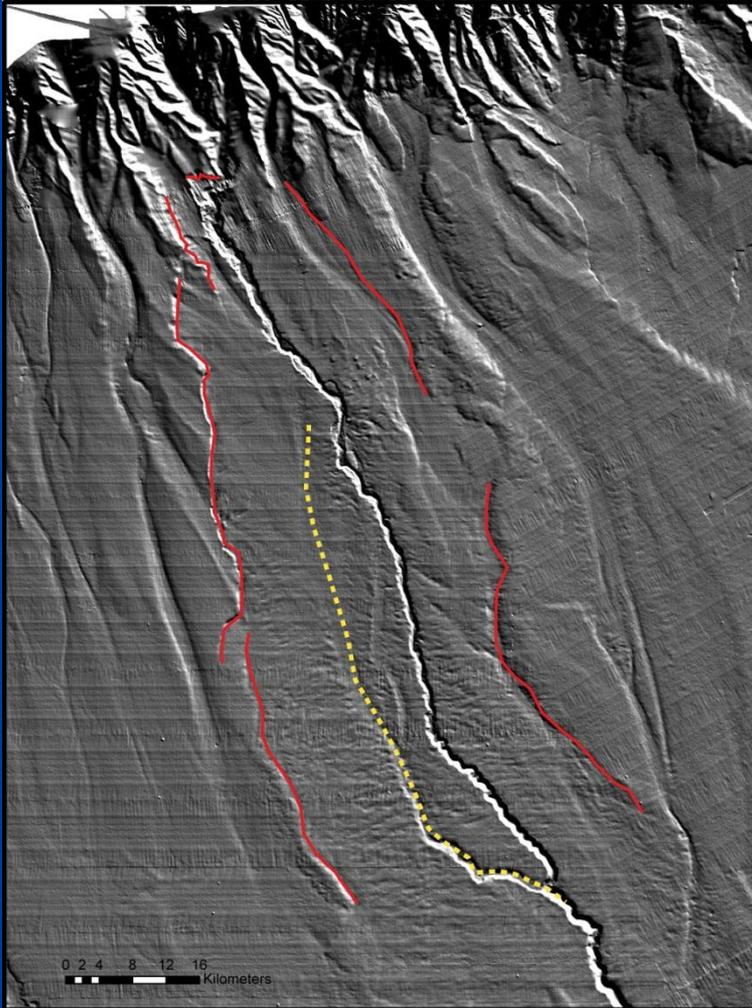


Earthquakes in the East Coast of the U.S.



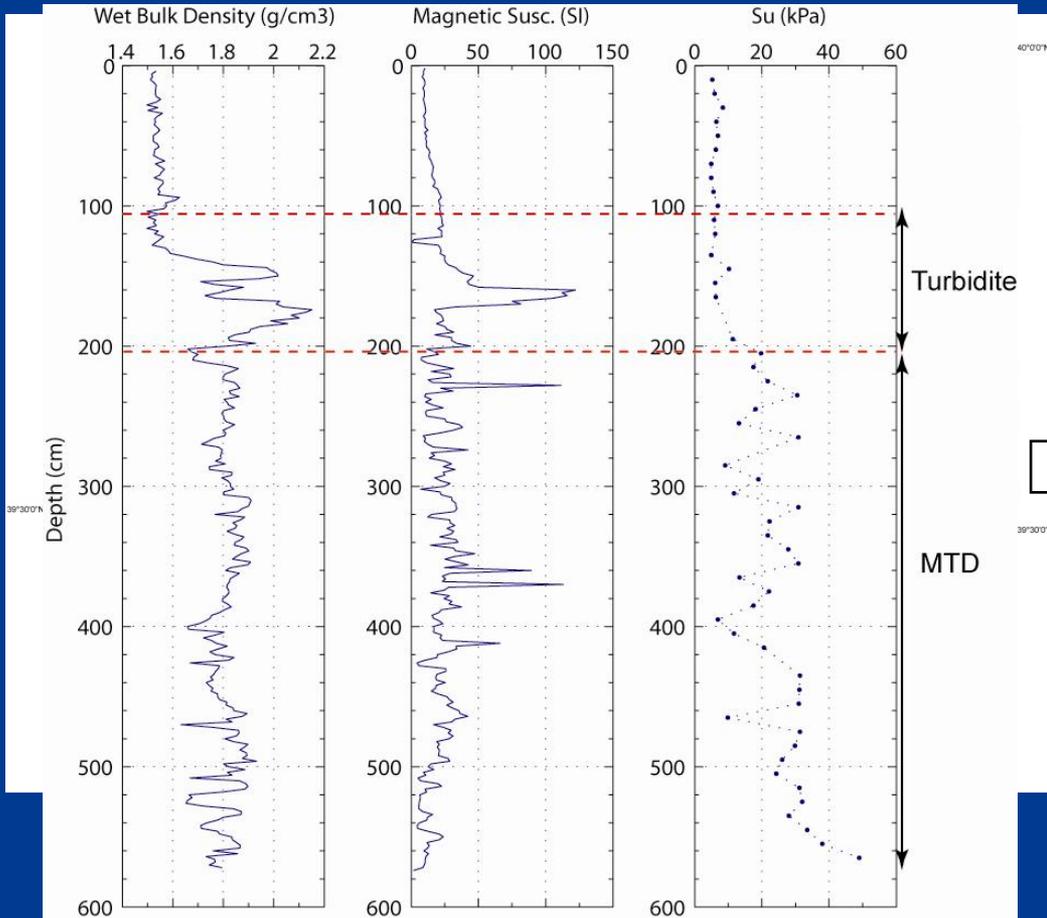
Relative Dating

- Cross-Cutting Relationships – Scarp/debris & Canyon/Debris

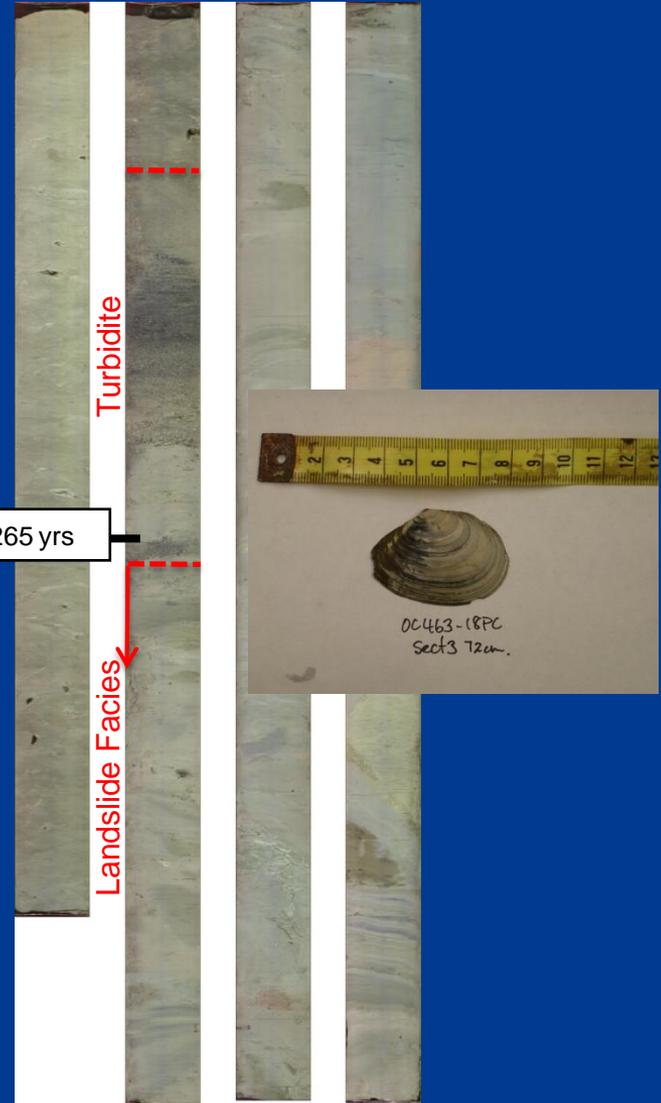


Absolute Dating

■ Atlantic – Southern New England



19,638±265 yrs



Gulf of Mexico Earthquakes and landslides

