

Magnitude 7.7 NNW OF JAMAICA

Tuesday, January 28, 2020 at 19:10:25 UTC

A magnitude 7.7 earthquake occurred between Cuba and Jamaica (19.440° N 78.755° W), 125 kilometers (77.6 miles) north-northwest of Lucea, Jamaica at a depth of 10 km (6.2 miles). People in Miami, Florida, which is 440 miles from the epicenter, felt shaking.

A tsunami threat message was issued by the US National Weather Service's Pacific Tsunami Warning Center. A sea level fluctuation of 0.11 meters (0.4 feet) was measured at George Town, Cayman Islands about 33 minutes after the earthquake. The tsunami threat has now passed. There are no initial reports of damage or casualties.

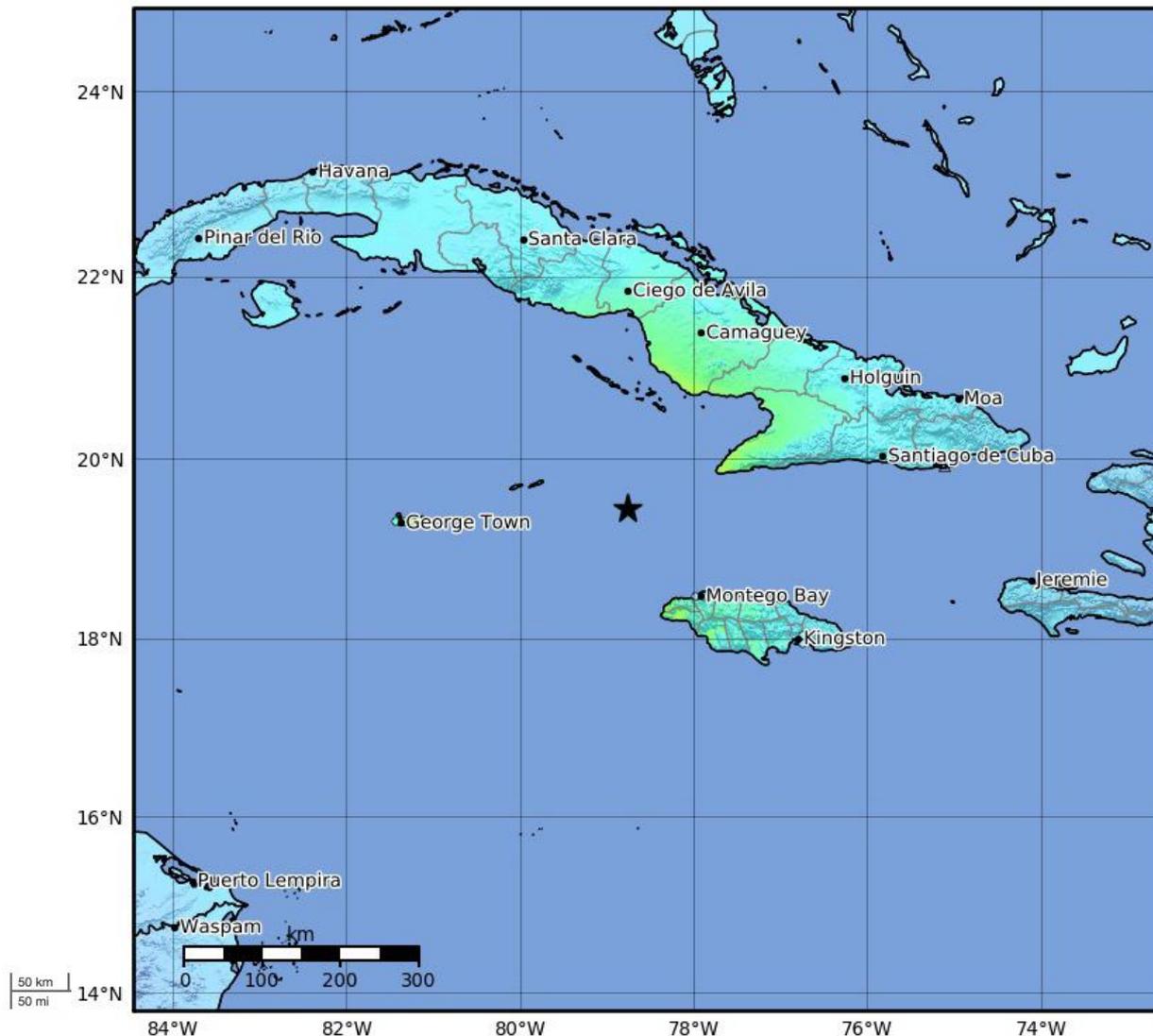


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The Modified-Mercalli Intensity (MMI) scale is a twelve-stage scale, from I to XII, that indicates the severity of ground shaking.

MMI	Perceived Shaking
X	Extreme
IX	Violent
VIII	Severe
VII	Very Strong
VI	Strong
V	Moderate
IV	Light
II-III	Weak
I	Not Felt



USGS Estimated shaking Intensity from M 7.7 Earthquake

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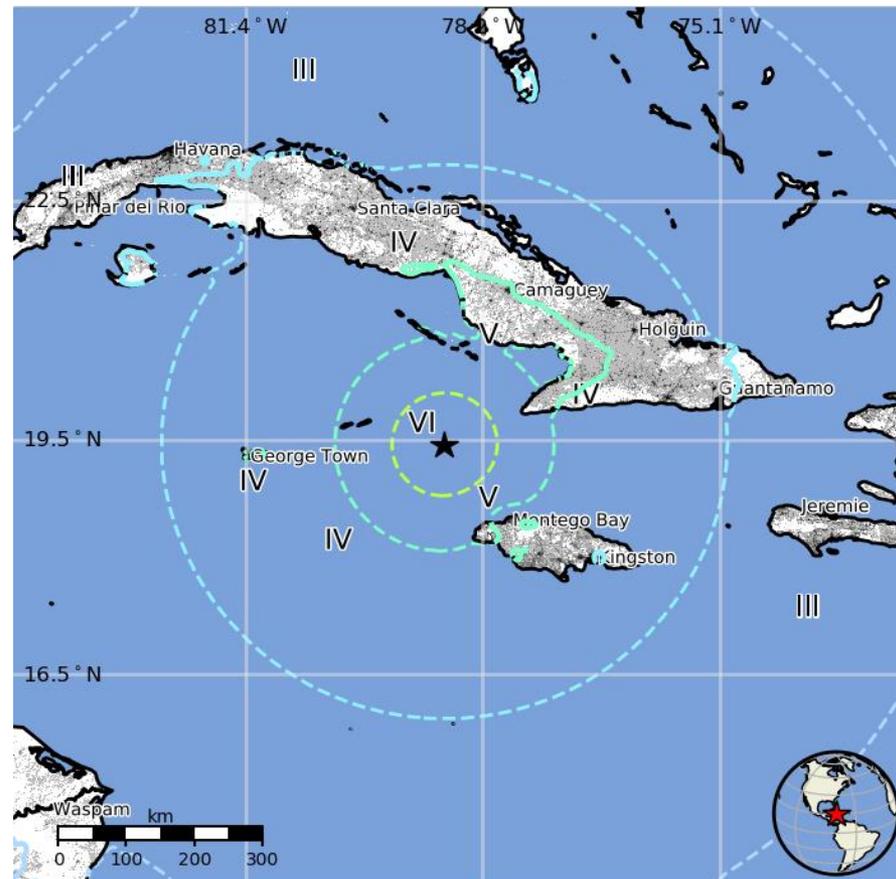
USGS PAGER

Population Exposed to Earthquake Shaking

The USGS PAGER map shows the population exposed to different Modified Mercalli Intensity (MMI) levels.

1.6 million people were exposed to moderate shaking from this earthquake.

MMI	Shaking	Population
I	Not Felt	0 k*
II-III	Weak	8,506 k*
IV	Light	8,171 k
V	Moderate	1,632 k
VI	Strong	0 k
VII	Very Strong	0 k
VIII	Severe	0 k
IX	Violent	0 k
X	Extreme	0 k



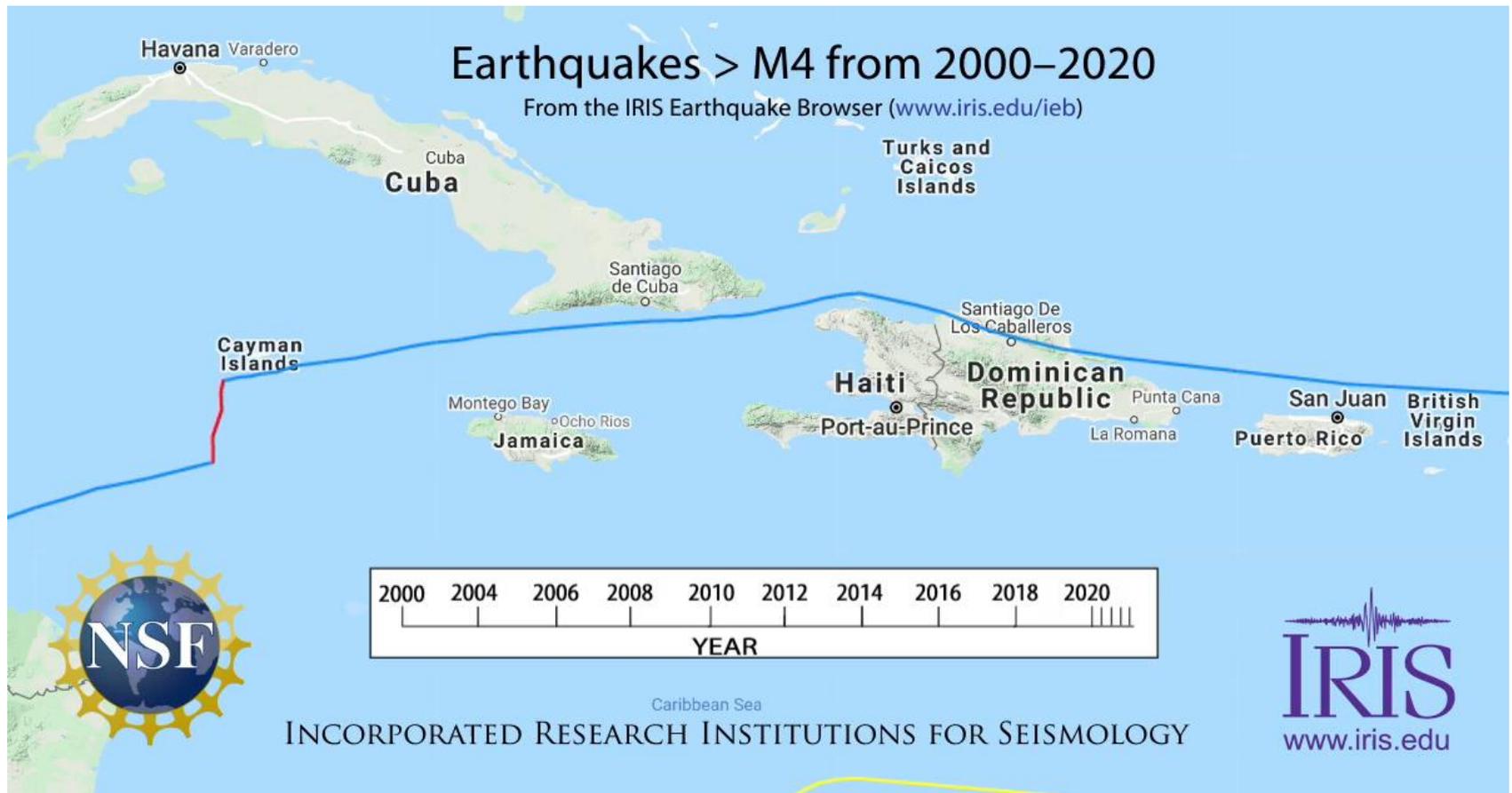
The color coded contour lines outline regions of MMI intensity. The total population exposure to a given MMI value is obtained by summing the population between the contour lines. The estimated population exposure to each MMI Intensity is shown in the table.

Image courtesy of the US Geological Survey

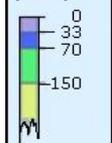
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Seismic history of the region since January 1, 2000
Shown are only earthquakes greater than magnitude 4.
Haiti 2010, Puerto Rico 2020, and Jamaica 2020 are highlighted.



DEPTH
(km)



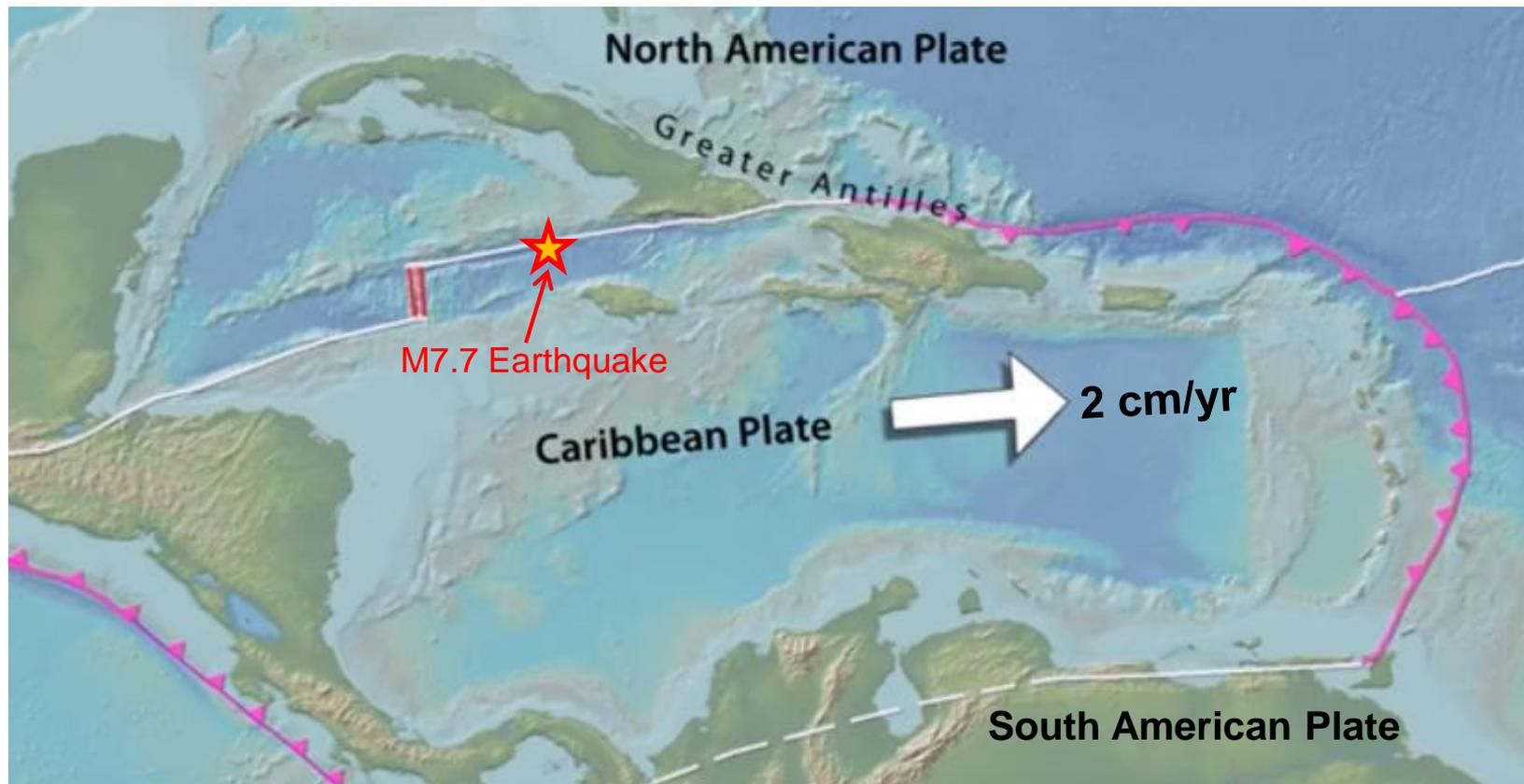
MAGNITUDE

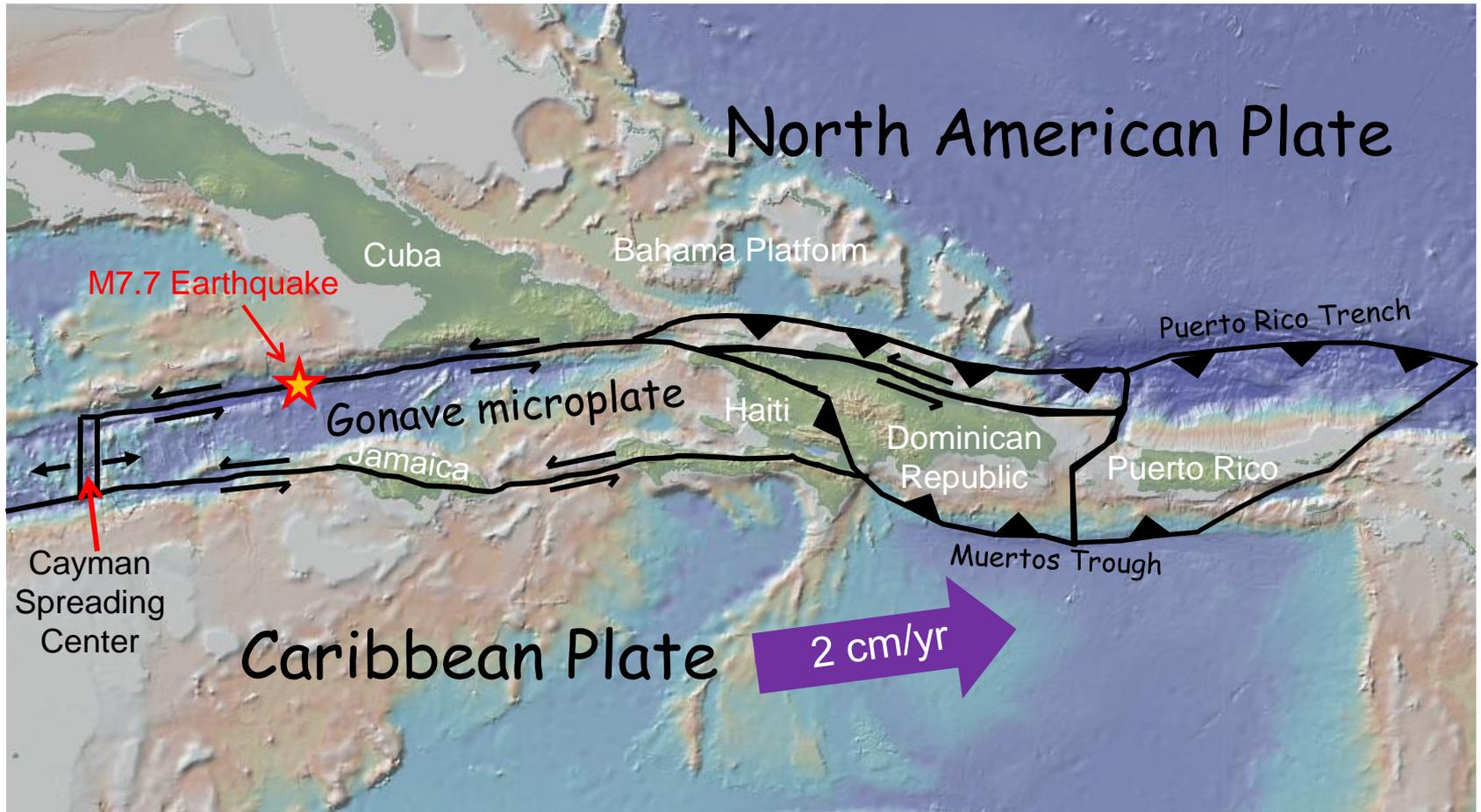


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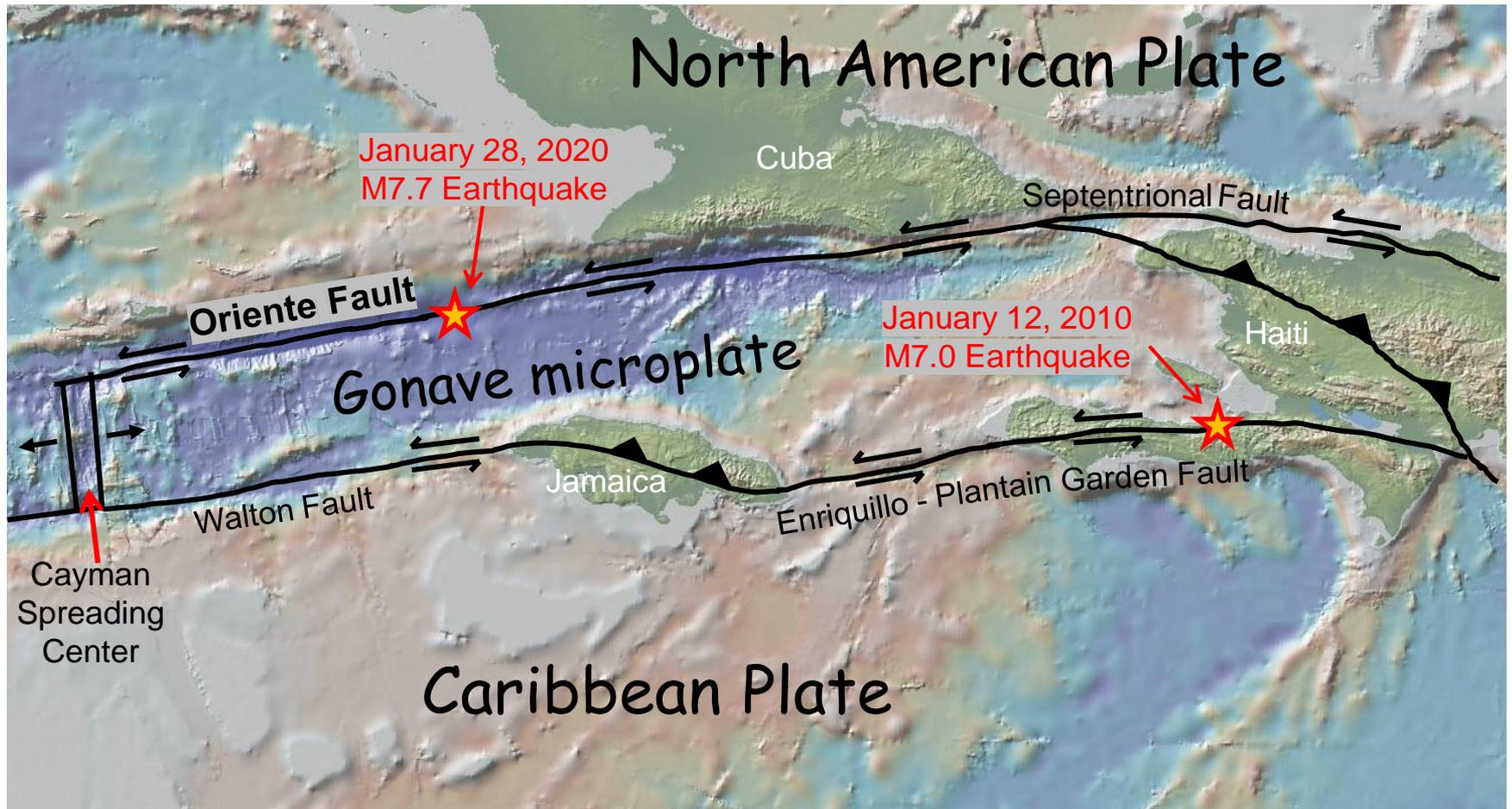
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The Caribbean Plate moves east at about 2 cm/yr with respect to the North and South American Plates. In the area of this M7.7 earthquake, the Caribbean – North American Plate boundary is a left-lateral transform fault.





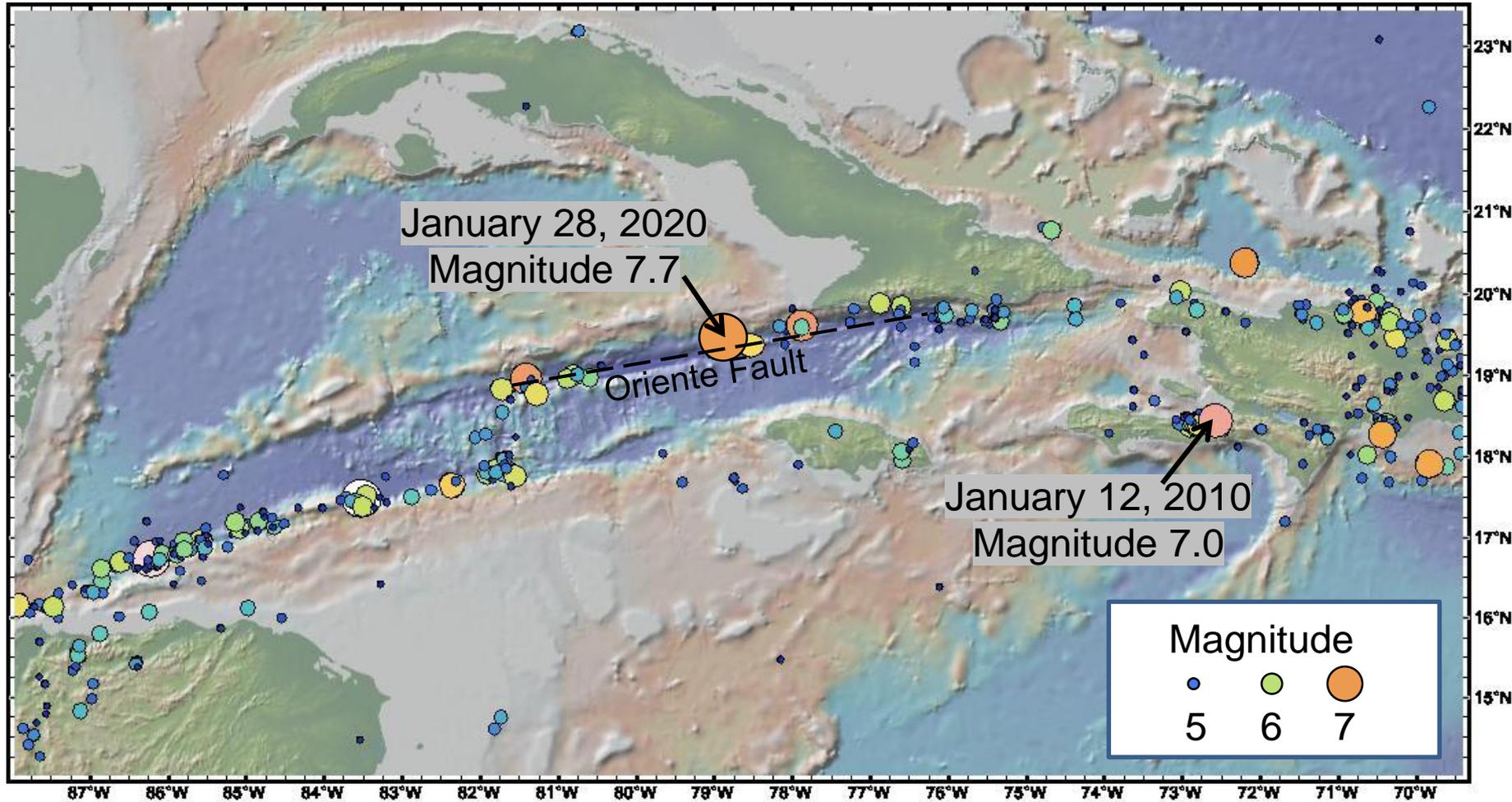
In the Greater Antilles region, the North American - Caribbean plate boundary is a zone of distributed deformation broken into at least four microplates. The largest of these is the Gonave microplate in the Cayman Trough between Cuba and Jamaica.



This earthquake occurred on the Oriente Fault, the left-lateral strike-slip fault that forms the boundary between the Gonave microplate and the North American Plate in the Cayman Islands area. Rate of motion on the Oriente Fault is about 1 cm/yr. The January 12, 2010 magnitude 7.0 Haiti earthquake occurred on the Enriquillo – Plantain Garden Fault Zone on the boundary between the Gonave microplate and the Caribbean Plate.

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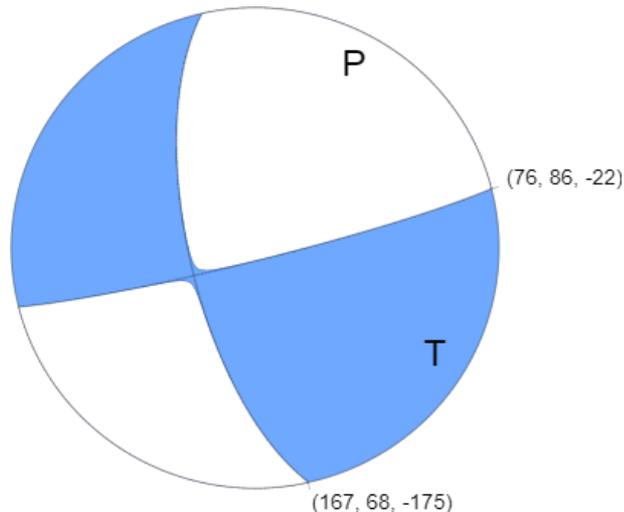
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This map of the bathymetry of the region accentuates the trace of the Oriente Fault. Shown here are earthquakes with magnitudes >4.5 since 1960. Today's earthquake is the largest to occur on the Oriente Fault in the past 60 years. (Base map from Geomapapp)

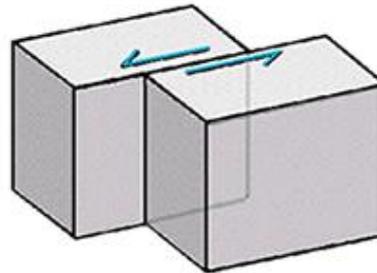
The focal mechanism is how seismologists plot the 3-D stress orientations of an earthquake. Because an earthquake occurs as slip on a fault, it generates primary waves in quadrants where the first pulse is compressional (shaded) and quadrants where the first pulse is extensional (white). The orientation of these quadrants determined from recorded seismic waves identifies the type of fault that produced the earthquake.

This earthquake occurred as the result of strike-slip faulting on the plate boundary between the North America and Caribbean Plates. The fault plane striking approximately east-west is consistent with the orientation of the regional plate boundary.

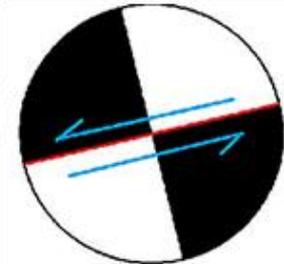


W-phase Moment Tensor Solution

Strike-Slip/Shear



Block model



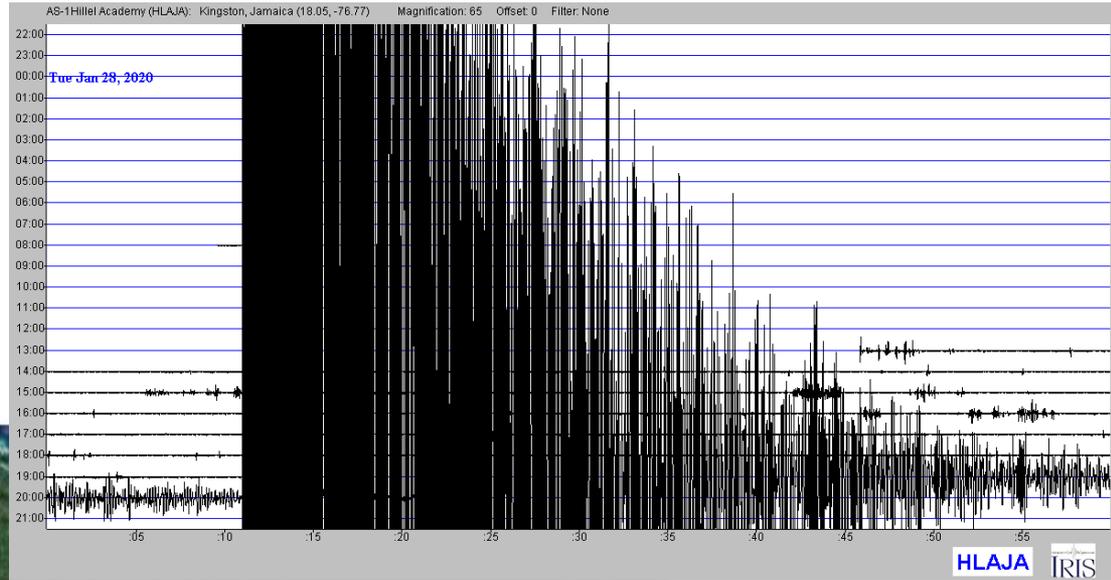
2D Projection
of Focal Sphere

The tension axis (T) reflects the minimum compressive stress direction. The pressure axis (P) reflects the maximum compressive stress direction.

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This earthquake recorded by the Jamaican Educational Seismic Network which operates 5 educational seismic stations in Kingston, Jamaica.

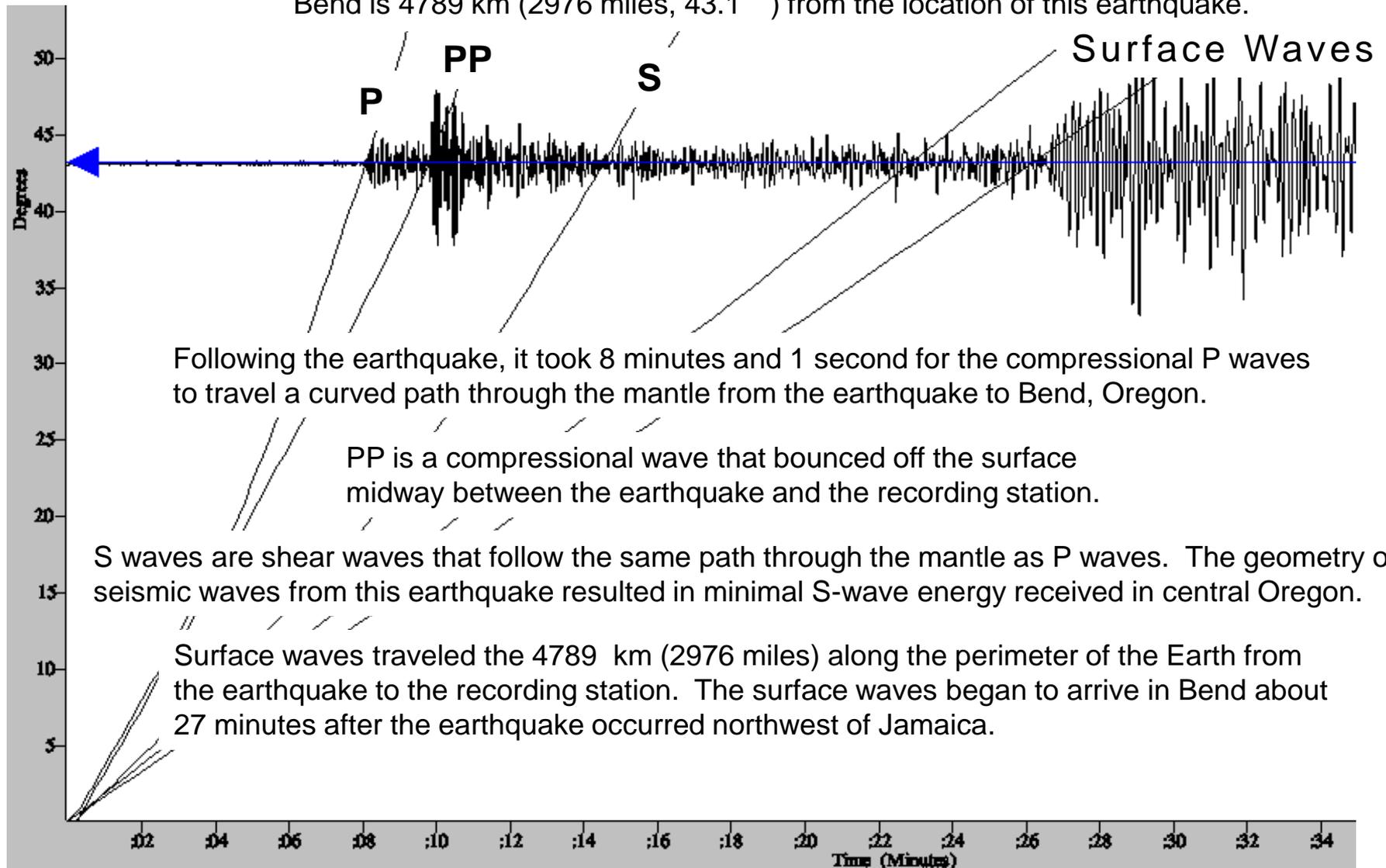


Station HLAJA
Hillel Academy
Kingston
St. Andrew
Jamaica

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The record of the earthquake in Bend, Oregon (BNOR) is illustrated below. Bend is 4789 km (2976 miles, 43.1°) from the location of this earthquake.



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