Caribbean Plate and Vicinity
Seismicity of the Earth 1900 - 2007
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TECTONIC SUMMARY

Eocene-Quaternary sedimentary basins characterize the perimeter of the Caribbean plate, involving three distinct tectonic settings: the North America plate subducting beneath the Caribbean plate along the Middle America Trench, the lesser subduction of the Cocos plate along the Central American and the South America plate beneath the Caribbean plate along the Eastern Caribbean Trench and the Caribbean Trench. These subduction zones are accompanied by major arc volcanoes, e.g., the Lesser Antilles arc (e.g., the Dominica, Martinique, Grenada Arcs) and the arc made up of Cocos Ridge, the Galápagos, and the Nazca ridge (e.g., the Ecuadorian Andes), with the middle to north of the Caribbean plate subducting beneath South America to the west.

The depth profile panels on this map portray earthquakes that extend from the Middle America Trench axis in the west to the Caribbean Trench axis in the east, with the relative positions of the North, South America, Cocos, and Caribbean plates depicted on the map. The arrows on the depth profiles indicate the direction of relative plate motion, which is toward the north along the Middle America Trench and toward the south along the Eastern and Caribbean Trenches. The depth of the earthquakes varies depending on the depth of the subduction zone, with the South America plate subduction being the deepest and the Cocos plate subduction being the shallowest.

The nucleation point of this earthquake is indicated on the map (rupture area is from Kanamori and McNally, 1975). The magnitude (Mw) of the earthquake is 8.5, and the energy (in Joules) of 6x10**28 dyne-cm (Okal, 1992). The study area is a 5° x 10° box, and the projection used is Albers equal area conic.

Along the western coast of Central America, the Cocos plate subducts beneath the Caribbean plate at a rate of 60 km, resulting in a relatively high level of seismic activity in this area. There are intermediate-depth earthquakes near the subducted Cocos plate to depths of about 100 km.

HISTORIC SOURCES

Earthquakes that are included in this compilation are those that were reported in the U.S. Geological Survey’s National Earthquake Information Center (NEIC) catalog and those that were reported in the Global Volcanism Program, a joint project of the Smithsonian Institution, the U.S. Geological Survey, the Pacific Disaster Center, and the University of the West Indies. The catalog includes earthquakes with magnitudes of at least 6.0 recorded on the Richter magnitude scale or magnitude 5.0 on the moment magnitude scale.

The depth of focus varies depending on the earthquake's location, with shallower depths near the surface and deeper depths at greater depths. The depth of focus is determined by the method used to calculate the earthquake's depth, with the shallowest depths being calculated using the double-couple method and the deepest depths being calculated using the moment tensor method.

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