

colliding or sliding against each other as in the Pacific Ocean. The majority of the Atlantic Ocean's active areas in terms of both seismic and volcanic activity is concentrated near the Caribbean Islands, and at the Scotia island arc chain (South Sandwich Islands) near Antarctica. In the Caribbean, just north of Puerto Rico lies the Puerto Rico Trench, the deepest point in the Atlantic Ocean. This is where the North American Plate (moving west) meets the Caribbean Plate (moving east), resulting in relatively active subduction zones and volcanic island-arc systems (Figure 6). The Antilles subduction zone is just southeast of this. Similarly, the South Sandwich Islands in the southern Atlantic also mark an active subduction zone. Here, the Atlantic Plate is being subducted below the Antarctic Plate, resulting in the formation of the volcanic South Sandwich Islands. Since these are well south in the southern Atlantic, they will not be discussed further.



Figure 5

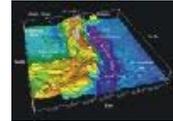


Figure 6

The majority of tsunamis in the Atlantic Ocean and Caribbean Sea were triggered by either seismic (earthquake) activity or the result of volcanic eruption. The majority of these resulted in localized damage and death, but nothing on a regionally catastrophic scale outside of the Caribbean. There are many confirmed and unconfirmed tsunami events that resulted in localized flooding, especially in the Caribbean Islands. Lander (1999) determined that there have been over 50 recorded tsunamis, varying in size, in the Caribbean Islands since the year 1530. Zahibo and others (2003a) evaluated past tsunami events and projected the impacts of future potential tsunami activity in the Caribbean.

Numerous websites provide information on recorded historical tsunamis in the Atlantic Ocean and the Caribbean. Several of these include:

- [National Weather Service Forecast Office - Philadelphia/Mount Holly](#)
- [Tsunamis of Volcanic Origin in the Caribbean](#)
- [Tsunami Laboratory - Siberian Division, Russian Academy of Sciences](#)
- [Catalogue of Caribbean Tsunami](#)

The Atlantic Ocean, however, has also been home to several devastating tsunamis, the most notable being the 1755 tsunami that hit Portugal, Spain, and northern Africa. Only the larger of these events are summarized below. At the end of each summary are links to more information on each event.

Large Historic Tsunamis in the Atlantic Ocean and Caribbean Sea (abbreviated list)

1755 Lisbon, Portugal - A near 9.0 magnitude earthquake occurred 200 km from the Portuguese coast. This earthquake was generated by convergence between the African and Eurasian Plates at a ridge known as Gorringe Bank. The earthquake itself destroyed much of the Portuguese City of Lisbon. Several minutes after the earthquake, a minimum of 3 tsunamis, around 10 meters in height, ravaged the city. An artist's rendering of the destruction of the earthquake and tsunami is provided at the [Lisbon earthquake site](#). The waves also hit Spain and North Africa, and did damage in the Azores, Madiera, and the Canary Islands. Its effects were felt as far west as the Caribbean Islands, where 3-5 meter waves were reported, and as far north as Ireland.

- [Dr. George Pararas-Carayannis](#)
- [University of California - Berkeley](#)
- [Baptista and others \(2003, pdf\)](#)

1867 U.S. Virgin Islands - A 7.5 magnitude earthquake occurred in the Aneganda Trough, located between the U.S. Virgin Islands of St. Croix and St. Thomas. The earthquake triggered a series of waves on the order of several meters to over 12 meters that impacted the surrounding Caribbean islands. An 18-meter wave was reported on the island of Guadeloupe, however, this report was considered an exaggeration since it exceeded the maximum wave heights reported closest to the epicenter of the earthquake. However, a 10-meter wave was recorded for two locations on Guadeloupe. A study of the event, including simulations, is provided by [Zahibo and others \(2003b, pdf\)](#).

1918 Puerto Rico - A 7.5 magnitude earthquake occurred 15 km off the northwest coast of the island within the Puerto Rican Trench. The deepest point in the Atlantic, the trench marks the location where