A major earthquake occurred just after midnight Thursday Portland time off the north coast of Honduras. The red star on the map to the right shows the location of the epicenter as determined by the US Geological Survey. The map below shows historic earthquake activity near the epicenter (gold star) from 1990 to present. This earthquake occurred on the transform plate boundary between the Caribbean and North American plates. As expected for an earthquake on a transform boundary, the depth of the event was quite shallow at about 10 km. Significant damage has been reported in Honduras and Belize with one death reported so far.
The epicenter of the earthquake that occurred May 28, 2009 is indicated by the red star on the map below. This map shows the rates and directions of motion of the Cocos, Pacific, and Caribbean plates with respect to the North American Plate. The small arrows on the Caribbean Plate show that it moves eastward at a rate of about 20 mm/yr (2 cm/year) with respect to the North American Plate. This is a fairly slow rate of transform (side-by-side) motion between the Caribbean and North American plates. For comparison, the rate of transform motion across the San Andreas transform fault between the North American and Pacific plates is about 50 mm/yr (5 cm/year).
The record of the Honduras earthquake on the University of Portland seismometer is illustrated below. Portland is about 4600 km (~2900 miles) from the location of this earthquake. The waves labeled P and S are “body” waves that traveled through Earth’s mantle from the earthquake to Portland. (P waves are compressional waves while S waves are shear waves). It took about 7 minutes for the P waves to travel from the earthquake to Portland while the S waves started arriving about 13 minutes after the earthquake occurred north of Honduras. The surface waves (Love and Rayleigh waves) traveled from the earthquake to Portland around the perimeter of the Earth. Because the distance around the perimeter is longer than the distance through Earth’s mantle and the speed of surface waves is slower than body waves, it takes surface waves much longer than body waves to travel from an earthquake to a distant seismic station. In this case, the first surface waves from the Honduras earthquake started arriving at the University of Portland about 20 minutes after the earthquake occurred off the north coast of Honduras.