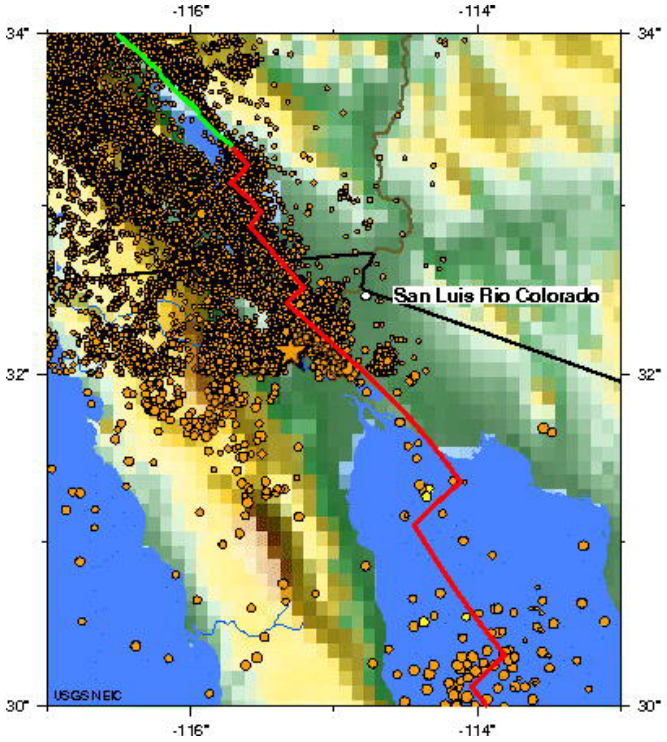
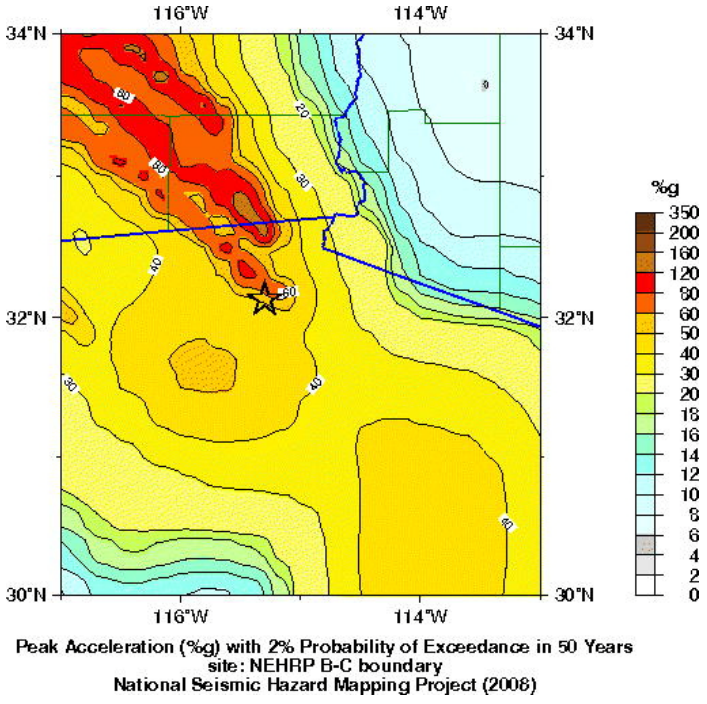
Magnitude 7.2 Major Earthquake in Baja California, Mexico
Sunday, April 4, 2010 at 22:40:40 UTC
Sunday, April 4, 2010 at 3:40:40 PM Pacific Daylight Time
Epicenter: Latitude 32.128°N, Longitude 115.303°W. Depth: 10 kilometers.

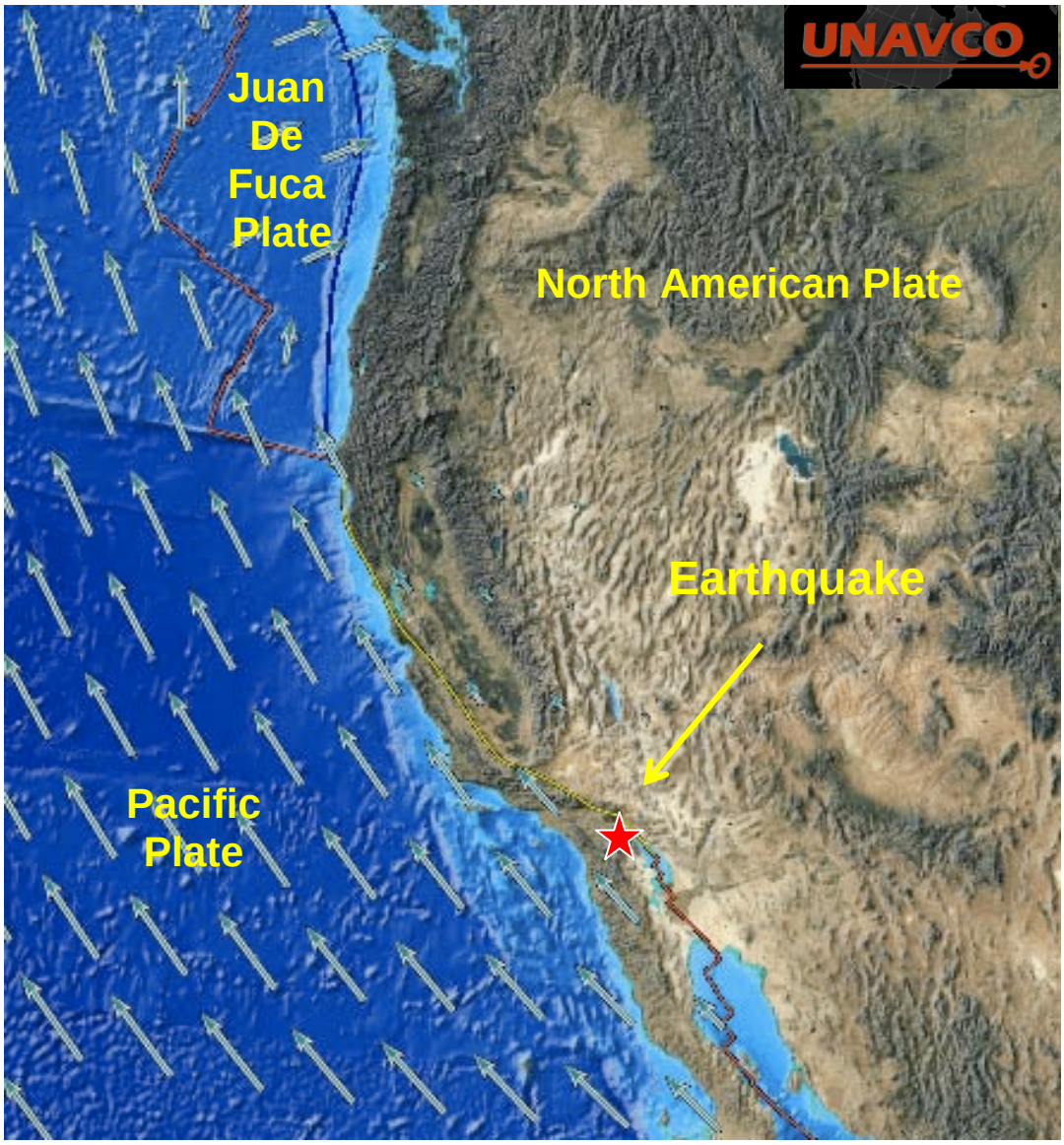
A major earthquake occurred Sunday afternoon Pacific Time in Baja California, Mexico about 60 km (38 miles) south-southeast of Mexicali and 167 km (104 miles) east-southeast of Tijuana. There were no immediate reports of significant damage or injuries produced by this earthquake. However ground shaking from this event was felt across a large portion of southern California. The circle with surrounding rings on left-side map below illustrates the epicenter of this earthquake as determined by the US Geological Survey. The map on the right below shows historic earthquake activity near the epicenter (star) from 1990 to present. As you can see from this map, the epicenter of the April 4, 2010 earthquake is southwest of the transform plate boundary between the North American and Pacific Plates. North-northwest of the M 7.2 event, this transform boundary connects to the San Andreas Fault that is shown by the green line on the map of historic earthquake activity. Essentially all of the earthquakes in this region are shallow with depths less than 30 km as expected for earthquakes on transform plate boundaries.





Left: The map on the left shows the epicenter of the M7.2 earthquake superimposed on the seismic hazard map of this region published by the National Seismic Hazard Mapping Project in 2006. It is important to realize that there are several northwest - southeast oriented strike-slip faults in this region. The relative motion between the North American and Pacific Plates is distributed over a set of faults rather than across one specific fault. The April 4 earthquake appears to be near the southeast end of one of these strike-slip faults.

The epicenter of the April 4, 2010 earthquake is indicated by the red star on the map below. This map also shows the rates and directions of motion of the Pacific and Juan de Fuca plates with respect to the North American Plate. The rate of transform motion between the Pacific and North American plates is about 55 mm/yr (5.5 cm/year). The M7.2 earthquake that occurred Sunday April 4 is typical of moderate and shallow earthquakes on this transform plate boundary. For comparison, the rate of subduction of the Juan de Fuca Plate beneath the North American Plate at the Cascadia subduction zone is about 35 mm/yr (3.5 cm/year).



The record of the April 4, 2010 earthquake on the University of Portland seismometer is illustrated below. This magnitude 7.2 earthquake occurred 14.60 degrees (1621 km) away from the recording station UPOR in Portland, Oregon. The first P wave energy arrived as Pn, 206.61 seconds (3 minutes 27 seconds) after the earthquake occurred in Baja, Mexico. Pn is a wave only seen for earthquakes that are nearby to the recording station. While P-wave energy travels a curved path through the mantle, Pn travels in the upper mantle just below the Mohorovicic discontinuity (Moho) at the base of the crust. For this earthquake, the P wave energy arrived at 213.10 seconds (3 minutes 33 seconds), slightly after the Pn wave arrived. Traveling the same path as the Pn wave energy, Sn is the first S wave energy to arrive at 369.68 seconds (6 minutes 10 seconds) after the earthquake but it not predominant on this seismogram. The surface waves are clipped on this seismogram, the amplitude at this station exceeding the recording range of the instrument.