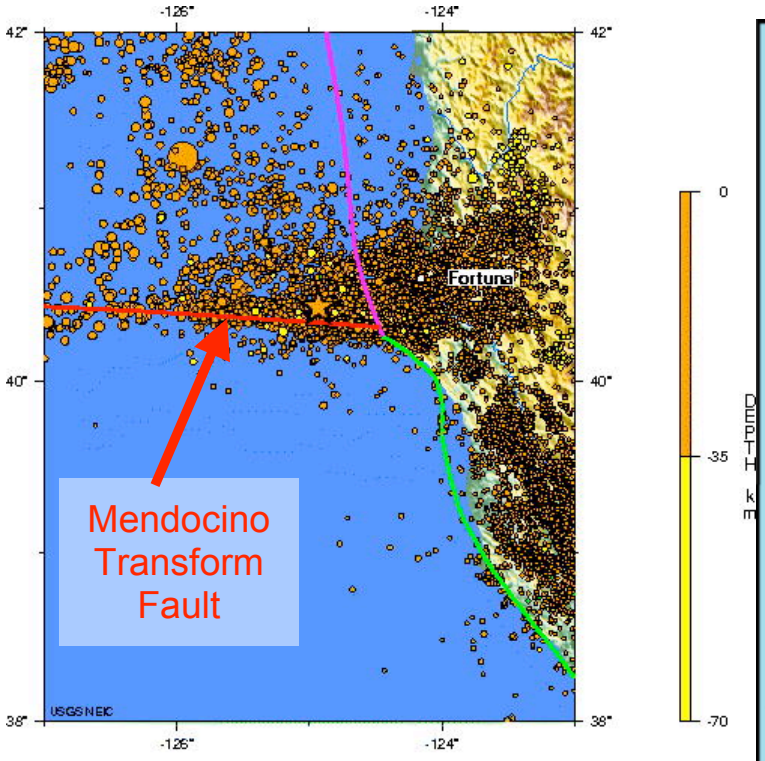
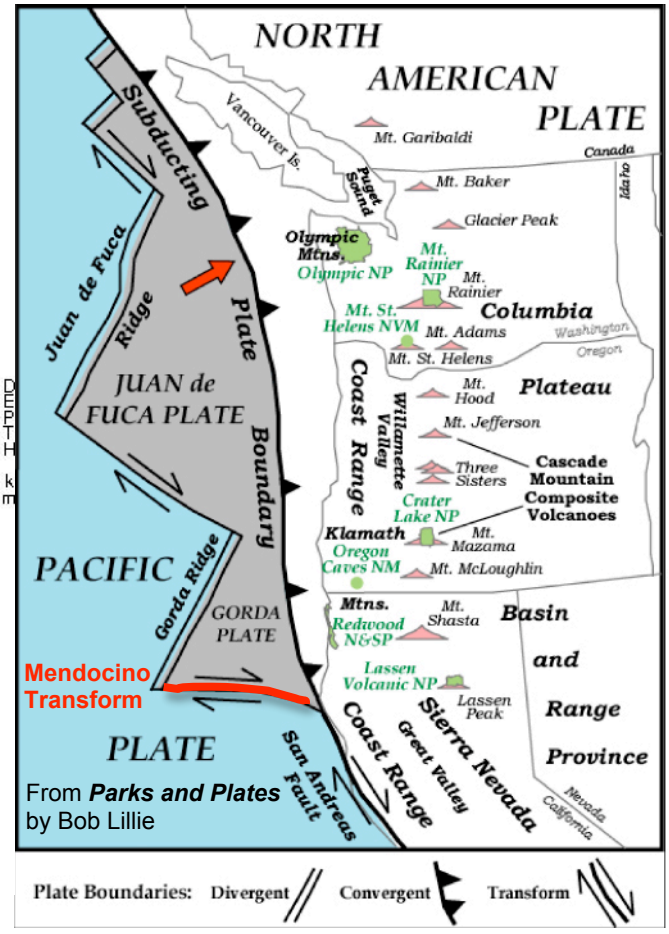
Magnitude 5.9 Earthquake Off Coast of Northern California
Thursday, February 4, 2010 at 12:20:21 PM Pacific Standard Time
Thursday, February 4, 2010 at 20:20:21 Universal Time
Epicenter: Latitude 40.431 °N, Longitude 124.929 °W
Depth: 11.2 kilometers.

A strong earthquake occurred Thursday just past noon local time off the northern California coast. The star on the left-hand map below shows the location of the epicenter as determined by the US Geological Survey, National Earthquake Information Center. Circles on this map show earthquakes that have occurred in this region from 1990 to present. The configuration of the Juan de Fuca, Gorda, Pacific, and North American plates is shown on the right-hand map. The Gorda Plate is the southern portion of the Juan de Fuca Plate that subducts beneath North America along the southern portion of the Cascadia Subduction Zone. The earthquake of Thursday (February 4, 2010) occurred on the Mendocino Transform Fault where the Pacific and Gorda plates meet. The fault motion during the earthquake was strike-slip (side-by-side like the San Andreas Fault) with the Gorda Plate moving east and while the Pacific plate jumped west along the Mendocino Transform Fault. Such horizontal displacement does not generate tsunamis because the ocean floor is not offset vertically during the earthquake and no tsunami warning was issued following this earthquake.



OFFSHORE NORTHERN CALIFORNIA
2010 02 04 20:20:21 UTC 40.43N 124.93W Depth: 11.2 km, Magnitude: 6
Seismicity 1990 to Present
Major Tectonic Boundaries: Subduction Zones -purple, Ridges -red and Transform Faults -green
USGS National Earthquake Information Center



The magnitude 5.9 earthquake occurred 598 km (5.39 degrees) away from the recording station UPOR in Portland, Oregon. The seismogram recorded by station UPOR is shown in the illustration below. The first P-wave energy arrived at UPOR as P_n at 1 minute and 20 seconds (80 seconds) after the earthquake. P_n is a compressional wave only seen in earthquakes that within several hundred kilometers from the recording station. While P-wave energy travels a curved path through the mantle, P_n travels in the upper mantle just below the Mohorovicic discontinuity (Moho) at the base of the crust. Traveling the same path as the P_n wave energy, S_n is the first S-wave energy that arrived 2 minutes and 23 seconds (143 seconds) after the earthquake. For an earthquake within several hundred kilometers of the recording station, there is no clear separation between the arrivals of the S waves and the later-arriving surface waves that produced the largest ground oscillations.