Resource from animation found at: <http://www.iris.edu/hq/inclass/search>

**Narration from the animation:**

**Solomon & Vanuatu Island Chains: Earthquakes & Tectonics**

The Solomon and Vanuatu Islands occupy the center of a region that is marked by a complicated arrangement of tectonic micro plates crushed **between** the greater Pacific and Indo-Australian Plates.The relatively fast-moving Australian continent is moving northeast at a rate of about 6 cm/year with variation along the boundaries up to 13 cm per year. Because of this, it a seismically active region as shown by two decades of earthquakes. In the region of the Solomon and Vanuatu islands, the earthquakes are caused by the northeasterly movement of the Indo-Australian Plate as it dives beneath the Pacific Plate.

We will focus on the short boundary between the IndoAustralian and Pacific plates, on the southern margin of the Solomon Islands, extending southeast to the seismically active New Hebrides Subduction zone, near the Vanuatu islands. The New Hebrides micro plate, is grouped within the Pacific Plate on generalized tectonic maps. The near-trench islands are the subduction-related back-arc volcanic islands of the Solomon and Vanuatu Island chains. Islands **far**ther from the trench represent older geologic processes not discussed here.

The map of earthquakes greater than magnitude 5 clearly delineate plate boundaries and show deepening earthquakes on the right. The largest, magnitude 7 and 8, cluster especially beneath the New Hebrides subduction zone reflecting the locked and loaded contact.

We’ll look more closely at three areas in cross section to reveal a change from steeply dipping subduction along the New Hebrides trench, to a short segment of strike slip motion along the Solomon Islands, and to a shallow subduction zone to the west.Again, all reflect the convergence of the Indo Australian Plate as it dives beneath, and scrapes against the Pacific plate**.**

First the New Hebrides trench. At this location this part of the IndoAustralian plate is diving beneath the Pacific plate. Farther south it dives beneath the New Hebrides micro plate. In cross section we see that this oceanic-plate portion of the Indo Australian plate is diving steeply beneath the Pacific plate. The upper plate is locked to the lower plate by tremendous friction. When the friction is overcome it can yield great earthquakes, and possibly tsunamis. Earthquakes occur within *both* plates near the contact between the plates. Earthquakes also occur in the overlying plate away from the contact due to deformation of the colliding plates. The deepest earthquakes occur in the subducting plate which is still brittle as it descends into the hot mantle.

The second cross section cuts through a short, east-west-oriented strike-slip boundary that accommodates motion between the Pacific and Indo Australian plates. It connects the Solomon Trench to the west, with the New Hebrides trench on the east. A February 2013 earthquake swarm was located at the bend in the contact where the strike slip fault merges with the New Hebrides boundary. Let’s look at a simplified cross section beneath the ocean to see what is going on. Deformation at the bend is dominated by thrust faults with fewer normal and strike slip faults caused by the convergent shortening of the overlying plate.

The third cross section, through a the northwest-trending lineament to the west of the strike-slip zone, marks a continuation of the east-northeast converging subduction of the IndoAustralian Plate. Here the subducting plate dives at a shallower angle thus earthquakes do not occur as deeply as in the New Hebrides subduction zone.

This has been a small and highly generalized portrait of a seismically active region that lies in the broader region sandwiched between New Guinea on the west and Fiji on the East. All regions have potential for great earthquakes and ensuing tsunamis.