

Tsunami

- (1) Are often confused with wind-generated waves but rather than being produced by wind are produced by a sudden abrupt disturbance of the sea surface.
- (2) Such disturbances are often produced by earthquakes with magnitudes greater than 7 and foci less than 30 km depth.
- (3) The results of the earthquake is commonly a sudden uplift of the seafloor which in turn produces an abrupt disturbance of the overlying sea surface

[Tsunami Animation](#)

Animation by Miho Aoki of the University of Alaska-Fairbanks Art Department

In the deep oceans tsunami are characterized by

(1) 100s of meters to over 500 km
wavelengths

(2) 10s of minutes to about 2 hour wave
periods

(3) less than a meter wave heights, and

(4) speeds that can exceed about 966 km/hour

In contrast, wind-driven waves commonly have
wavelengths of 100-200 m, periods of ~5-20
seconds, and wave heights around 2 m.

As a tsunami enters shallow water its speed and wavelength decreases, its period stays the same, and its height increases.

The first indication that a tsunami may be coming a shore is a drop in sea level – this phenomenon is called draw down.

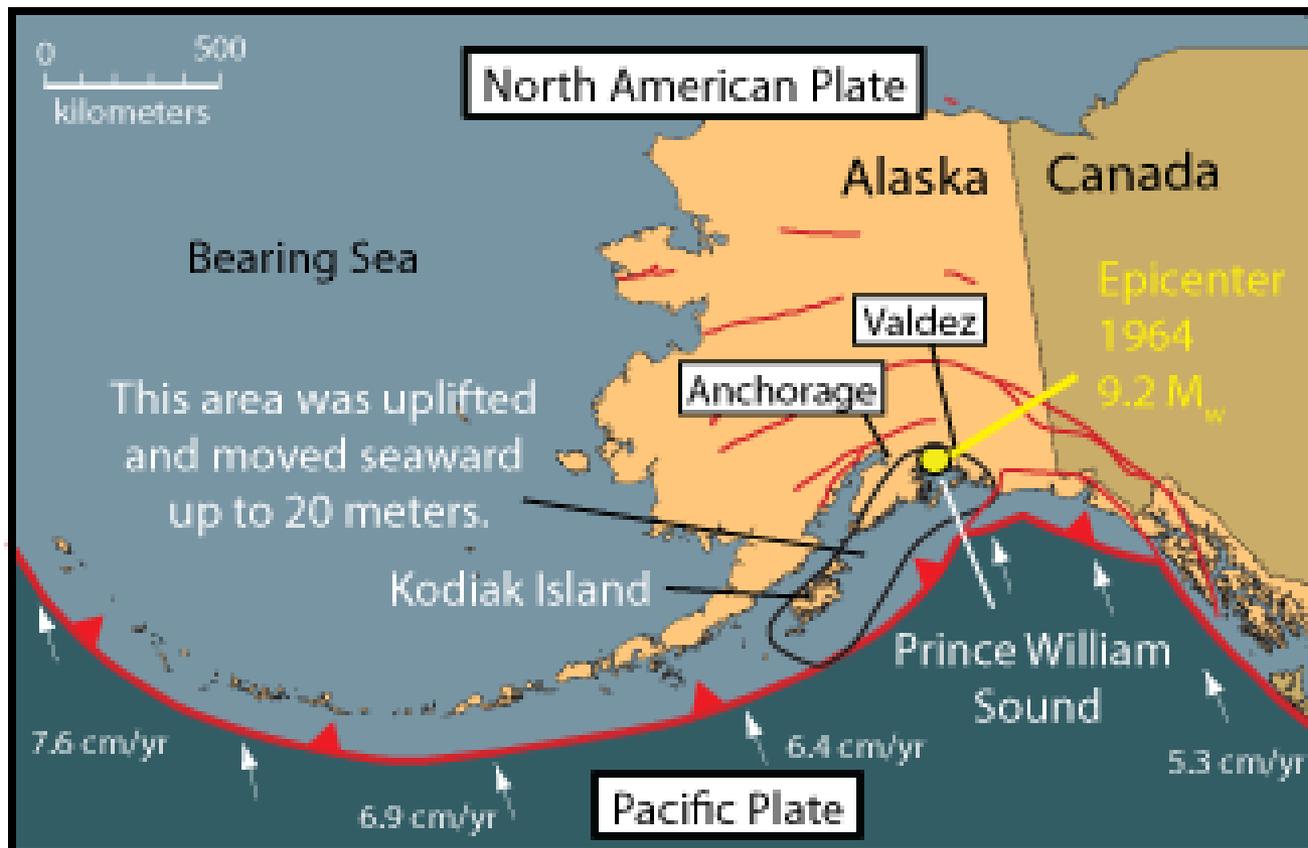
Draw down is followed by the tsunami's arrival which is often described to be like an extreme high tide.

The maximum vertical height above normal high tide reached by a tsunami as it travels over the land surface is called run up.

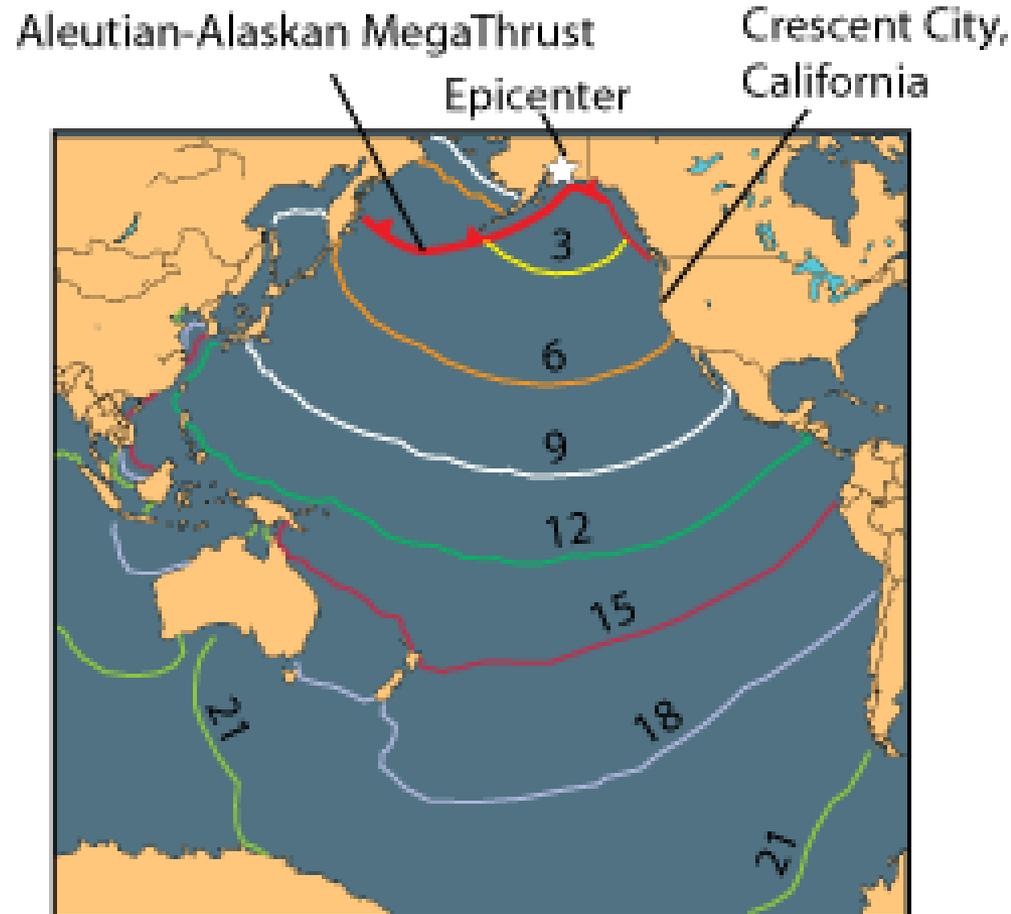
Lets look at another animation by Professor Aoki that nicely shows draw down followed by run up.

[Animation by Professor Aoki](#)

The Good Friday earthquake



At Crescent City, ~25 km south of the border with Oregon, the tsunami came ashore as a series of 4 waves. The first wave arrived 4.1 hours after the earthquake. The 4th wave came ashore about 2 hours later and was preceded by significant draw down. When the 4th wave came ashore it had a height of about 6 meters (20-21 feet). It flooded 30 blocks of the city. In total 11 people lost their lives.



Cascadia Subduction Zone

On January 26, 1700 an 8.7 to 9.2 magnitude earthquake occurred within the Cascadia subduction zone. This is the largest earthquake known to have affected the continental United States. It generated a tsunami that traveled across the Pacific where ancient documents record its affect in Japan.

The recurrence interval for great earthquakes in the Cascadia subduction zone is 300-600 years.

