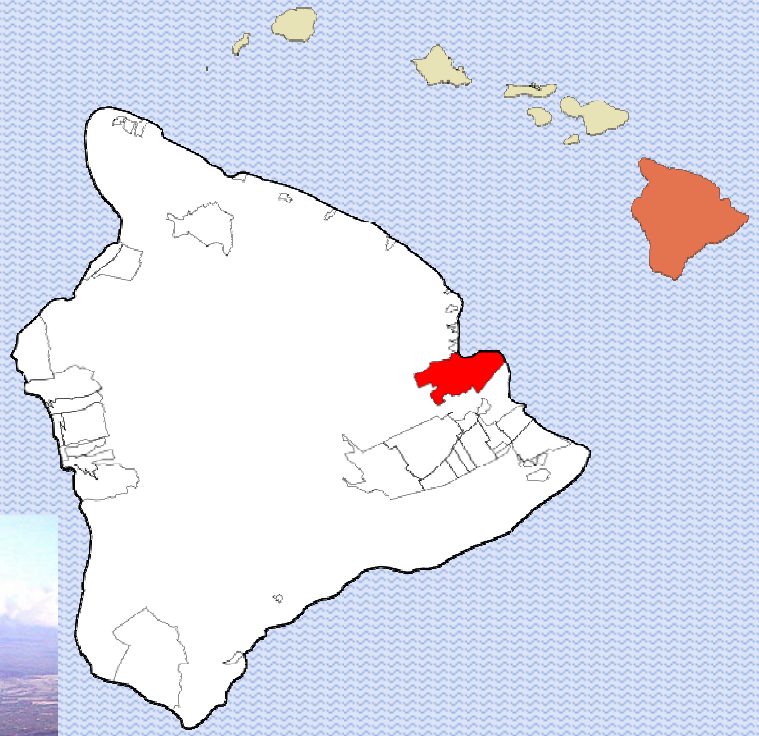
Hilo Bay, Hawaii



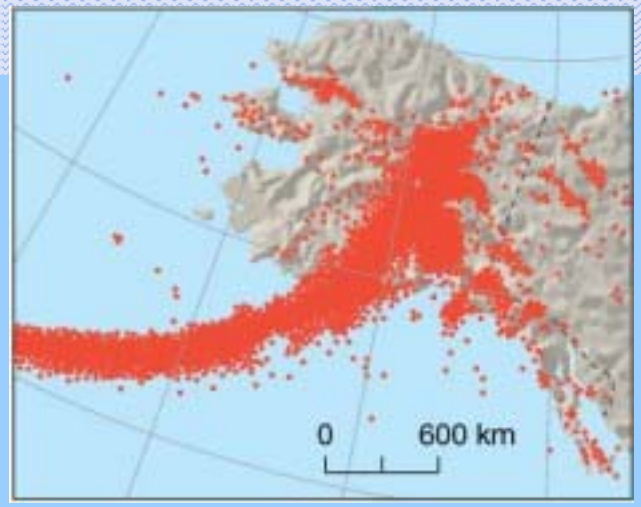
Hawaii 1947

Hawaii 1947

Hawaii 1947

Hawaii 1947

Major tsunamis in Alaska



Alaska

Canada

Berring Sea

1964

1958

Gulf of Alaska

1957

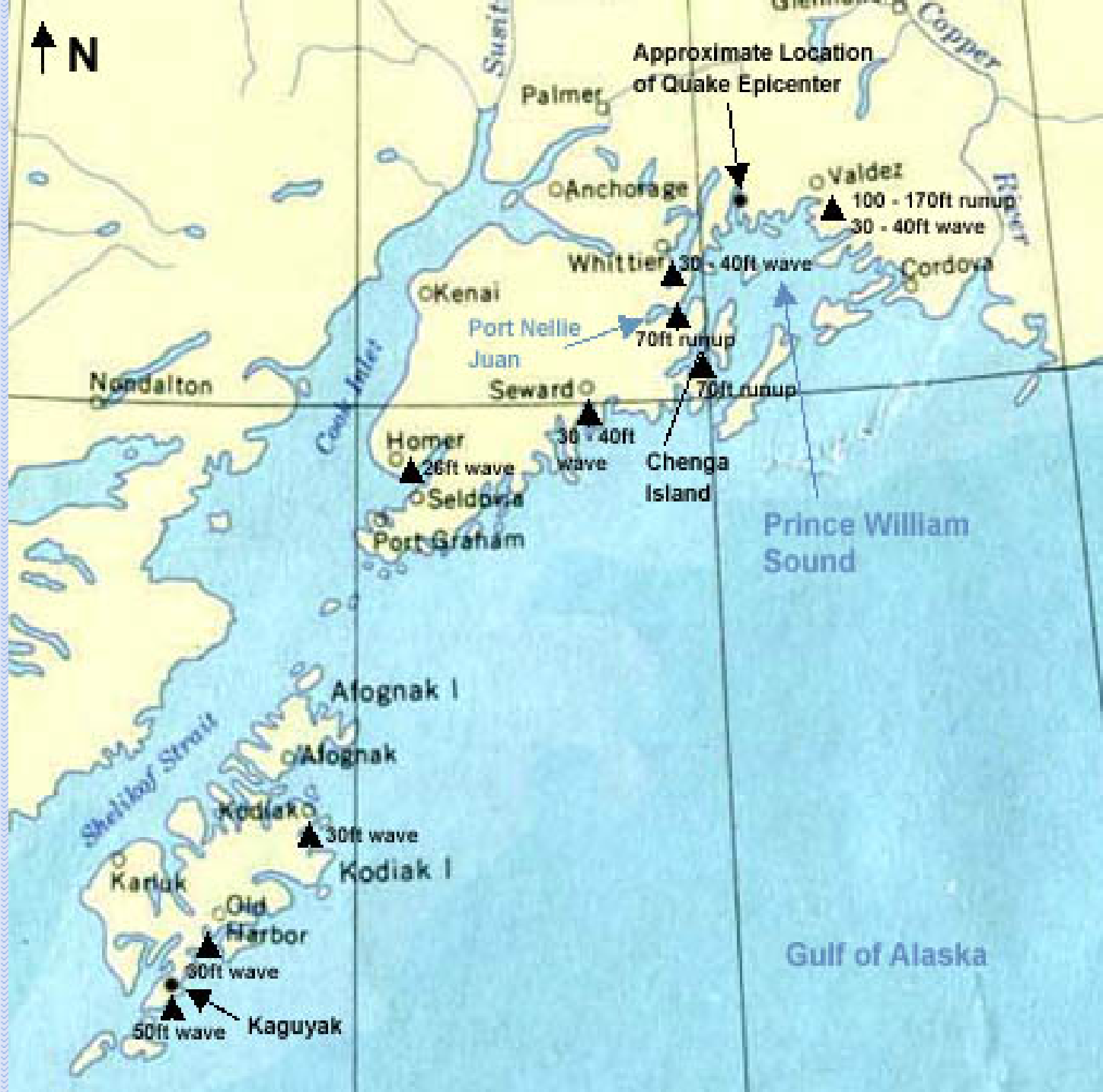
1946

Pacific Ocean

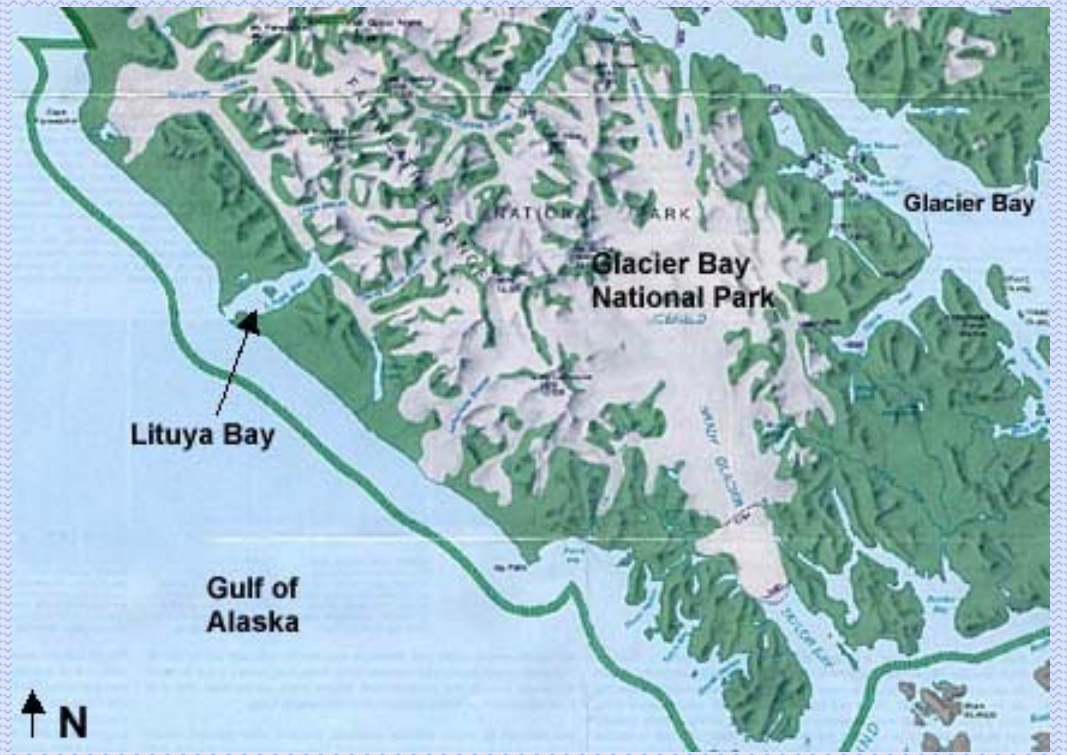
Alaska
1964

30-40 ft
wave

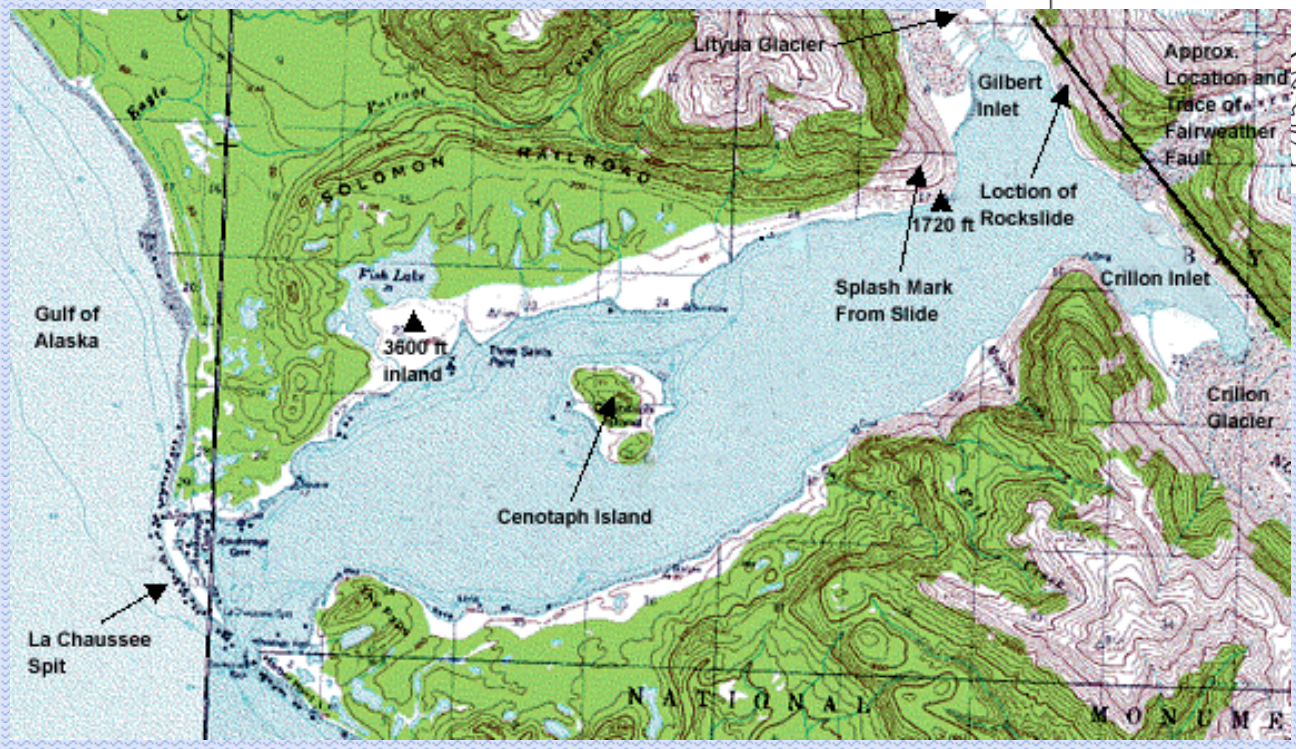
100-170 ft
run-up



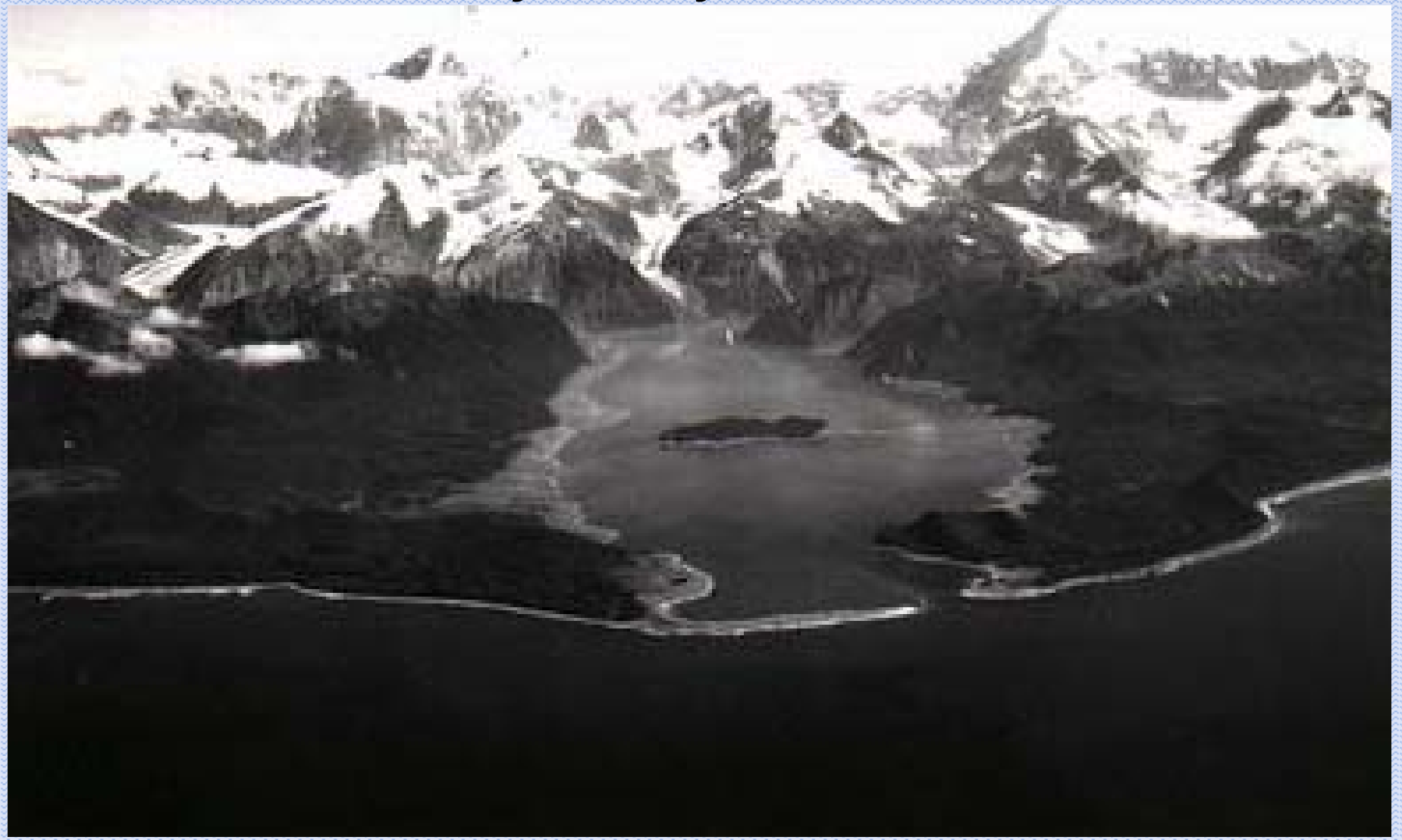
Lituya Bay, Alaska



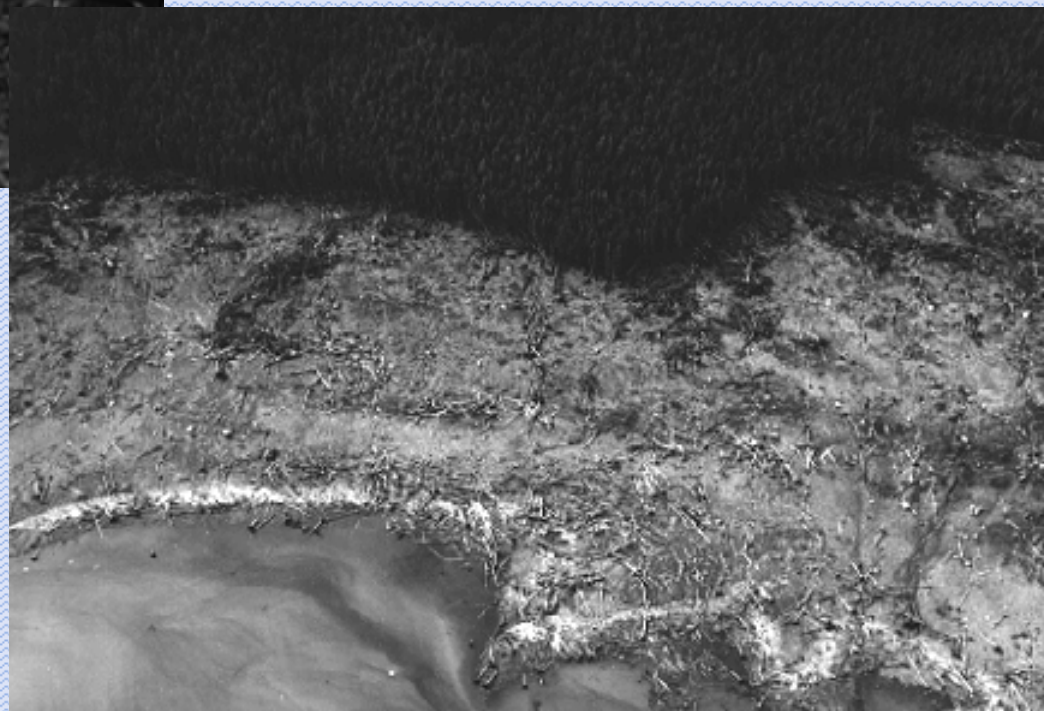
Lituya Bay, Alaska



Lituya Bay, Alaska



Lituya Bay, Alaska



Lituya Bay, Alaska

Krakatau 1883

Forming a caldera – Crater Lake, Oregon

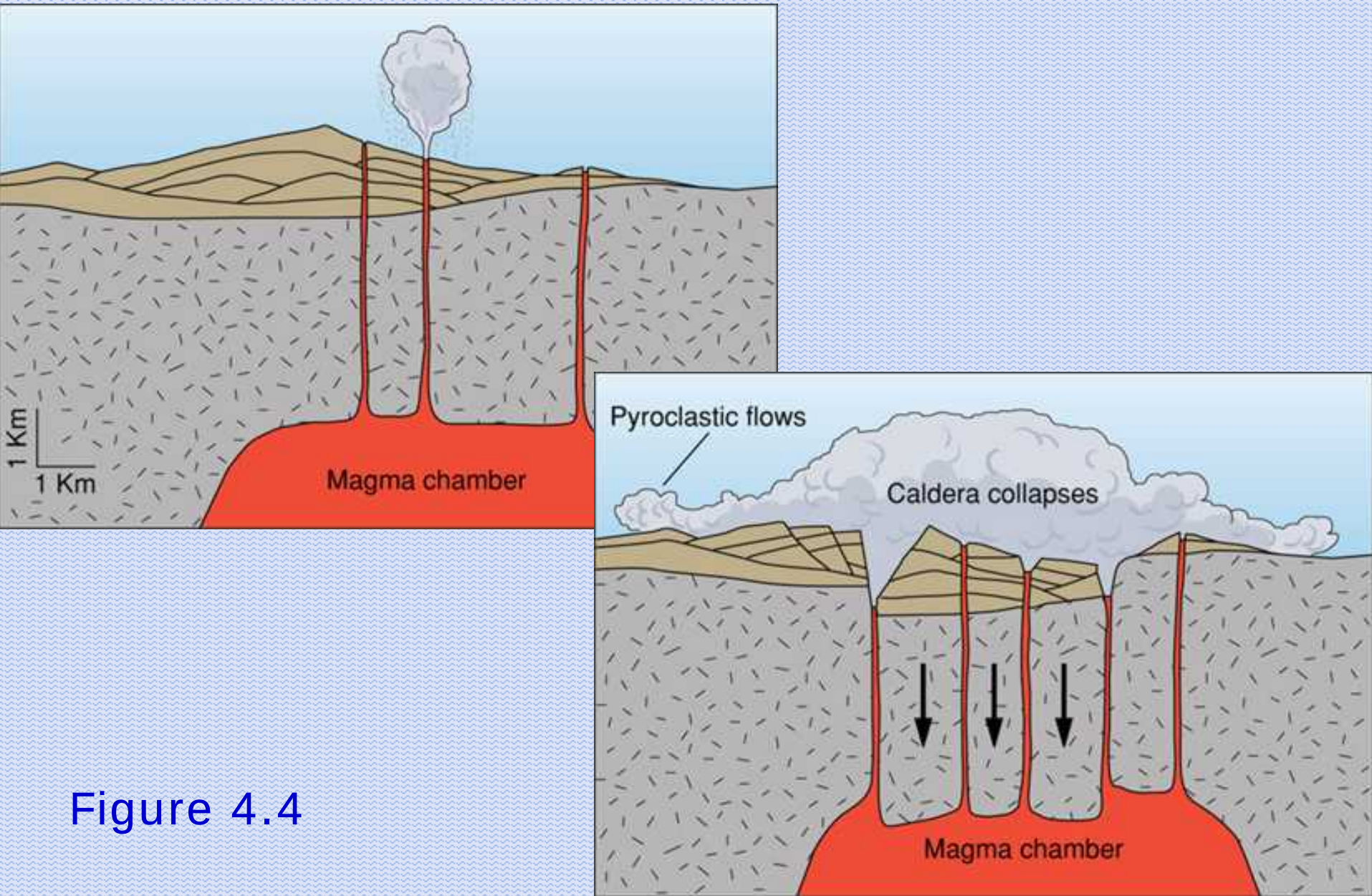
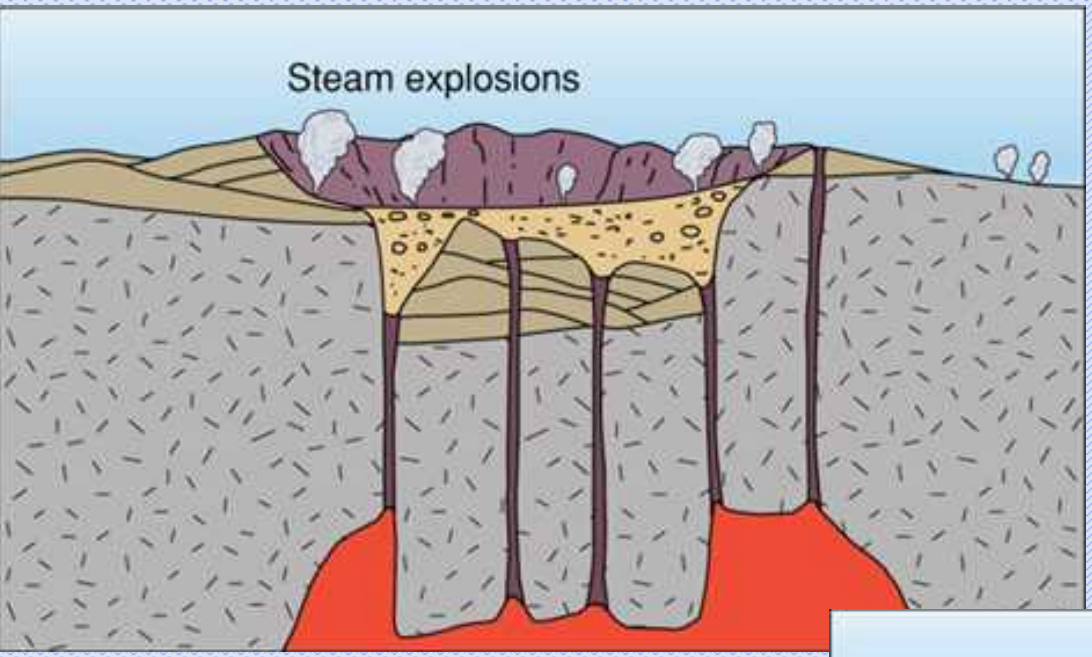
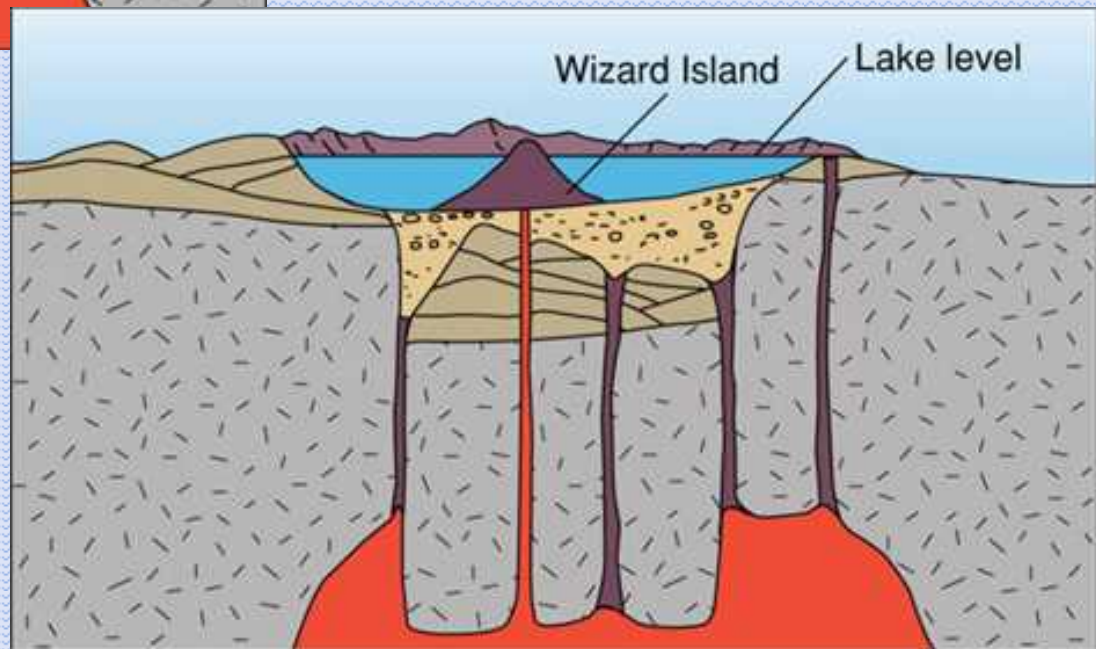


Figure 4.4

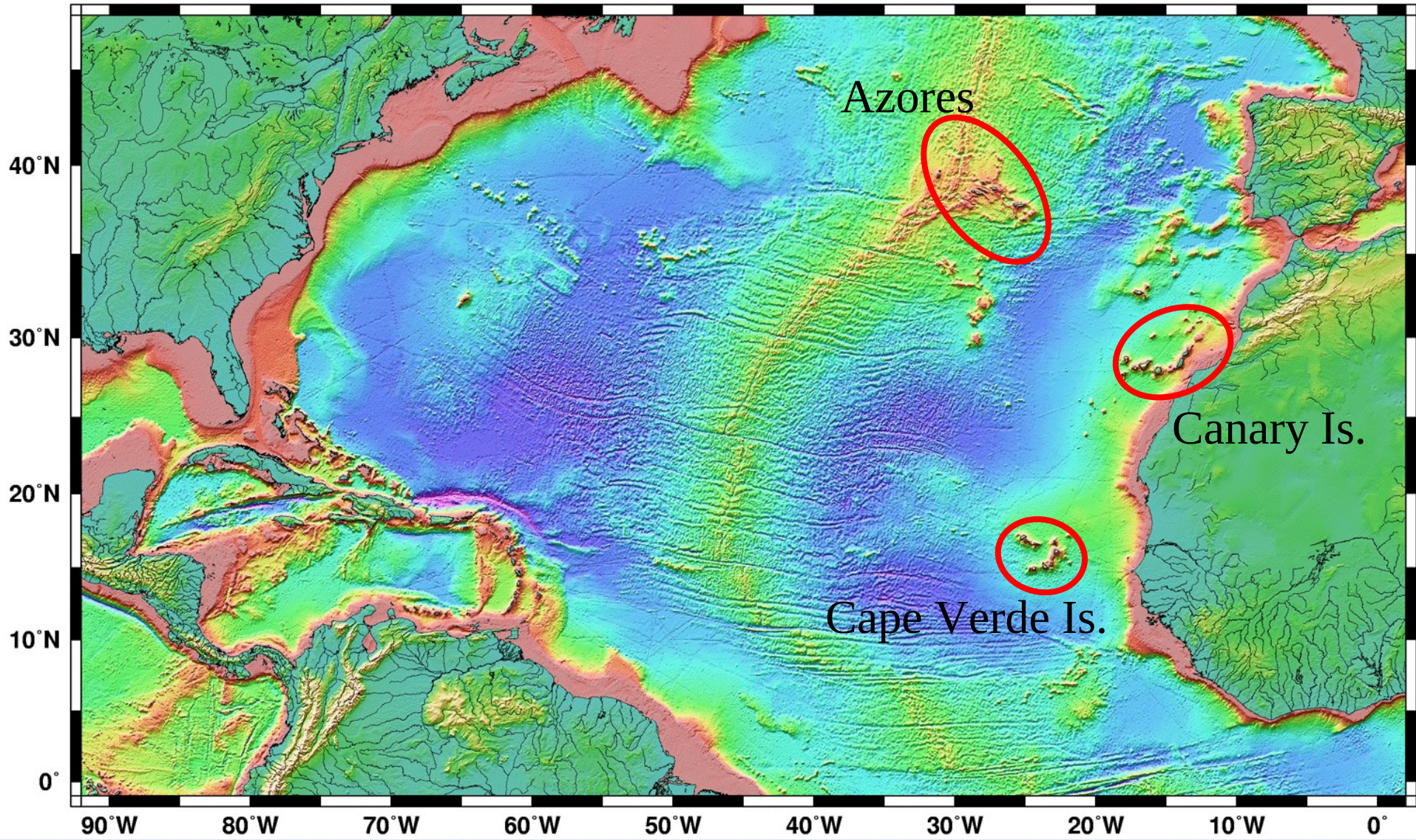
Forming a caldera



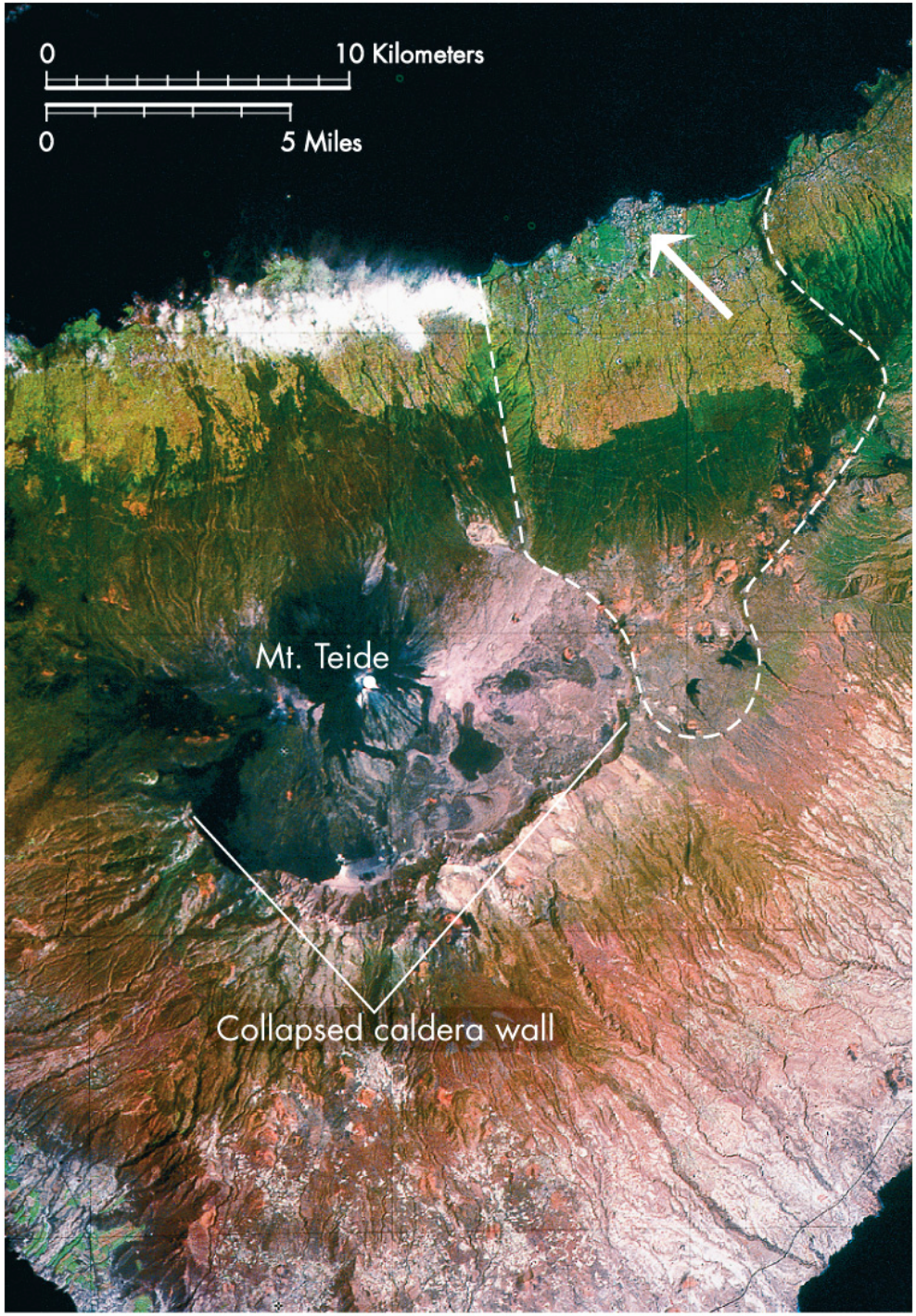


Cinder cone with a collapsed crater

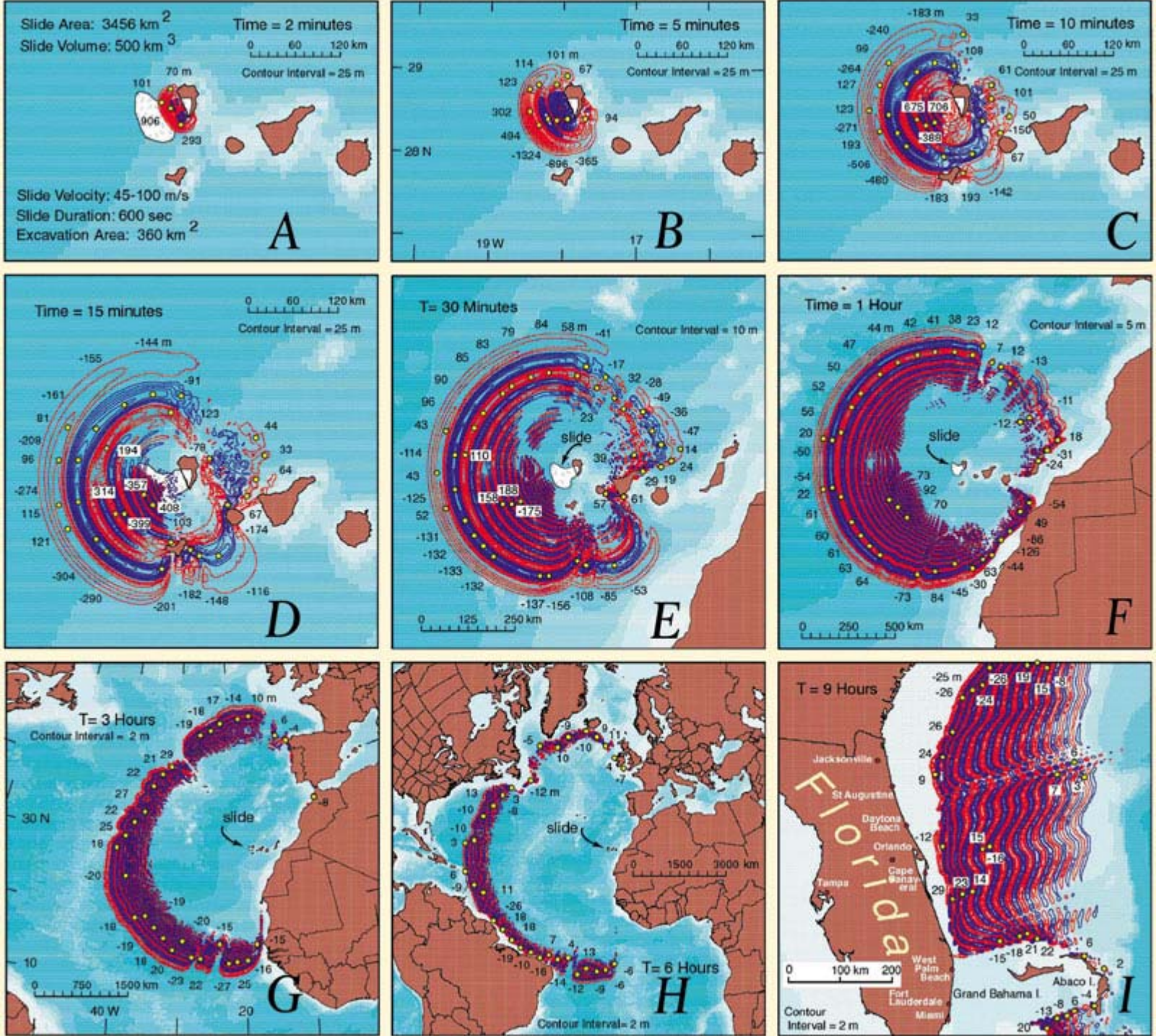
North Atlantic Ocean



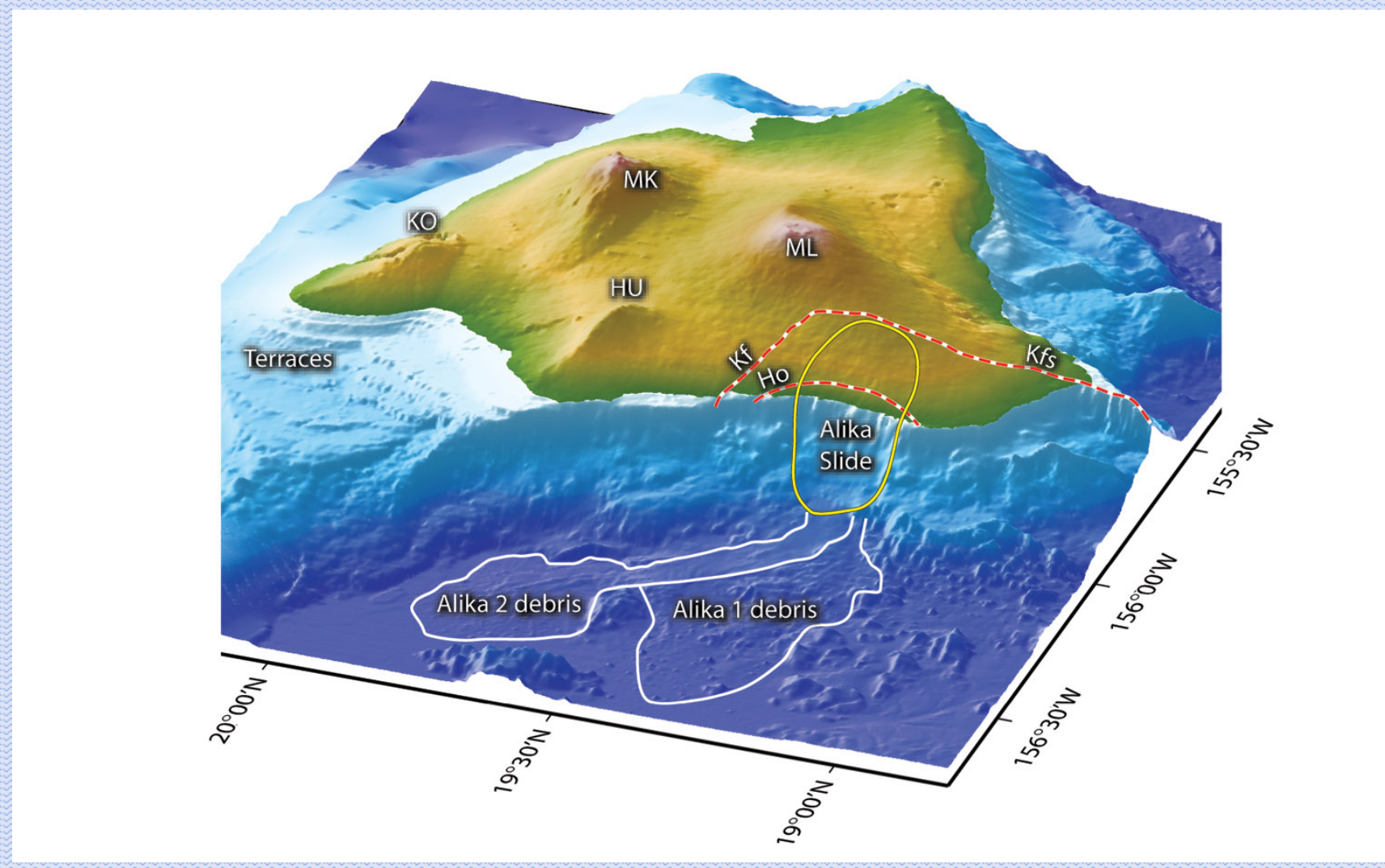
Tenerife, Canary Islands



Orotova landslide

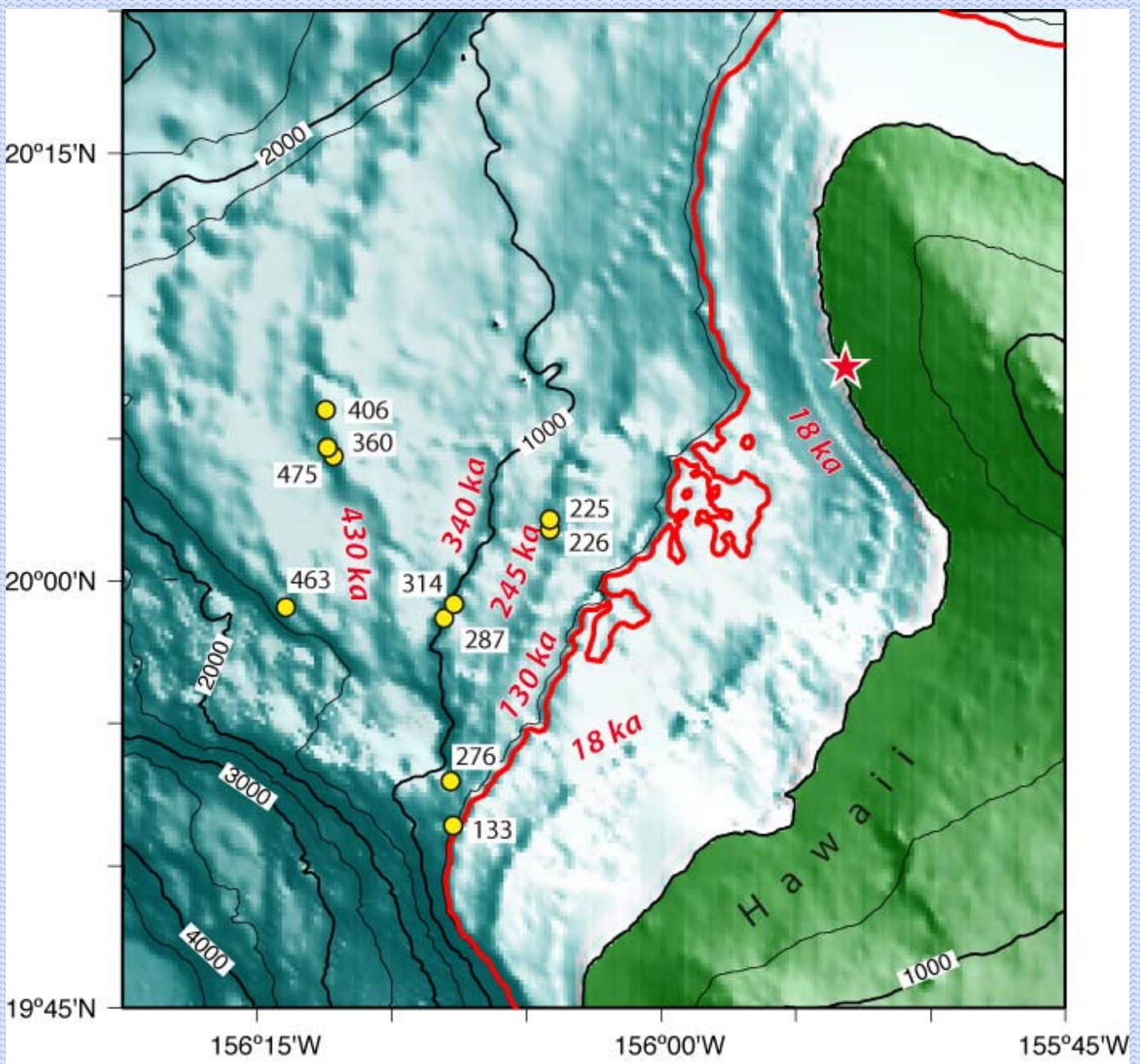

Slide Area: 3456 km 2
Slide Volume: 500 km 3
Time = 2 minutes
0 60 120 km
Contour Interval = 25 m
Slide Velocity: 45-100 m/s
Slide Duration: 600 sec
Excavation Area: 360 km 2
A
Time = 5 minutes
0 60 120 km
Contour Interval = 25 m
29
28 N
19 W
17
B
Time = 10 minutes
0 60 120 km
61 Contour Interval = 25 m
C
Time = 15 minutes
0 60 120 km
Contour Interval = 25 m
D
T= 30 Minutes
Contour Interval = 10 m
slide
0 125 250 km
E
Time = 1 Hour
Contour Interval = 5 m
slide
0 250 500 km
F
T= 3 Hours
Contour Interval = 2 m
30 N
slide
0 750 1500 km
40 W
20
G
slide
0 1500 3000 km
T= 6 Hours
Contour Interval= 2 m
H
T = 9 Hours
Jacksonville
St Augustine
Daytona Beach
Orlando
Cape Canaveral
Tampa
Florida
West Palm Beach
Fort Lauderdale
Miami
Grand Bahama I.
Abaco I.
0 100 km 200
Contour Interval = 2 m
I

Alika submarine landslide



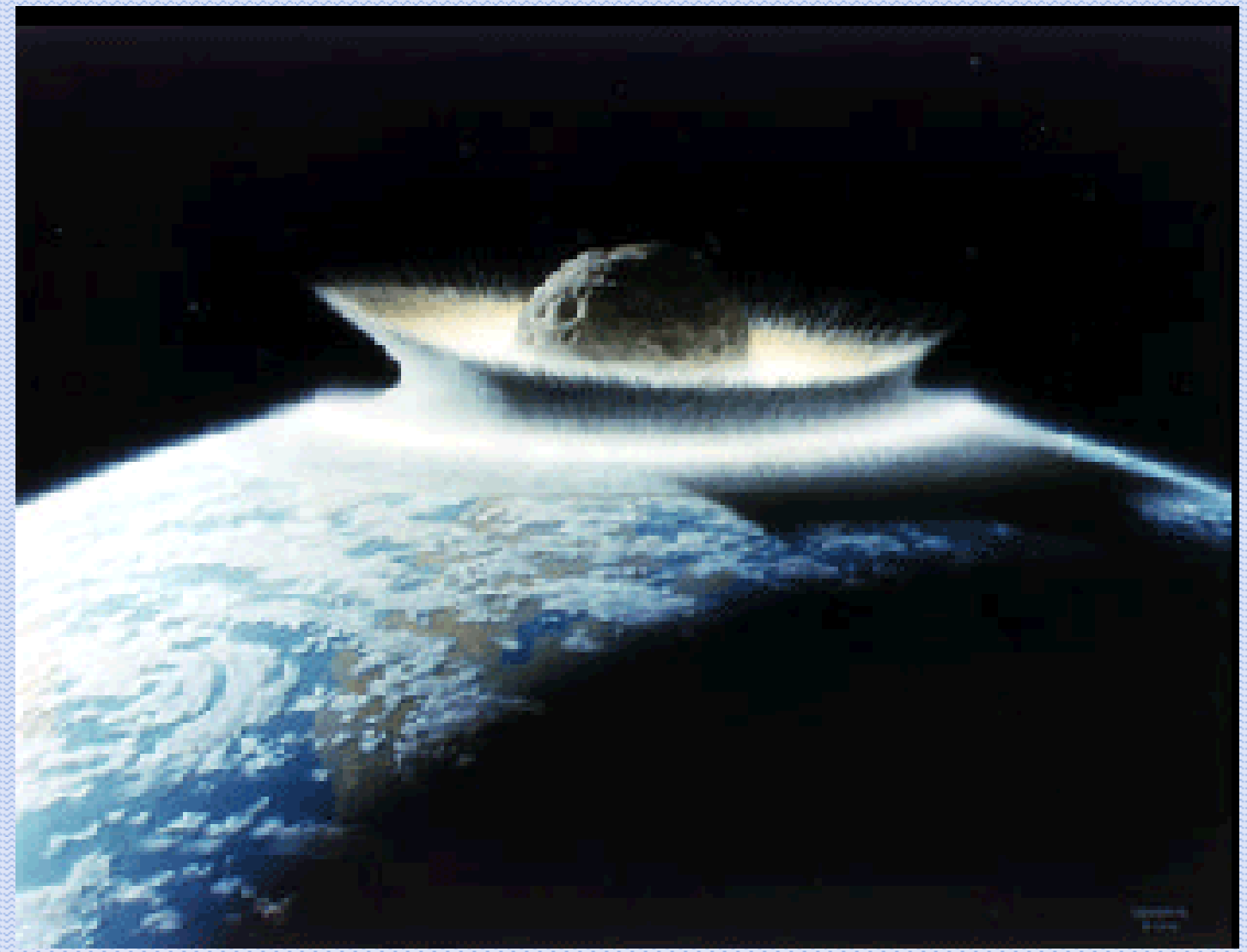
Alika submarine landslide

At least
60 m
of run-up

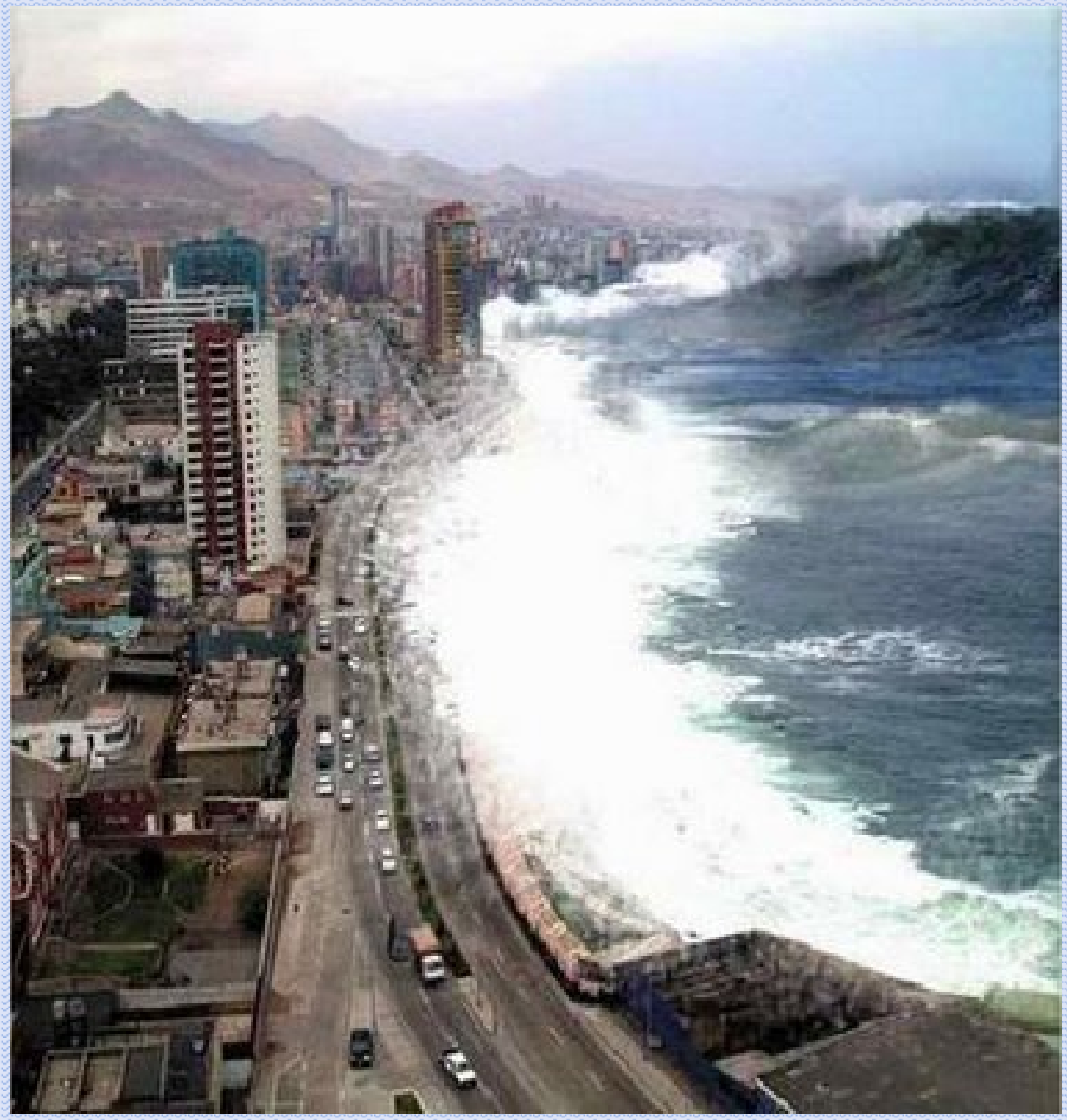


Drop

Asteroid impact



Mega tsunami



Mega tsunami

Minimizing the Tsunami Hazard

Detection and warning

- Monitor earthquake zones

Tsunami warning system

- Seismographs to detect earthquakes
- Tidal gauges to determine sea level changes
- Buoy sensors to detect tsunami in open ocean

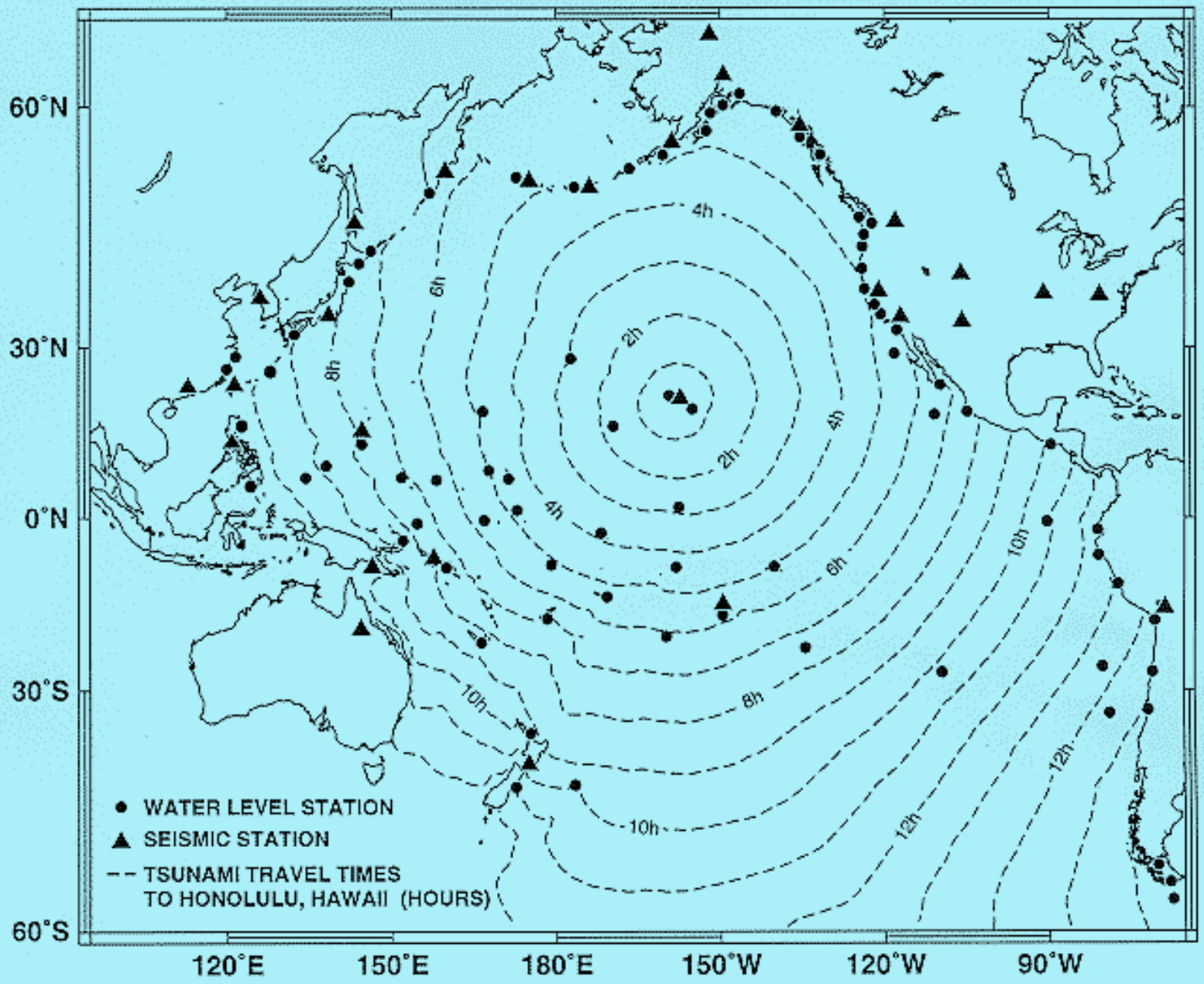
Structural control

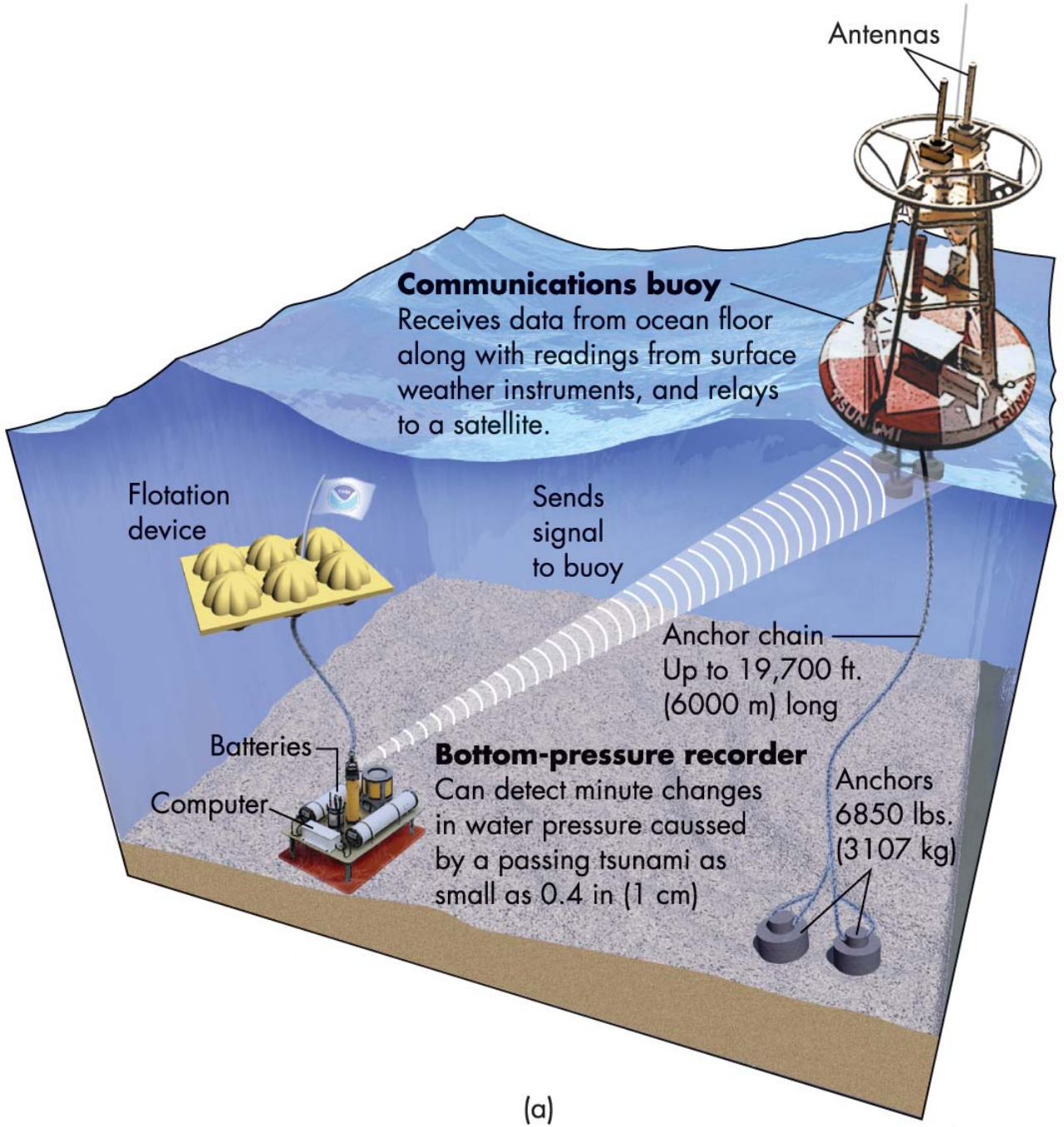
- Building codes for susceptible coastline areas

Run-up maps

- Show the height to which water is likely to rise

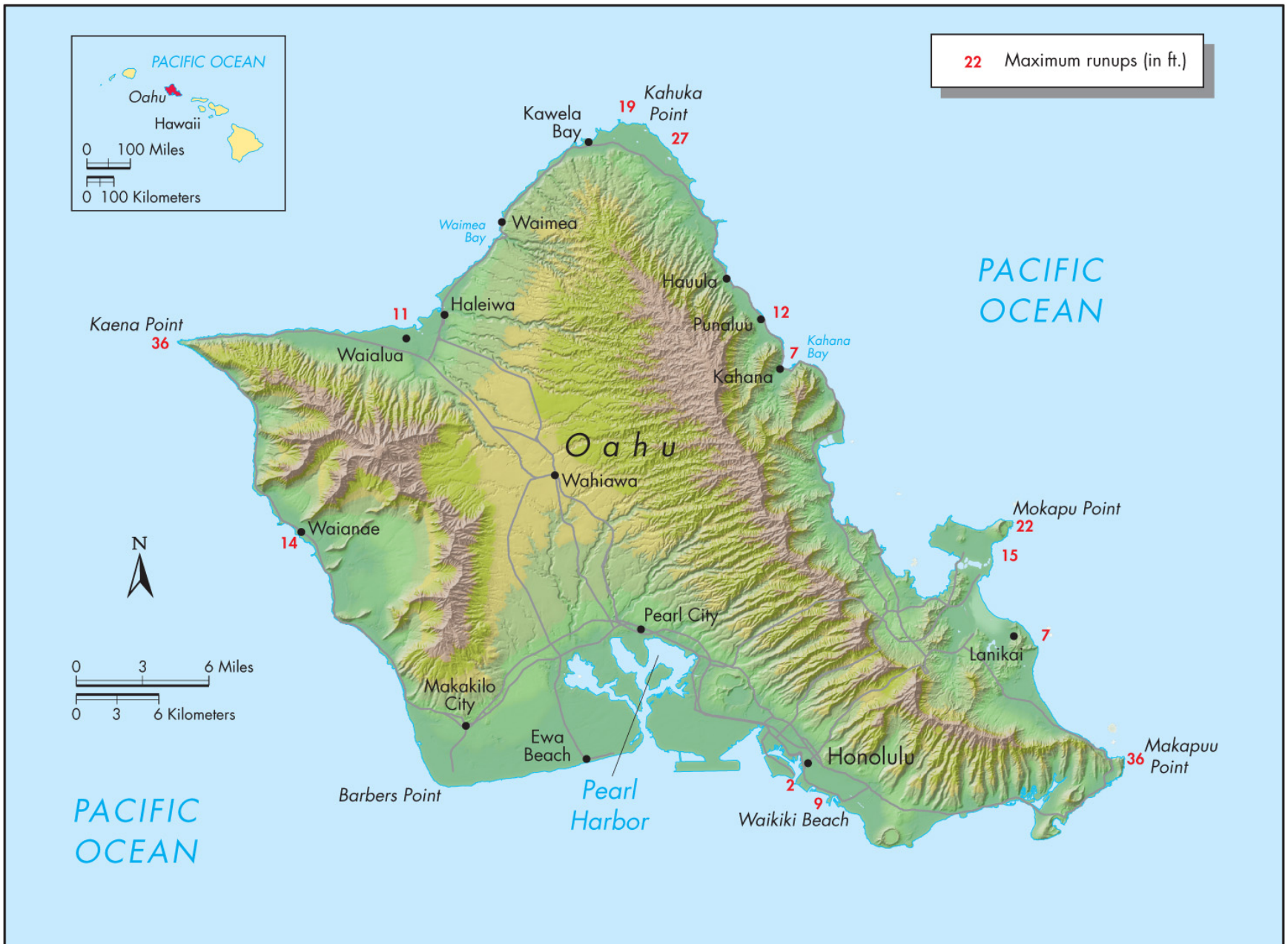
Pacific Tsunami Warning System





(a)

Tsunami run-up map



What Individuals Can Do

- If you feel an earthquake, leave the beach or low-lying area.
- If you see the ocean receding, run from beach.
- A small tsunami in one location may be larger nearby.
- If you hear the tsunami siren, move to higher ground.
- Do NOT go down to the beach to watch the tsunami. If you can see it, you are already in danger.

Fig. 10-36b, p. 292

C

Fig. 10-36c, p. 292

Minimizing the Tsunami Hazard, cont.

- Land use
  - Native vegetation may provide defense.
  - Development of land must be monitored.
- Probability analysis
  - Similar to earthquake analysis.
- Education
  - Educate people on the signs of tsunami.
  - Differences between **tsunami watch** and **tsunami warning**.

Minimizing the Tsunami Hazard, cont.

- Tsunami-ready status
  - Establish emergency operation center
  - Be able to receive tsunami warnings
  - Have ways to alert the public
  - Develop a preparedness plan with drills
  - Promote community awareness program