

# March 11, 2011 Earthquake and Tsunami

Sanriku Tsunami

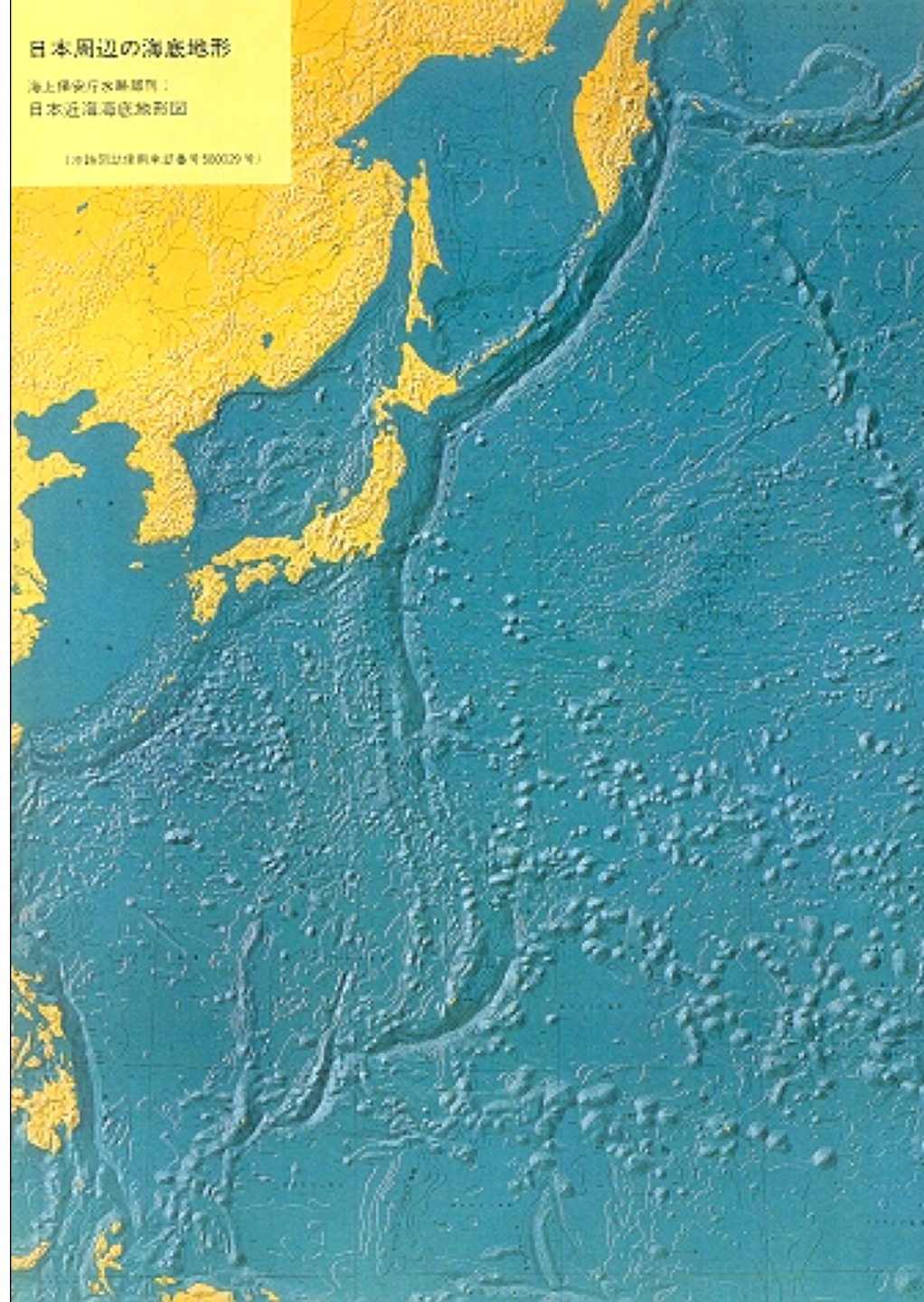
# Earth's Energy Unleashed As Tectonic Plates Shift

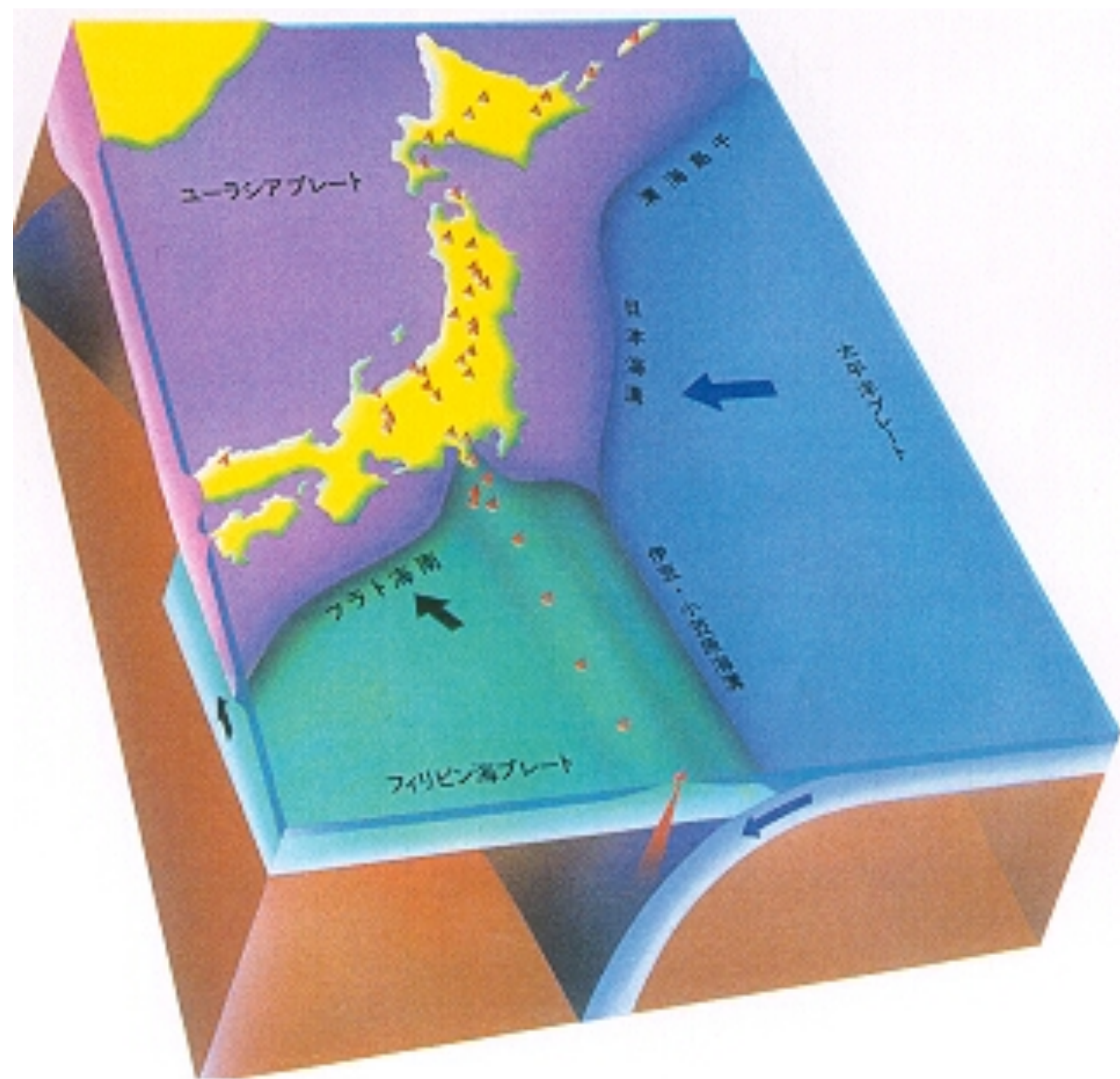
- Fifth largest recorded since 1900 and the biggest to hit Japan in 3 centuries
- Pacific plate moving at a speed of about 3 inches a year, slides under the Eurasian plate
- Motion of Pacific plate moving under the Eurasian plate caused massive uplift of the seafloor displacing water and causing 40-foot-tall tsunami.

# 日本周辺の海底地形

海上保安庁水測部刊  
日本近海海底地形図

(水測図は従来より番号 500029 号)







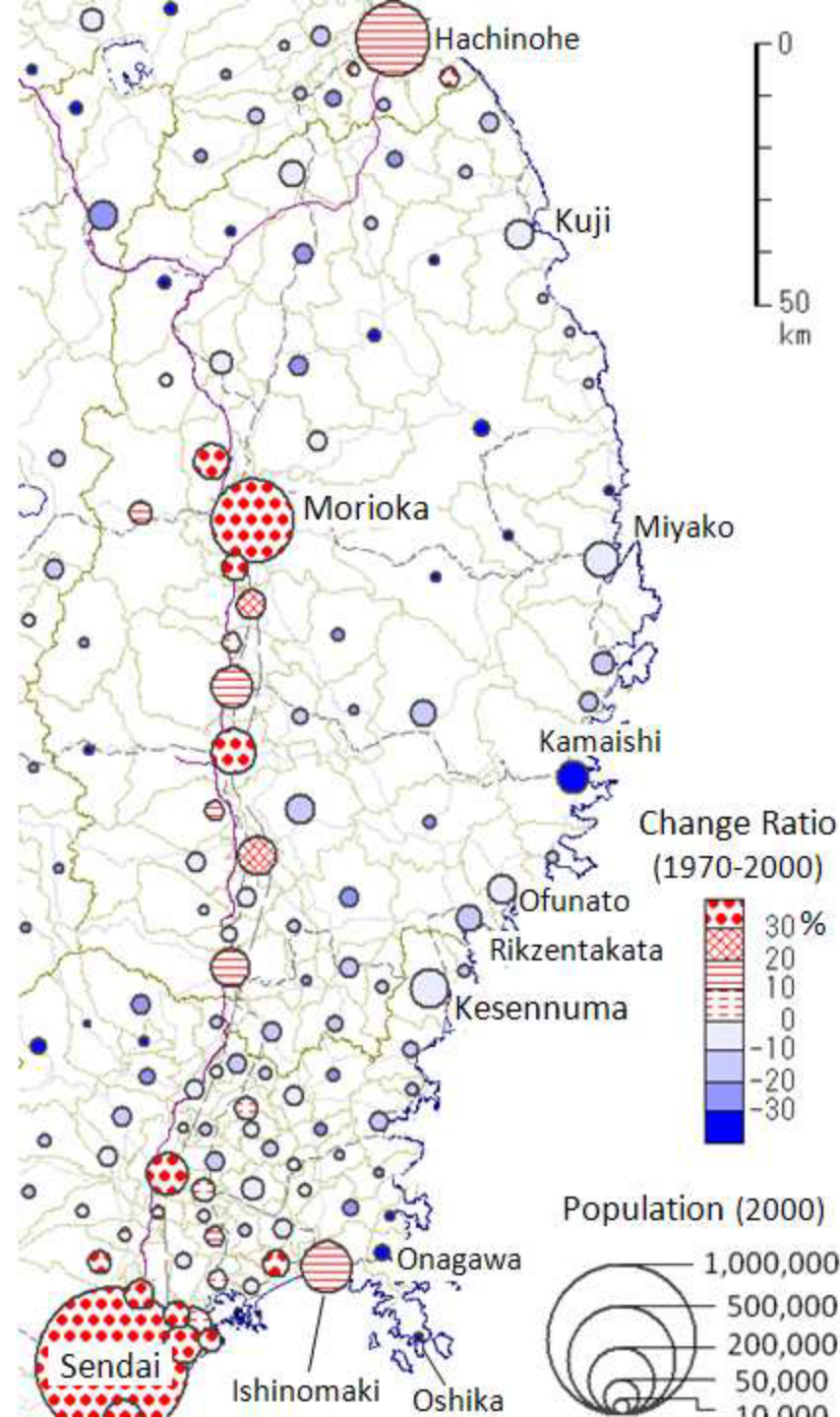
# Japan's Preparedness for Natural Disasters

- Physically, Japan was better prepared for the earthquake and tsunami than almost any other country, though human toll was horrific and nuclear consequences scary.
- Japan's strict building codes and drills were lifesavers.
- All along the coast, tsunami warning signs, towering sea walls and well marked escape routes offer some protection from walls of water.

# Seawalls

- In the 1980s and 1990s Japan built concrete seawalls (some as high as 40 feet) in many communities as defense against the tsunami.
- On March 11 tsunami spilled over some sea walls and embankments washing cars, houses, farm, factories before reversing directions and carrying them out to sea.

































































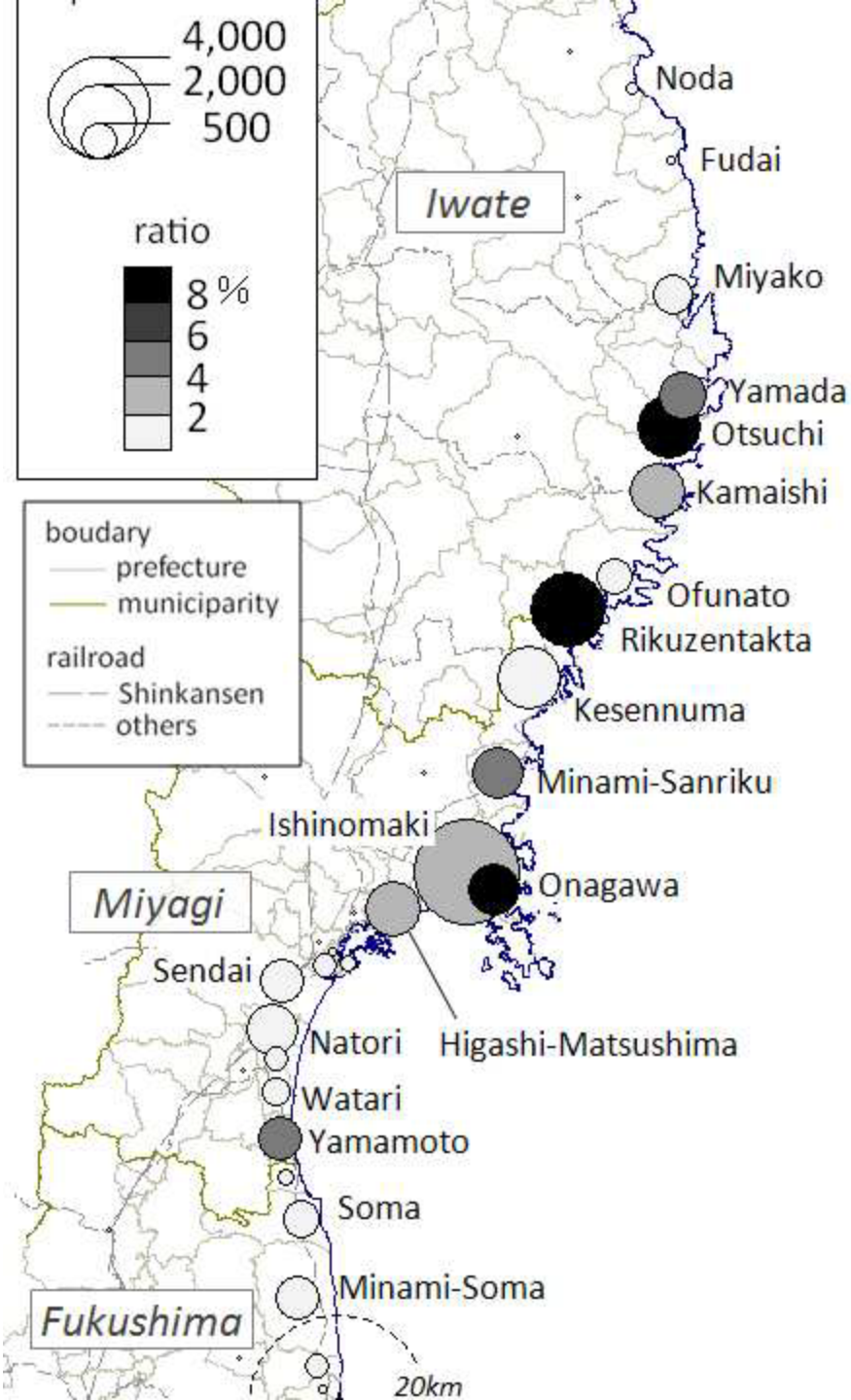




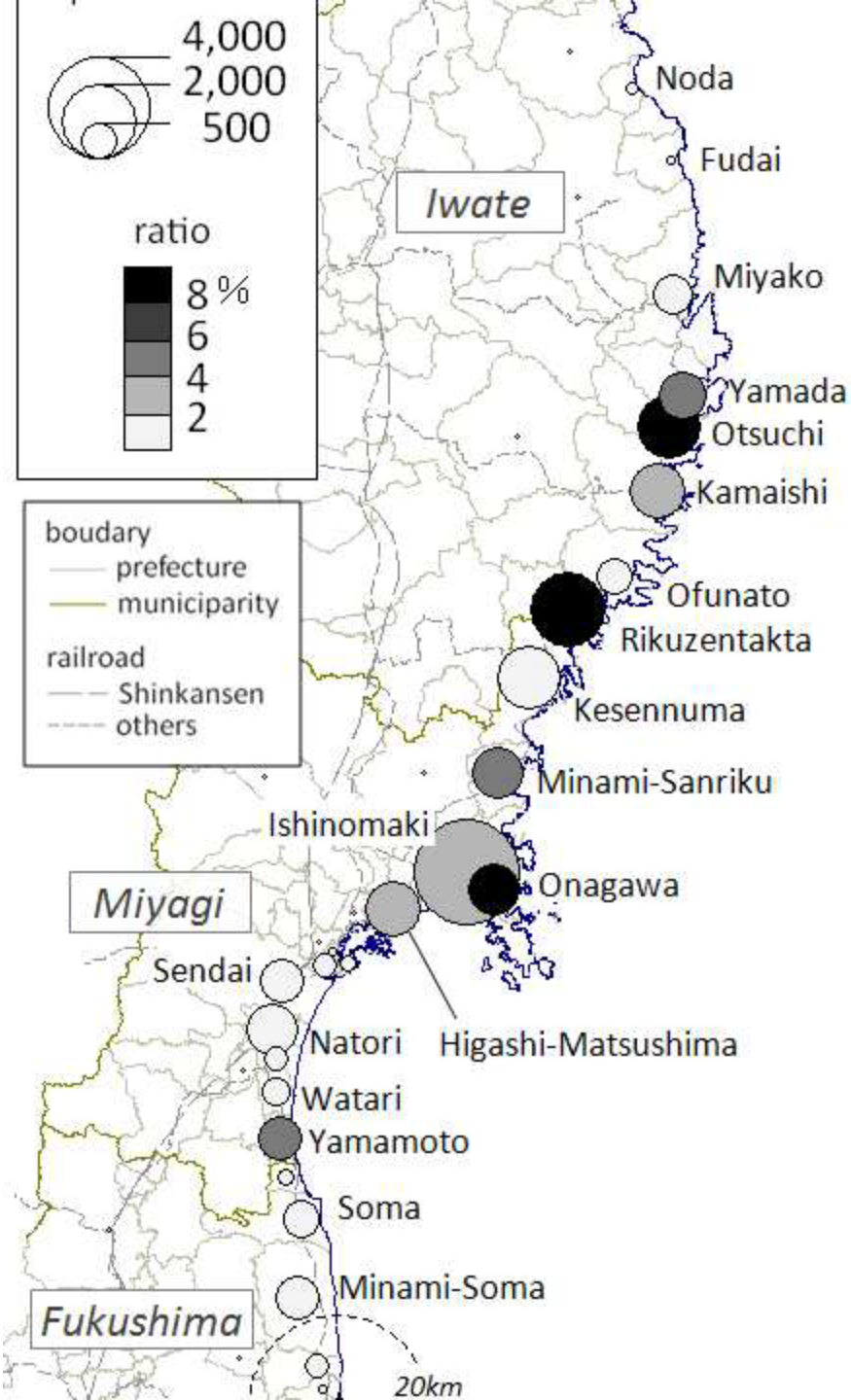














# The Aftermath

- Tsunami wrecked communities along hundreds of miles of the Pacific seacoast of Tohoku region
- Shift in the earth's plates and 9.0 tremor reduced the height of land along the coast by more than a meter
- Disposing 20 million tons of tsunami debris estimated to cost \$8.6 billion

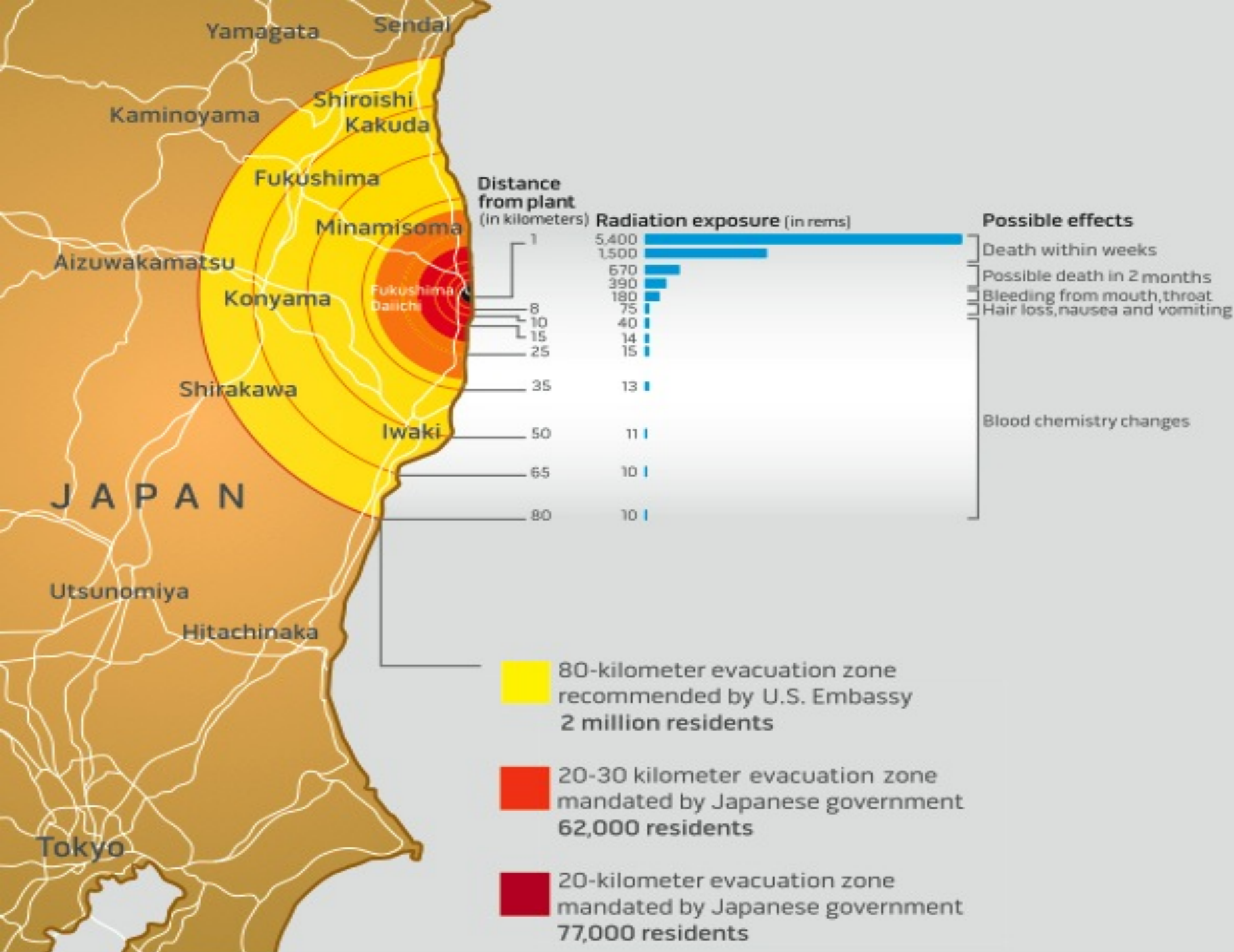


# Impacts of the Quake and Tsunami

- Quake and tsunami claimed some 20,000 lives, destroyed more than 200,000 homes
- Damaged nuclear reactors, factories, disrupted supply chains, caused crippling power shortage.
- Nearly 23,000 hectares of farmland were flooded with salt water; more than 21,000 fishing boats lost.
- Caused about \$210 billion in economic damage; world's costliest disaster.

- Bridges, roadways and rail connection damaged or destroyed by the black waves





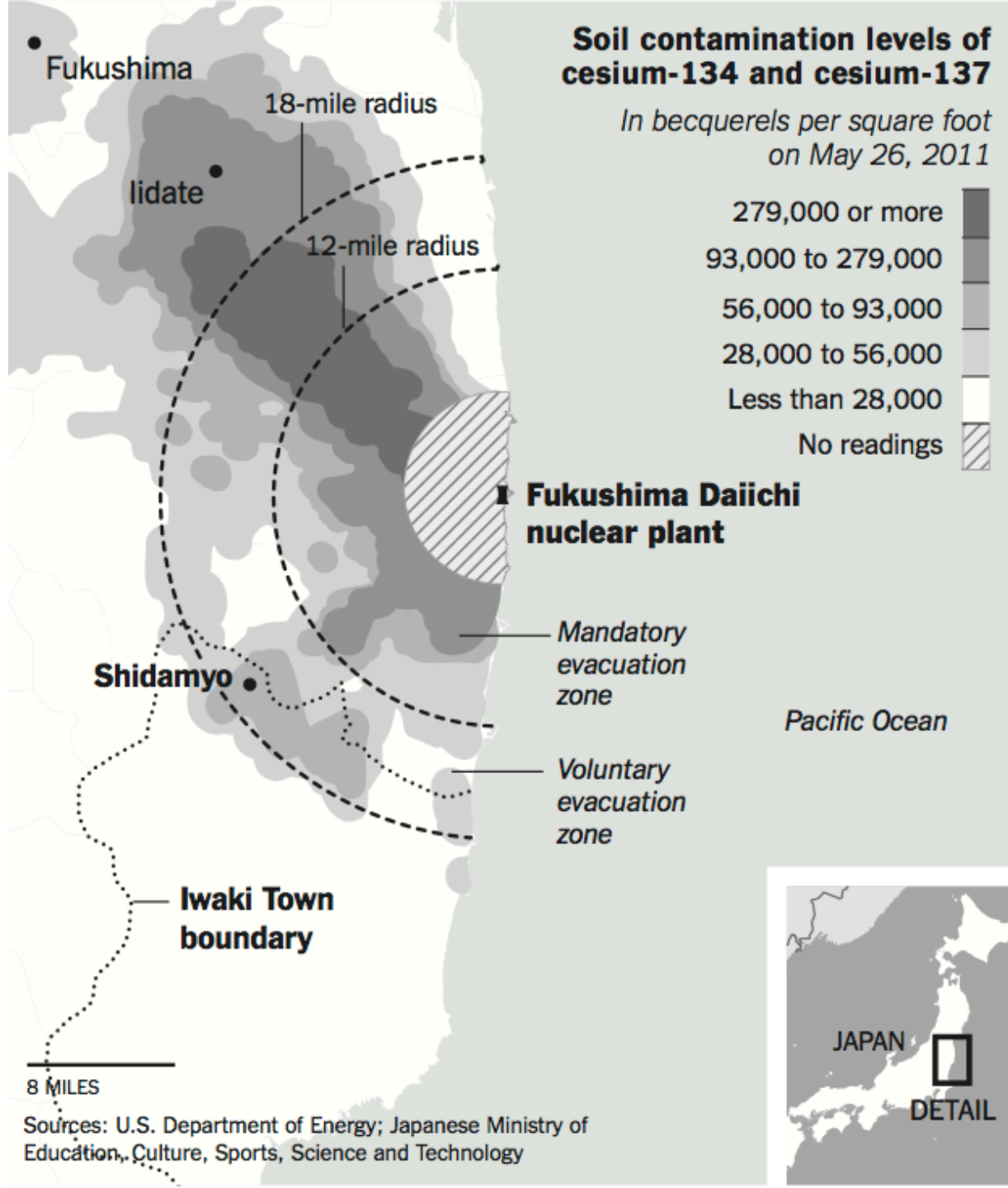
# Radiation and Japan's Food Chain

- Radioactive cesium from damaged nuclear power plants contaminated beef, kicking off food scare.
- Some contaminated food including milk and spinach from Fukushima prefecture was caught before they reached store shelves
- Radioactive contamination in rice was found in Ibaraki prefecture, 90 miles south of Fukushima
- Tokyo's water supply contaminated with radiation



## Soil contamination levels of cesium-134 and cesium-137

*In becquerels per square foot  
on May 26, 2011*





# Rice Contamination

- Fukushima prefecture, showered with radiation in March, 4<sup>th</sup> largest rice-producing region in Japan
- Contamination has triggered sales ban of harvested rice ( above 500 bequerels per kilogram)
- Cultivation banned in fields with soils above 5,000 bequerels of cesium per kilogram of soil.

















# Impact on Global Supply Chain

- Impact on final production and the supply chain was severe in Japan; much less marked in other countries
- Manufacturers outside Japan faced production stoppages because of their dependence on Japanese components.
- Worst hit were Japanese manufacturers: Honda, Toyota, Nissan, and electronics and communication technology groups: Sony, Nintendo, Panasonic, Toshiba, Sharp and Fujitsu.



- Other companies such as South Korean Hyundai, world's fifth largest car maker was beneficiary (37 percent increase in earnings) as it took advantage of disrupted production at its Japanese rivals.
- Companies that suffered a setback included chipmakers Taiwan Semiconductor Manufacturing, Nanya Technology and Hynix Semiconductor in South Korea.

## Aftershocks | Japan's struggle to rebuild

### Otsuchi

Debris largely cleaned up, but no restoration plan yet for this fishing town, where most boats washed away.

### Ofunato

Vast port areas still abandoned. But a half-dozen large fish processors are back to work.

### IWATE

### J A P A N

### MIYAGI

### Rikuzentakata

Downtown areas have been cleaned, but City Hall and other abandoned buildings still litter the landscape.

### Kesennuma

Downtown, large areas of undemolished, unusable buildings remain. City sections sank in the disaster. It remains unclear which ones are safe for rebuilding.

### Minamisanriku

Fishing port remains in disarray. Only 132 of the city's 2,188 vessels survived. Fish market may reopen next month.

EPICENTER OF MARCH 11  
9.0-MAGNITUDE QUAKE  
THAT TRIGGERED THE  
TSUNAMI



20 miles  
20 km





# Recovery

- Japan plans to spend \$167 billion over five years
- Money for new roads and ports; support for farming and fisheries; and help for small-and-medium-size companies.
- Incentives to rebuild factories
- Rebuild towns and villages, support aging population, and public housing for those unable to rebuild their homes.

- After the tsunami Japan has shown a determined spirit aptly captured in the phrase *fukutsu no seshin* means never give up.
- Japan's civility and selflessness, Japan's ethic of uncomplaining perseverance – gaman in Japanese-

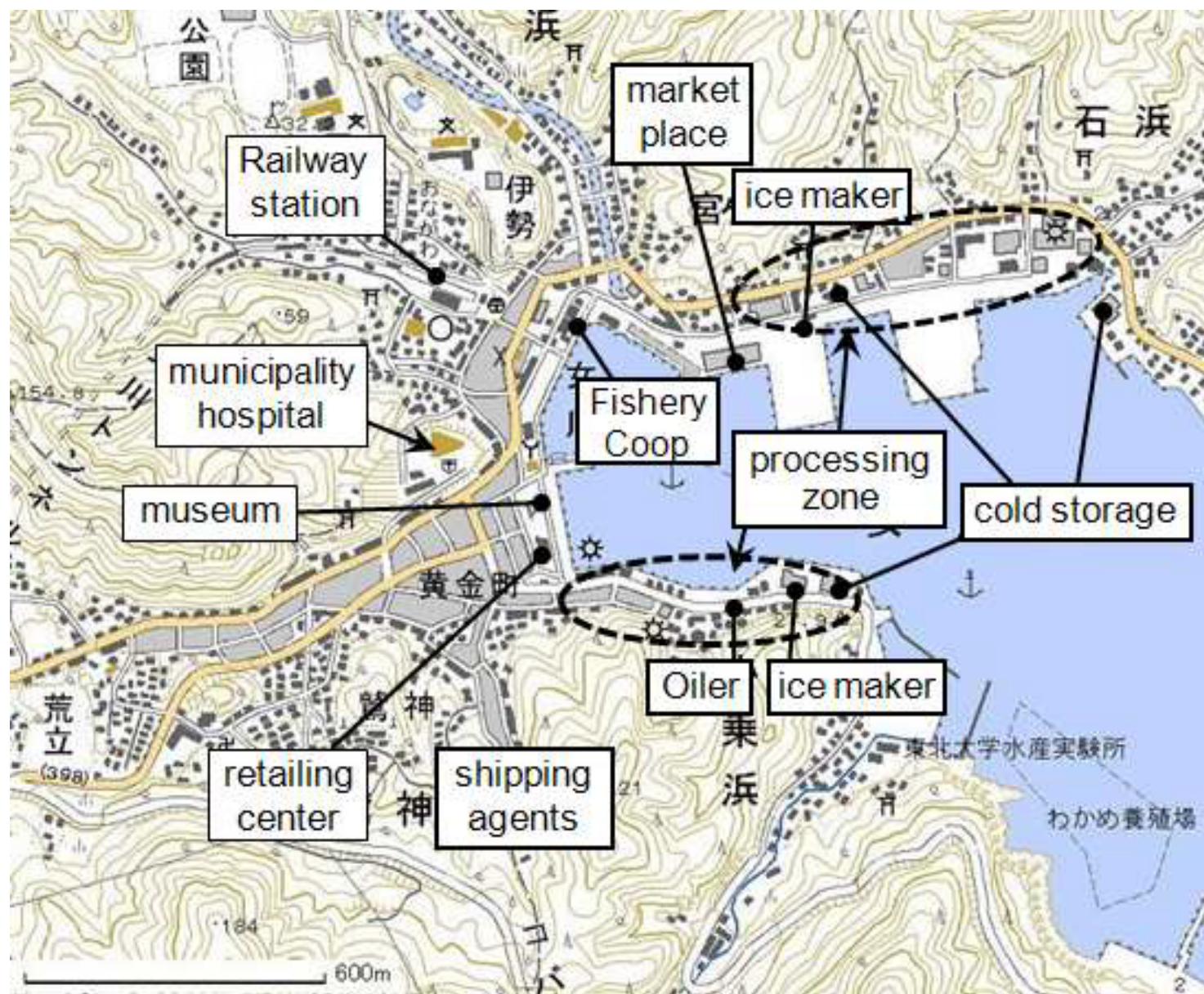














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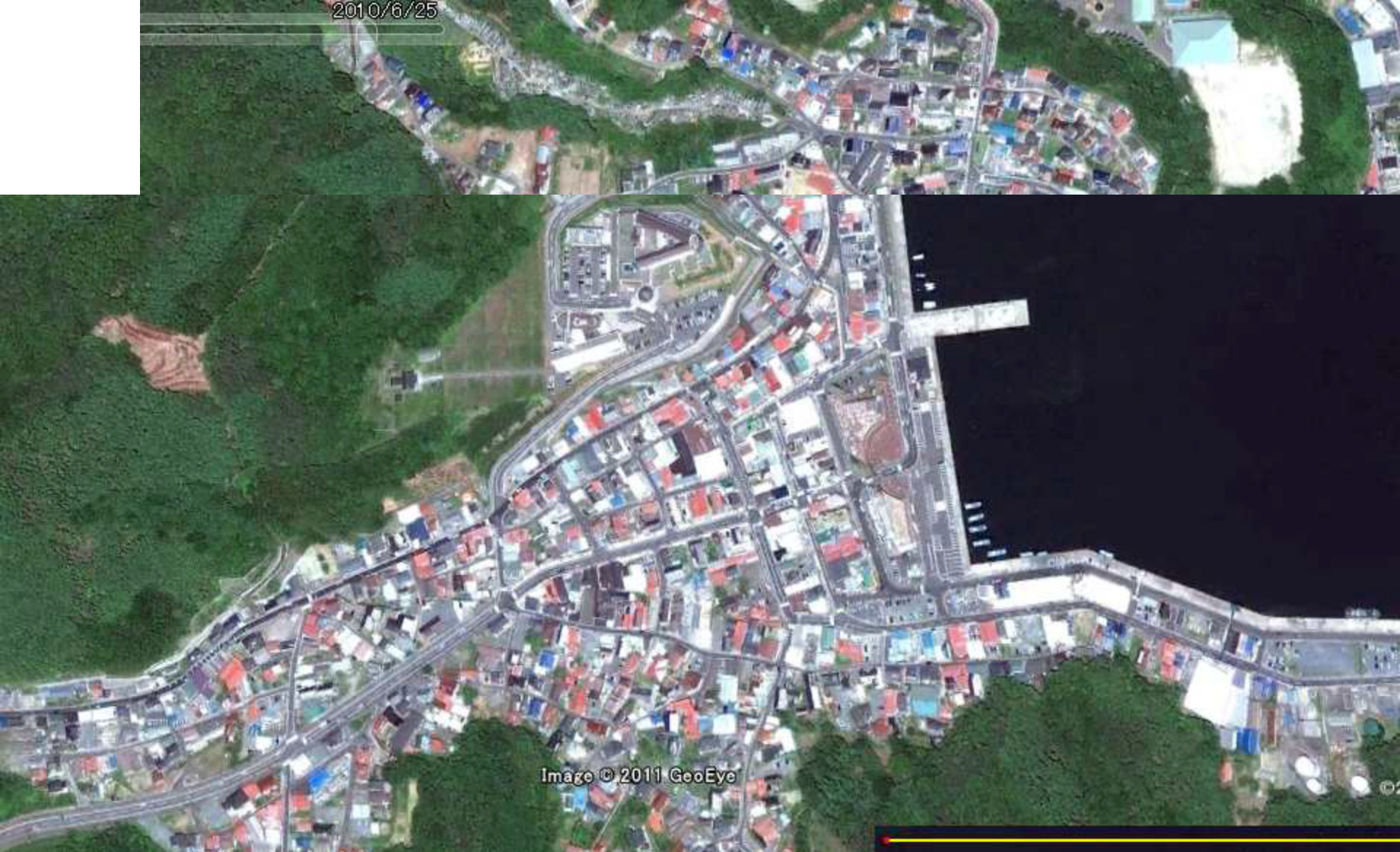


Image © 2011 GeoEye







