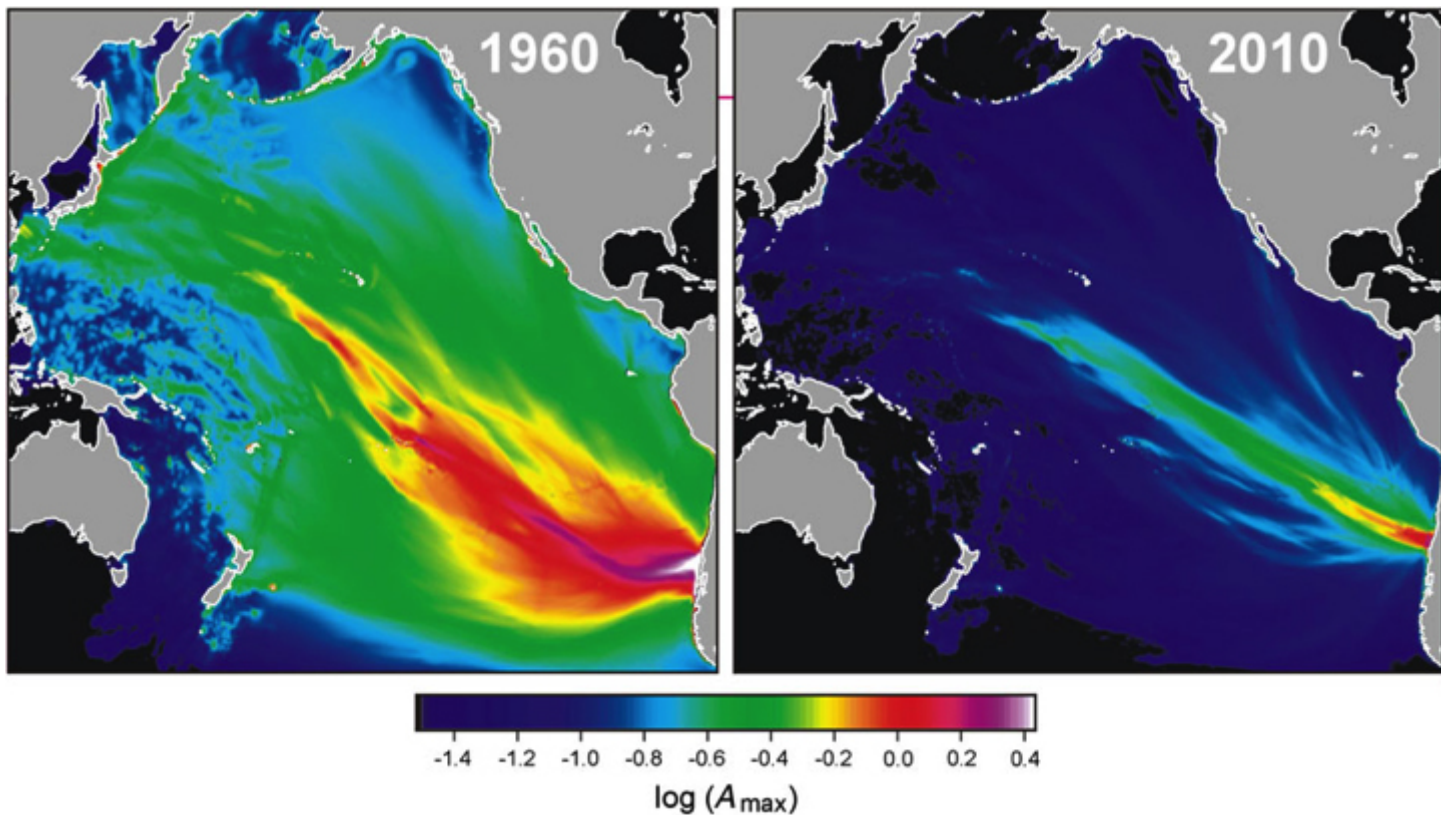


Tale of Two Tsunamis ^[1]

Submitted by Rory Lattimer Wed, 2012-09-05 00:00

A magnitude 8.8 earthquake struck Chile in February 2010, generating a tsunami that crossed the Pacific, with measurable waves recorded throughout coastal British Columbia.

A [recent paper](#) ^[2], published in *Pure and Applied Geophysics* ^[3], describes this tsunami in detail and compares it to [the Great Chilean earthquake and tsunami of May 1960](#) ^[4].



[5]

After the devastating 2004 Sumatra tsunami, monitoring instrumentation was increased and upgraded by countries around the Pacific, which resulted in an unprecedented amount of data gathered for the 2010 Chilean tsunami. In the northeast Pacific, it was recorded by over 200

high-precision coastal tide gauges, two DART [6] bottom pressure stations and four Ocean Networks Canada bottom pressure recorders. Seismic waves from the earthquake were also recorded by the three NEPTUNE bottom pressure recorders and ocean bottom seismometers. This wealth of data allowed the Canadian researchers at the Fisheries and Oceans Canada [7] to provide a comprehensive analysis of the event.



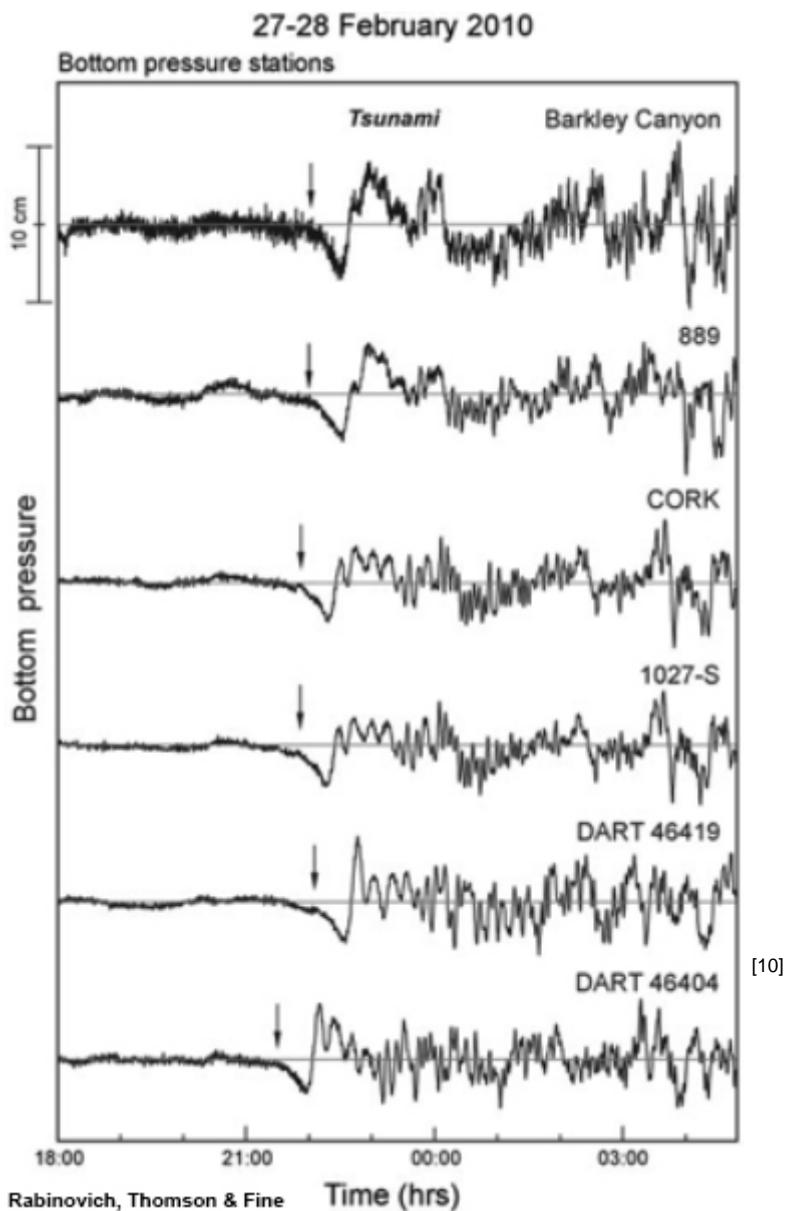
[8]

The 2010 tsunami claimed 124 lives, but was much smaller and less deadly than 1960 event, which killed 1655 people in Chile and another 235 in Hawaii, Japan and the Philippines. The 1960 Chilean tsunami generated 8 m waves in coastal Japan and 3-4 m waves in California and Alaska. By contrast, the 2010 tsunami, triggered by an earthquake 11 times weaker than the 1960 earthquake, generated estimated maximum wave heights 4.3 m in the Marquesas Islands and up to 2 m in Japan and Hawaii. In coastal British Columbia, maximum wave heights from the 1960 tsunami measured 2.1 m in the Queen Charlotte Islands and 1.26 m in Tofino, while the 2010 tsunami generated maxima of 98 cm in Port Alberni and 68 cm at Winter Harbour on northwestern Vancouver Island.



[9]

NEPTUNE Canada and DART bottom pressure recorders captured detailed information about this tsunami as it crossed the northeast Pacific. Deep-sea wave heights ranged from 6.3 ? 10.6 cm. The tsunami reached NEPTUNE?s outermost recorders over 50 minutes before striking the west coast of Vancouver Island at Tofino and Bamfield. By comparing these time gaps with those between NEPTUNE Canada recorders and the Washington coast, scientists may be able to improve coastal warnings for arrival of distant tsunamis in coastal Washington and British Columbia.



[10]

Researchers also studied the refraction of the tsunami waves as they approached the coast of Vancouver Island. The direction of the incoming wave fronts rotated clockwise significantly (20 degrees to over 40 degrees) as the waves encountered shallower water. There was also a marked clockwise rotation in the direction of propagation of the second train of incoming tsunami waves that arrived 7 hours after the leading tsunami wave train.

Compared with capabilities during earlier devastating tsunamis like the 1960 Chilean event and the 2004 Sumatra tsunami, the Pacific Tsunami Warning System has seen significant improvements. Due to the addition of real-time measurements from seafloor networks like NEPTUNE Canada and the open-ocean DART system, as well as improved coastal networks and advances in tsunami prediction models, it is now possible to provide tsunami warnings with more precise estimated arrival times and specific run-up heights for high-risk regions.

Published research: [The 2010 Chilean Tsunami Off the West Coast of Canada and the Northwest Coast of the United States](#) [2]

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- [earthquake](#) [11]
- [tsunami](#) [12]
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- [News Stories](#) [18]
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