Can an earthquake be felt at sea?

Commander Wilson Trumper, former Temuka man, who was on board the HMNZ Canterbury in Lyttelton during the February 22 Christchurch earthquake, said "anyone who says you won't feel an earthquake on a ship in a harbour has not experienced one". 26 April 2011 Timaru Herald

Otago Witness
Entered Inwards -Dunedin, New Zealand

June 5 1862 - Black Swan, ship, 976 tons, King, from London, general cargo, 104 passengers the majority of whom are from Scotland. J. Jones, and Co., agents. A protracted passage of 107 days from Plymouth. Her passenger list comprises 12 in the saloon, 9 in the second cabin, and 83 in the steerage; and Capt. King is accompanied by his lady and child. Amongst the amusements the passengers had, was a series of highly instructive and entertaining lectures, on the Steam Engine, which was delivered by C.S. Wood, Esq., F.G.S. one of the saloon passengers. Another gentleman gave three lectures on Astronomy. The lectures were for the most part delivered on the poop deck, under the awning, but as the weather became colder the saloon had to be resorted to. Divine service was always most creditably attended, and conducted by Dr Wood, the surgeon. The most noticeable circumstance on the voyage was the occurrence of an earthquake, which was most distinctly felt on board. It occurred on Friday the 23rd of May, the ship being at the time in lat. 48.59 S. and long. 127.05 E. For several days the barometer had been very low, varying from 28 to 30, and early on the morning of the 23rd ult., the ship shook violently and a peculiar sound was heard, as if the vessel were grating over the bottom, the tremor and the sound being so distinct, as to wake the watch below.

The Star June 24 1886 page 2
A sharp shock of submarine earthquake was felt on board the Sharpshooter, barque, bound from Eureka to Sydney, on March 6, lat. 40 48 N., long. 125 58W.

Nelson Examiner and New Zealand Chronicle, 2 August 1851, Page 96
On Sunday morning lust, about nine o'clock, the shock of an earthquake was felt in Nelson and its neighbourhood. It was preceeded by a low rumbling noise, such as is generally heard on like occasions. At the moment the shock occurred, a boat was entering the harbour with the tide, when her progress was momentarily checked by an apparent reflux of the current.

Timaru Herald, 31 July 1879, Page 3 A Wellington Earthquake thirty years ago.
Presently, we took refuge in our schooner. Strange to say we felt the shocks as much on the sea as on the land. The force of the earthquake did not seem to be deadened by the water, and our little vessel trembled like a leaf. At Wellington we found the whole town in confusion.

The Last Big One - 1855 - 8.2

On 23 January 1855, Wellington was struck by a earthquake at 9.11 pm, estimated to be 8 on

the Richter scale. The quake was at a depth of 25kms below Cook Strait, 40kms southwest of Wellington. The date also marked the marked the 15th anniversary of the founding of Wellington.

Taranaki Herald February 7th 1855

The first shock occurred at 17½ minutes past 9 o'clock p.m. and its duration was 50 seconds. It was followed so closely by the two shocks. The shock is stated to have proceeded from E.S.E. towards E.N.E., describing an arc of about 40 degrees. The sea rose at the time of the earthquake three feet high in the houses along the beach, but since then high water has never come within ten feet of the low water mark; while in the stream where the vessels lie there is a depth of water six feet greater than before. In the road between Whanganui and Wellington there were cracks eight feet wide and in other places where the ground had been quite dry the water was for miles two feet deep.

Taranaki Herald February 28 1855 page 3

From Commander Byron Drury's Remark Book. - Cook's Straits, January 25 1855

The Anniversary of the Wellington Settlement was most auspiciously celebrated - a brighter or a calmer day never beamed on the harbour. In the evening, a light N.W. wind sprang up which increased gradually during the bright; and at 8 on the morning of the 23rd, it blew violently. At 11 minutes past 9 o'clock, p.m. the gale still blowing strong, we felt suddenly an uncommon and disagreeable grinding, as if the ship was grating over a rough bottom. It continued for more than a minute; the ship slewed broadside to the wind; we were then in six fathoms, so there was little doubt that it was an earthquake. Lights were seen running to and fro in all parts of the town. Lieutenant Jones and myself immediately landed. We found the tide alternately ebbing and flowing. From close observation on the barometer, I have no reason to believe that the effect before or after the principal shock was evident) it ranging from 29 30 to 30.00) nor that the calm preceding, or the gale attending, the earthquake, had any connection with the subterraneous convulsions. We witnesses during the 48 hours following , every variety of wind and weather, yet with repeated shocks' but although I would discount the atmospheric influence with the earthquakes, we had every reason to believe the latter has immediate local influence on the atmosphere, producing violent gusts after the shocks. But a more interesting and extraordinary phenomenon occurred : for 8 hours subsequent to the first and great shock, the tide approached and receded from the shore every 20 minutes, rising from eight to ten feet, and receding four feet lower then at spring tides. One ship was aground at her anchorage four times. The ordinary tide seemed quite at a discount for on the following day (24th) it scarcely rose at all. We returned to the ship at 2 a.m. m, the tide having at that time receded about 4 feet lower than at ordinary spring tides. We, H.M.S. Pandora, weighed anchor for Nelson, and in crossing Cook's Straits we felt one shock in 26 fathoms at noon off Sinclair head (exactly the same feeling as when at anchor), and a slighter shock in 80 fathoms, off Queen Charlotte Sound.

Taranaki Herald February 21st 1855

Te Kopi a small boat harbour at Wairarapa, was visited by a heavy wave during the earthquake, which swept the beach, washing away the buildings and sheds, and bales of wool lying there to be taken to Wellington; and that the Mukamuka rocks which were the worst part of the coast road to Wairarapa, have now become the best by the alteration caused by the earthquake, the beach now extending a considerable distance beyond them above the level of high water.

Wellington. On the dividing range of hills between Wairarapa and Wellington on the east side of the harbour there have been heavy landslips from the summits, which are plainly visible from Wellington. The Porirua road is sunk in some places. Taylor and Watt's wharf is a wreck nearly, warped and bent up and down all along, and the extreme end sunk obliquely. The river at low water this morning looked liked an ill ploughed field, although a high tide had intervened which must have helped to fill up the fissures made, and it sank in many places and rose in others. Most of the brick buildings in Wellington have been destroyed, together with the Hutt Bridge and that great damage was done to the Public Works in progress, and to other buildings by a fearful inroad of the sea. The death of Baron Alzdorf is also stated to have been occasioned by the falling of his house. He was struck in the body by portions of the brick wall of the fireplace of the room in which he was sitting and died immediately. He was one of the earliest colonists. One house at Wairarapa was thrown down, and four Maoris, who were within, were unfortunately killed by the ruins. About forty houses (including the Bank, Baron Alsdorf's hotel) and Bethune and Hunter's warehouses) have been shaken to the ground and there is scarcely a chimney left standing. Wellington's population in 1855: 6000.

With shops exposed, and every temptation to plunder, there seemed to be neither fear not thought of robbery, but a generous and manly feeling to lessen each other's burdens prevailed all classes, from the Superintendent to the lowest mechanic, from the colonel to every soldier of the 65th regiment; nor can I forget to mention the ready asylum afforded by the merchant vessels in the harbour to the houseless and the more nervous inhabitants.

Lyttelton Times, Jan. 24. 1855 Canterbury.

Two shocks of earthquake were distinctly felt in Lyttelton last night at about the hours of 9 and 12 o'clock, and another this morning a t about 7 o'clock. Several pendulum clocks were stopped by the motion. The wind was blowing in strong gusts from the N.W., and has continued in that quarter ever since, the weather being oppressive and sultry.

Nelson Examiner, Jan. 27 1855

The Blind Bay District. The first shock appeared to come in a N.E. direction. From this shock a few brick building have sustained great damage. They are now so far damaged as to require in part taking down. This applies to the premises in Trafalgar street, occupied by Mr Nicholson as a warehouse; the premises in the same street lately occupied by Mr Foy; Mr A. Aitken's residence in Bridge-street, a small building adjoining Mr Hargreave's butcher, and the

Wesleyan chapel. The first three first named are two story buildings. Beyond the demolition of several chimnies the other building that suffered a pise house, the residence of the Rev. H.F. Butt; all the remaining brick and cob houses in the town and neighbourhood being uninjured, while the wooden and lath and plaster buildings are not of a character to be affected by such an occurrence. A little boy, son of A. McDonald who was lying in his cot, was slightly struck by some falling brickwork.

Daily Southern Cross, 13 March 1855, Page 2

The earthquake seems to hare been generally felt about the same time throughout New Zealand, at lease information to that effect has been received from every Province except Otago, from which there has been no arrival; and the 'Taranaki Herald" states, that the Josephine Willis, which had arrived there, felt the shock about 9 p.m. on the evening of the 23rd at the distance of 150 miles from the coast of New Zealand. From measurements, which have since been made it has been ascertained that the land has been raised to a height of from three feet six inches to four feet. All the shell fish attached to the rocks, that live below low water mark, in consequence of the elevation of the land are dead, and the number is considerable enough to cause a strong smell to be perceived by those walking round the east side of the harbour towards Evans' Bay. The Bally Rock off Point Jerningham, which was formerly 18 inches below low water (spring tides) is now about two feet above low water.

About ten minutes after the first great shock a great wave entered the harbour, which was estimated to have been above twelve feet in vertical height ; from the narrow entrance of the harbour compared to an area very little damage was done by it, but in the open and exposed boat harbour at Te Kopi, all the buildings, &c, on the beach, were swept away by a similar wave. Two coasters, one from the Kaikoras, the other from Point Underwood, on their approaching the harbour the next morning at daylight, passed through an immense quantity of dead fish, principally ling, and quantities of dead fish were found on the beach, and at Burnham water.

Taranaki Herald, 24 January 1855, Page 2

Arrived. January 25.— Josephine Willis, ship, 786 tons, Canney, from London.

Here are some words written in 1992 by a Victoria University Geologist:

"... The first great shock of the 1855 earthquake lasted nearly 50 seconds, followed almost immediately by another. Shortly afterwards, the sea rose in the harbour between two and three metres, and receded about three metres lower than at spring tides. This cycle repeated every 20 minutes throughout the night for eight hours. All the shops and houses along the foreshore were inundated and extensively damaged as a result. One ship anchored in Lambton Harbour grounded four times during the rapid rise and fall of the tide. Shocks of variable intensity continued throughout the night and the "trembling motion of the ground was continuous". In the Te Aro and Thorndon areas, the first earthquake shock floored most people, levelled every brickwork chimney and opened up numerous fissures through which sand and mud were ejected, particularly in the area of the formed road along the foreshore. Uplift around the harbour amounted to between one and two metres, but was somewhat less in the Lambton

Harbour area because of seaward movement of unconsolidated tidal and shoal sediment. A new shoreline created by the lift extended out into Lambton Harbour 20-40 metres from its pre-earthquake position. " Rodney Grapes, Associate Professor in the Research School of Earth Sciences, Victoria University of Wellington.

1864

What was the name of the vessel? Samuel Butler sailed from Lyttelton for London on June 15 1864 with three friends including Charles Paine Pauli, a lawyer, James Selfe, a son of the London Stipendiary Magistrate, and Mr. William Aubrey Willes of Astrop, Northamptonshire. Arrived London 28 August, 1864. The vessel was only 400 tons, a sailing bark of American build and ownership, and a Captain Lunt commanded her . Via Callao and Panama and the Caribbean. We arrived in Callao harbour on the 2_th July. The early morning of the first day in harbour was memorable for the occurrence of a severe earthquake. We were awoke in our bunks at 5 A.M. by the vessel giving a great lurch and every timber in the ship sounded as though it was going to fall to pieces.

1868 Tidal Wave

Otago Witness Saturday 19th September 1868 - page 22 large article (2 columns)

Earthquake and Tidal phenomena by Dr Hector. Three distinct oceanic waves reached the coast from eastward on the forenoon of 15th instant; the

1st between 3 to 4 am - a wave four feet in height, rushed up the Waimakariri River and swept vessels lying at the wharf, this was a distance of four miles from the mouth of the river.

2nd between 7 and 8 am - a terrific rush of water at Bluff and at Nelson flowed over the Boulder Bank.

3rd between 10 to 11 am.

The fluctuations of the barometer during the oscillations of the tide, indicate a frequency variation, amounting to -004 inches, it is evident that some influence must have been at work beyond the ordinary secular variation due to the sun's position....

Timaru Herald Saturday January 2 1869 page 4 The Year 1868

In the month of August, on the 15th, the whole east coast of New Zealand was visited with volcanic disturbances, the effect of the frightful earthquake which devastated the western coast of South America, where it destroyed towns with their thousands of inhabitants. Our coasts were visited by a tidal wave, but nowhere was much damage. The Chatham Islands being more in a line with the seat of disturbance suffered heavily, one small settlement being completely washed away. The tidal wave even extended to Australia and Tasmania but fell harmless on those coasts.

The Sydney Morning Herald of 17 August 1868 and the New York Evening Post and Boston Daily Advertiser, Nov. 12, 1868

At Oamaru the tide rose and fell fifteen feet in fifteen minutes; and at Lyttelton it receded suddenly to six feet below extreme low water level, and then came in with such a rush that it tore all the shipping away from the wharfs.

The Times, Wednesday, Nov 04, 1868; pg. 4.

August 15. We expected an earthquake to have been at work in the neighbourhood of New Zealand. One observer at Lyttelton says nearly all the ships and boats in harbour being left high and dry by the receding tide. In a few minutes their attention was directed to a noise resembling thunder. On looking they saw an immense wave coming up the harbour. In a few minutes it was surging round the vessels, tearing them from the different wharves, and breaking their wraps like twine. At Newcastle and Moreton Bay, Queensland five tides were observed, the water rising and falling 2ft 6in. in 15 minutes.

The Times, Thursday, Nov 26, 1868; pg. 7

At Valparaiso on the 16th and 17th of October the sea again rose and fell in the same manner as in August. Earthquakes continued to be felt along the coast of Chili and Peru.

West Coast Times, 28 August 1871, Page 2

The Nelson Colonist says, the captain of the ship Euterpe, arrived at Bombay, reports having experienced two shocks of earthquake at sea, in lat. 3 deg. N., long. 55 deg. 33 min. E., on March 23. The ship had a tremulous motion, as though grinding over a hard bottom.

Timaru Herald May 30 1876 pg 6 col. e

On 27th of February, last, at 2.30 p.m. the water in Sydney Harbour suddenly rose five inches, at the same time the barometer fell rapidly, as shown by the self-registering instruments at the Observatory. A number of similar but smaller oscillations of pressure took place on the 26th. New from New Zealand records that on 27th February at 3 a.m. and again at 9 a.m., severe shocks of earthquake were felt, with many minor quakes. Last evening May 7th, at 6.45 p.m. the barometer began to fall and then rose. Simultaneously, the water in the harbour rose and fell.....

White Wings, by Brett Vol. 1. pg 321

On the 1877 voyage the Dilpussund left Gravesend for Auckland on March 9th, and on April 25th, during the afternoon, the crew of the barque felt a distant shock, as if she had passed over a sand bank. The incident was put down to a submarine earthquake.

Southland Times Wednesday 23 April 1879

On the passage of the barque Lugar, from Mauritius to Melbourne, three distinct shocks of earthquake were felt. The severest of these occurred on the 9th March, in lat. 30deg. 27min. S., and long. 57deg. 35 min. E. A peculiar tremulous motion was experienced on board while the shock lasted.

Earthquake at Sea
Timaru Herald March 23 1883 page 2

Among the news per Te Anau from Sydney, is an item stating that on the 11th inst. heavy rollers suddenly began to break on the coast in the neighbourhood of Sydney Heads. Nelson papers speak of high tides experienced at Collingwood, about the same time, water flowing into houses in the town. It is also on record that the central volcanic regions of the North Island was disturbed by frequent earthquakes shocks during several days before and after the 11th. Taking these three facts together, it seems reasonable to conclude that an earthquake shock of considerable violence occurred somewhere in the bed of the ocean between New Zealand and Australia about the 11th.

Tidal phenomena
Northern Advocate, 4 March 1893, Page 3

The tidal phenomena above referred to as reported in previous issues of the Herald consisted of irregular flow and ebb lasting over several days, ships lying at anchor in the streams swinging twice during the time ordinarily taken for tidal change. On Friday, 10th inst., the tide rose 4ft. 6in. only, the customary rise being between 7 and 8 feet. This departure from the regular course was more specially noted as it happened that the German warship Buzzard was to have been taken into the Calliope Dock, but the work was interrupted by non-floatage of the caissons. South of the East Cape, coastal steamship officers report passing through large quantities of floating pumice stone. Captain Burgess, Chief Harbourmaster, Auckland, states that these irregularities are without precedent in his experience extending over 47 years.

A Tidal Wave
Otago Daily Times 30 June 1909

A full-rigged ship, the Leicester Castle, was towed into port at midnight in a disabled condition.

She left Montevideo on April 12 in ballast, bound for Newcastle. Eight days later, in a high breeze, she was suddenly overwhelmed by a tidal wave, estimated to be 120ft high. She was thrown on her beam ends and it was fully 10 minutes before the vessel righted again. The wave was attributed to seismic action. At the end of April, the vessel experienced heavy gales and mountainous seas. Considerable damage was done to the spars, sails and rigging from June 12 to 16. The fore-topgallant mast carried away, bringing down the topmast head and the yards. The ship was labouring so much that it was unsafe for the crew to attempt to clear the wreckage. A steamer was sighted and rockets were displayed for assistance, but they were not seen. The main topgallant mast was subsequently lost. The weather moderating, the wreckage

was cleared away and the vessel, going before the wind, succeeded in reaching the New Zealand coast.

26 Dec. 2004
The devastating Indian Ocean tsunami on Boxing Day in 2004 rightly put the whole planet on alert.

An Australian who was sailing near the epicentre of the latest Indonesian earthquake said it sent shudders through his boat, then caused the ocean to swirl 180 degrees, dragging the boat backwards and forwards. He had anchored his 21m Antar Pulau near the Banyak islands, the closest land to the epicentre, when the 8.7 magnitude quake struck on Monday night. “We were down below in the saloon watching a movie and we felt some very strange movement for about two minutes. The boat rose and fell really sharply.” The crew told him an earthquake had struck. The ocean went calm, but about 20 minutes later, the water started rushing with incredible force. The boat was dragging anchor. The current moved with a 180-degrees swing. Then it happened again, the third time the current changed. It rushed for 20 minutes. Big waves. The effects of the quake lasted two hours. — Reuters April 1 2005. The December 26 2004 earthquake was a magnitude of 9.1 to 9.3 and tsunami left over 265,000 people dead in eleven countries from Malaysia to Somalia. The quake occurred where Eurasian plate was being pulled downward by the descending Indo-Australian plate, which sprang up, lifting the ocean floor and sending the seawater off in a giant wave. The south to north 720 to 780 miles fault rupture spread over ten minutes. A typical earthquake lasts for 30 seconds.

18 July 2006
Reuters

Tsunami death toll hits: 104 in Indonesia

A tsunami caused by a strong undersea earthquake off the south coast of Indonesia's Java island killed 104 people on Monday. Waves up to 1.5 metres (five feet) high crashed into Pangandaran beach near the town of Ciamis, 270km (170 miles) southeast of Jakarta, killing 37 people. Areas up to half a kilometre (550 yards) from the beach were affected by the tsunami, with flimsily constructed buildings flattened. "We need tents, food and medical aid." The US-based Pacific Tsunami Warning Centre said the quake had a magnitude of 7.2 All wooden structures are flattened to the ground but hotel buildings made out of concrete are still standing. The quake, which struck more than 40km under the Indian Ocean and was centred 180 km off Pangandaran beach, and fled their offices. In May, an earthquake near the central Java city of Yogyakarta killed more than 5,700 people.

20 July 2006 Pangandaran, West Java: An aftershock, 6.0, and a new tremor off the southwestern Java coast sowed fear on Wednesday as the toll from Monday's disaster climbed to 550. About 275 people still missing after the tsunami smashed into a 300-km (185 mile) stretch of coast along southern Java. July 23rd, 2006 The death toll rose to 652. Another 83 people are missing and 21,000 have been displaced.

Tsunami hits NZ - but quietly. 23 Nov. 2006

Parts of the country have been hit by a tsunami, however there is no need to run for the hills. The NIWA says the half metre wave was generated by a huge earthquake in the northern Pacific Ocean, in the Kuril Islands in Russia's Far East - hit on Thursday last week, and was still affecting parts of New Zealand on Saturday. Fourteen hours after the magnitude 8.3 quake, the initial wave reached the Chatham Islands and the Bay of Plenty, 9600 km from the site of the quake. Its journey across the Pacific was measured at an average speed of 685 km/hr. By comparison, a Boeing 737-300 travels at 790 km/hr. A couple of days later it was recorded by sea level gauges at Timaru, Lyttelton and Kaikoura. The largest wave heights were 56cm at the Chatham Islands on November 16, and 58cm at Timaru on November 18. The tsunami affected New Zealand for over a three or four day period as waves bounced off undersea ridges such as the Chatham Rise, and moved to and fro along indented sections of the coast. The tsunami impact was greatest at Crescent City in northern California, where a peak wave height of 1.76m caused strong surging currents, resulting in more than $US1 million ($NZ1.17 million) in damage to docks, slipways, floats and electrical equipment.

A strong earthquake has shaken the northwest Solomon Islands, where an 8.1 magnitude quake and ensuing tsunami killed at least 52 people and made thousands homeless at the start of April 2007.

July 15 2009 Fiordland

The 7.8 magnitude tremor caused the southwest of the South Island to move about 12 inches nearer to Australia while the east coast moved less than half an inch, meaning the island actually stretched. The earthquake, it struck in the remote southwest Fiordland, 12 kilometres deep under Resolution Island, Dusky Sound at 9.22pm on Wednesday had the potential to cause extensive damage and threaten life. It was the biggest in New Zealand in 78 years. The quake was centred where the Australian crustal plate was diving under part of the South Island on the Pacific plate. It ripped open a six-metre thrust between the plates throughout an area about 60km along the Fiordland coastline and down to about 50km below the surface. It started about 30km deep and ruptured upwards. A small tsunami was generated by the earthquake, with a tide gauge on the West Coast of New Zealand recording a wave of 40 inches. A 6.1 magnitude aftershock was registered by GNS Science about 20 minutes after the main quake this time at sea 150km west of Tuatapere, at a depth of 5km. Two aftershocks magnitude measuring 5.3 and 5.6 jolted Southland residents at 4.13am and 5.27.

The latest quake was the biggest in NZ since February 2, 1931 when a 7.8 quake killed at least 256 people in Napier. The biggest quake that has ever been recorded there was in the year 1855. It measured 8.2 and severely damaged the settlement of Wellington. In 2003 an earthquake measuring 7.1 on the Richter scale, struck the region around Te Anua in 2003. An 6.7 magnitude earthquake occurred off Fiordland in October 2007.

Tsunami - 27 Feb. 2010

Nothing dramatic but definitely worth watching.

This is the worst disaster to hit Chile in 50 years, sliced main highways with massive fissures and bridges and overpasses lay in crumpled heaps and at twisted angles, unpassable and going nowhere, 1.5 million homes damaged. Centred 115km northeast of Concepcion, 325km southwest of Santiago. Depth: 35km Over 706 are dead, some from a tsunami, 300 from a swamped fishing village of Constitucion alone. The wave came and covered everything. It was something like six meters (20 feet) high in the seaside town of Penco, Chile. The weekend's quake 8.8 magnitude on the Richter scale, struck 3.34am Saturday (7.34pm, NZ time), in Chile, and large aftershocks, meant tsunamis were possible. For the second time in just a few months, coastal NZ, had been placed on high alert about the possibility of tsunami wave and for the second time, the result has been not too much to write home about. Ports including Lyttelton and Auckland closed for the day and evacuated ships out to sea and Timaru's port was on standby. Tory Channel and the Queen Charlotte Channel in the Marlborough Sounds were closed. Low tide had again intervened to avert damage. The weather or a significant swell could have changed that.

"As in 1960, we are hell of a lucky it's occurred at low tide. That first wave is not chicken feed at all, that's a big one." Three surges struck the Canterbury coast with one breaching the shores of Lyttelton Harbour, flooding paddocks, submerging jetties, washing across a road and filling the car park of a country hotel. A reported one-metre wave hit the Chatham Islands about 8am yesterday. About 11am water dramatically sucked out from several Canterbury beaches, e.g. Purau Bay on Banks Peninsula. The first surge in Canterbury, between midday and 1pm, that raised the sea level in the harbour 2.2 metres in less than an hour. Yachts were left grounded when the water disappeared from Cass Bay on Banks Peninsula. Similar dramatic surges were seen at beaches in Northland, East Cape, Otago and Chatham Islands. Lyttelton Harbour tidal gauges showed a surge raising the sea level 2.2 metres in the hour between 11.45am and 12.45. The 4pm surge submerged the jetty at Governors Bay and caused a stream beside the Tavern in Teddington to burst its banks. Tsunami waves can change the dynamics of water around river mouths by seiching i.e. pushing additional water up rivers so the Rakaia river mouth fishing tournament was postponed. Seiche - It would take a while for the Pacific Ocean and Canterbury waters to recover from the Chile earthquake. "What happens with something as big as that is you get excited water motions on the continental shelf, so it is a bit like water slopping around in the bathtub – once they're going it takes time to get them to die out." NASA said this quake probability shifted the earth's axis and shortened the day by 1.26 millionths of a second. The axis should have moved by 2.7 milliarcsecomd or about 8 cms. Haiti, struck by a devastating 7.0-magnitude earthquake on 12 January 2010 which killed 217,000 people.

The 7.1 Darfield earthquake was felt at sea.

0435 Saturday, early in the morning, September 4th 2010. A local fisherman in a small boat had a scary experience and wrote the sea started moving in the most peculiar way. Water was lashing at the side of the boat making it roll over and over. Stood up and walked outside to take a look but was having trouble balancing. The big ripples of water, were seen heading toward the shore. Aftershocks felt.

NZ Earthquakes
1962

http://freepages.genealogy.rootsweb.ancestry.com/~nzbound/earthquake.htm