

Nine Years ago, The Tsunami: Foreknowledge of A Natural Disaster

Washington was aware that a deadly Tidal Wave was building up in the Indian Ocean

By [Prof Michel Chossudovsky](#)

Global Research, December 30, 2013

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This article was first published nine years ago on 29 December 2004, revised on December 31 with the release of more information as well as satellite images of affected areas.

(See update published 14 January 2005: [Discrepancies in the Tsunami Warning System](#), by Michel Chossudovsky

The US Military and the State Department were given advanced warning. America's Navy base on the island of Diego Garcia in the Indian Ocean was notified.

Why were fishermen in India, Sri Lanka and Thailand not provided with the same warnings as the US Navy and the US State Department?

Why did the US State Department remain mum on the existence of an impending catastrophe?

With a modern communications system, why did the information not get out? By email, telephone, fax, satellite TV... ?

It could have saved the lives of thousands of people.

Magnitude 9 Cascadia Earthquake

More than three hundred years ago, at 9 PM on January 26, 1700 one of the world's largest earthquakes occurred along the west coast of North America. The undersea Cascadia thrust fault ruptured along a 1000 km length, from mid Vancouver Island to northern California in a great earthquake, producing tremendous shaking and a huge tsunami that swept across the Pacific.

These events are recorded in the oral traditions of the First Nations people on Vancouver Island. The tsunami swept across the Pacific also causing destruction along the Pacific coast of Japan. It is the accurate descriptions of the tsunami and the accurate time keeping by the Japanese that allows us to confidently know the size and exact time of this great earthquake.

The recognition of definitive signatures in the geological record tells us

the January 26, 1700 event was not a unique event, but has repeated many times at irregular intervals of hundreds of years. Geological evidence indicates that 13 great earthquakes have occurred in the last 6000 years.

Natural Resources Canada

<http://www.pgc.nrcan.gc.ca/seismo/hist/anniv.press.htm>

The earthquake was a Magnitude 9.0 on the Richter scale, among the highest in recorded history. US authorities had initially recorded 8.0 on the Richter scale.

As confirmed by several reports, US scientists in Hawaii, had advanced knowledge regarding an impending catastrophe, but failed to contact their Asian counterparts.

Charles McCreery of the Pacific Warning Center in Hawaii confirmed that his team tried to get in touch with his counterparts in Asia. According to McCreery, director of the National Oceanic and Atmospheric Administration's center in Honolulu, the team did its utmost to contact the countries. ([The NOAA in Hawaii's Report](http://www.noaa.gov/stories2004/s2357.htm) at <http://www.noaa.gov/stories2004/s2357.htm>).

We started thinking about who we could call. We talked to the State Department Operations Center and to the military. We called embassies. We talked to the navy in Sri Lanka, any local government official we could get hold of," Hirshorn said. "We were fairly careful about who we called. We wanted to call people who could help." (quoted in <http://the.honoluluadvertiser.com/article/2004/Dec/29/ln/ln05p.html>)

TSUNAMI BULLETIN NUMBER 001 [initial warning]

PACIFIC TSUNAMI WARNING CENTER/NOAA/NWS ISSUED AT 0114Z 26 DEC 2004

THIS BULLETIN IS FOR ALL AREAS OF THE PACIFIC BASIN EXCEPT ALASKA - BRITISH COLUMBIA - WASHINGTON - OREGON - CALIFORNIA. TSUNAMI INFORMATION BULLETIN: THIS MESSAGE IS FOR INFORMATION ONLY. THERE IS NO TSUNAMI WARNING OR WATCH IN EFFECT. AN EARTHQUAKE HAS OCCURRED WITH THESE PRELIMINARY PARAMETERS

ORIGIN TIME - 0059Z 26 DEC 2004 COORDINATES - 3.4 NORTH 95.7 EAST LOCATION - OFF W COAST OF NORTHERN SUMATERA

MAGNITUDE - 8.0 EVALUATION: THIS EARTHQUAKE IS LOCATED OUTSIDE THE PACIFIC.

NO DESTRUCTIVE TSUNAMI THREAT EXISTS BASED ON HISTORICAL EARTHQUAKE AND TSUNAMI DATA. THIS WILL BE THE ONLY BULLETIN ISSUED FOR THIS EVENT UNLESS ADDITIONAL INFORMATION BECOMES AVAILABLE. <http://www.prh.noaa.gov/ptwc/olderwmsg>

Note the tone of the first Bulletin above. It downplays an imminent catastrophe. It points to a Magnitude 8.0 Earthquake, subsequently revised to 8.5 and then 9. (See the texts of all

three Bulletins in annex to this article).

The Bulletin fails to underscore the seriousness of the situation. It states in a routine fashion. "There is no Tsunami Warning or Watch in Effect" [in the Pacific]. It does not make any statement as to what might happen in the Indian Ocean. Neither does it acknowledge that the country which is worst hit, namely Indonesia, is a member of the Pacific tsunami warning system along with Thailand and Singapore.

In fact, the Bulletin is grossly misleading on the extent of the catastrophe caused by the earthquake and the tsunami which had already hit Indonesia prior to the release of the Bulletin (01.14 GMT), on the North Sumatra Coastline and in Banda, Aceh. To state that there is no tsunami or tsunami warning is mistaken. It had already happened!

We Did Not Know!

Nine (9.0) on the Richter scale: The Director of the Hawaii Warning Center stated that they did not know that the earthquake would generate a deadly seismic wave until it had hit Sri Lanka, more than one and a half hours later, at 2.30 GMT. (see Timeline below)

"Not until the deadly wave hit Sri Lanka and the scientists in Honolulu saw news reports of the damage there did they recognize what was happening... 'Then we knew there was something moving across the Indian Ocean,' said Charles McCreery. (quoted in the NYT, 28 Dec 2004).

It is impossible that the movement of the seismic wave could have gone unnoticed following the initial devastating impact of the tidal waves in Aceh and North Sumatra immediately after 1.00 GMT on the 26th.

Moreover, according to expert opinion, known to the scientists who were monitoring seismic activity, an earthquake of more than 6.5 on the Richter scale has the potential of triggering a tsunami. In other words, there should have been no hesitation by scientists or government officials on the likely impacts of an earthquake which was initially assessed at 8.0 on the Richter scale.

Moreover, the Hawaii Center's statement is at odds with the Timeline of the seismic wave disaster (see below), which no doubt was also being monitored on a continuous basis, once it hit the Indonesian and Thai coastlines by satellite imaging using the Global Positioning System (GPS). These satellite images are available to a number of agencies including the US military and intelligence. It should be noted, however, that the energy of a tsunami is transferred through open water, it is therefore not easily detectable in the Ocean.

It is the extreme seismic activity which provides advance warning prior to the tsunami reaching the coastline. But as pointed out above, the tsunami had already hit the Indonesian coast shortly shortly after 01.00 GMT:

"In the open ocean, tsunamis would not be felt by ships because the wavelength would be hundreds of miles long, with an amplitude of only a few feet. This would also make them unnoticeable from the air. As the waves approach the coast, their speed decreases and their amplitude increases. Unusual wave heights have been known to be over 100 feet high. However, waves that are 10 to 20 feet high can be very destructive and cause many

deaths or injuries.” (see http://www.redcross.org/services/disaster/0,1082,0_592_,00.html#feel)

Thailand was hit almost an hour before Sri Lanka and the news reports including photographic evidence were already out. Surely, these reports out of Thailand were known to the scientists in Hawaii, not to mention the office of Sec. Colin Powell, well before the tidal wave reached Sri Lanka.

“We wanted to try to do something, but without a plan in place then, it was not an effective way to issue a warning, or to have it acted upon,” Dr. McCreery said. “There would have still been some time — not a lot of time, but some time — if there was something that could be done in Madagascar, or on the coast of Africa.”

The above statement by Director of the Hawaii Center is also inconsistent.

The seismic wave reached the East African coastline several hours after it reached The Maldives islands. According to news reports, Male, the capital of the Maldives was hit three hours after the earthquake, at approximately 4.00 GMT. By that time everybody around the World knew. It is worth noting that the US Navy was fully aware of the deadly seismic wave, because the Navy was on the Pacific Warning Center’s list of contacts. The Military also has its own advanced systems including satellite images, which enables it to monitor in a very precise way the movement of the seismic wave in real time. In other words, in all likelihood the US Military had information on an impending catastrophe.

Moreover, America’s strategic Naval base on the island of Diego Garcia had also been notified. Although directly in the path of the tidal wave (see animated chart below), the Diego Garcia military base reported “no damage”.

“One of the few places in the Indian Ocean that got the message of the quake was Diego Garcia, a speck of an island with a United States Navy base, because the Pacific warning center’s contact list includes the Navy. Finding the appropriate people in Sri Lanka or India was harder.” (NYT, 28 Dec 2004, emphasis added)

Now how hard is it to pick up the phone and call Sri Lanka?

According to Charles McCreery, director of the Pacific Tsunami Warning Center.

“We don’t have contacts in our address book for anybody in that part of the world.”

Only after the first waves hit Sri Lanka did workers at National Oceanic and Atmospheric Administration’s Pacific Tsunami Warning Centre [PTWC] and others in Hawaii start making phone calls to US diplomats in Madagascar and Mauritius in an attempt to head off further disaster.

“We didn’t have a contact in place where you could just pick up the phone,” Dolores Clark, spokeswoman for the International Tsunami Information Centre in Hawaii said. “We were starting from scratch.”

These statements on the surface are ambiguous, since several Indian Ocean Asian countries are in fact members of the Tsunami Warning System.

There are 26 member countries of [the International Coordination Group for the Tsunami Warning System](#) , including Thailand, Singapore and Indonesia. All these countries would normally be in the address book of the PTWC, which works in close coordination with its sister organization the [ICGTWS](#) , which has its offices at the headquarters of the [National Weather Service Pacific Region Headquarters](#) in downtown Honolulu.

The mandate of the ICGTWS is to “assist member states in establishing national warning systems, and makes information available on current technologies for tsunami warning systems.” Australia and Indonesia were notified.

The US Congress is to investigate

The US Congress is to investigate why the US government did not notify all the Indian Ocean nations in the affected area:

“Only two countries in the affected region, Indonesia and Australia, received the warning.. Yet the tsunami took as long as two hours to reach some countries, and NOAA’s critics say timely even unofficial warnings might have allowed people in coastal areas to flee.”

Maine Senator Olympia Snowe is “exploring and looking into why NOAA was not able to provide this valuable, life-saving information to the 11 affected nations,” (quoted in Boston Globe, 29 Dec 2004):

The issue of the Ocean Sensors is a Red Herring

“Although Thailand belongs to the international tsunami-warning network, its west coast does not have the system’s wave sensors mounted on ocean buoys.

The northern tip of the earthquake fault is located near the Andaman and Nicobar Islands, and tsunamis appear to have rushed eastward toward the Thai resort of Phuket.

“They had no tidal gauges and they had no warning,” said Waverly Person, a geophysicist at the National Earthquake Information Centre in Golden, Colorado, U.S., which monitors seismic activity worldwide. “There are no buoys in the Indian Ocean and that’s where this tsunami occurred.”” (Hindu, 27 Dec 2004)

The Hawaii Center was not able to warn them because they had no sensors in the Indian Ocean: That argument is a Red Herring.

We are not dealing with information based on Ocean sensors: the emergency warning was transmitted in the immediate wake of the earthquake (based on seismic data). The earthquake took place at 00.58 GMT on the 26th of Dec. The report was transmitted to The State Department and the US Navy following the earthquake.

With modern communications, the information of an impending disaster could have been sent around the World in a matter of minutes, by email, by telephone, by fax, not to mention

by live satellite Television.

Coastguards, municipalities, local governments, tourist hotels, etc. could have been warned.

According to Tsunami Society President Prof. Tad Murty of the University of Manitoba:

‘there’s no reason for a single individual to get killed in a tsunami,’ since most areas had anywhere from 25 minutes to four hours before a wave hit. So, once again, because of indifference and corruption thousands of innocent people have died needlessly.” (Calgary Sun, 28 Dec 2004)

While the above quote is an overstatement, given the nature and magnitude of the catastrophe, it should nonetheless be taken seriously.

Key Questions

1. Why were the Indian Ocean countries’ governments not informed?

Were there “guidelines” from the US military or the State Department regarding the release of an advanced warning?

According to the statement of the Hawaii based PTWC, advanced warning was released but on a selective basis. Indonesia was already hit, so the warning was in any event redundant and Australia was several thousand miles from the epicentre of the earthquake and was, therefore, under no immediate threat.

2. Did US authorities monitoring seismographic data have knowledge of the earthquake prior to its actual occurrence at 00.57 GMT on the 26th of December?

The question is whether there were indications of abnormal seismic activity prior to 01.00 GMT on the 26th of Dec.

The US Geological Survey confirmed that the earthquake which triggered the tidal wave measured 9.0 on the Richter scale and was the fourth largest quake since 1900. In such cases, one would expect evidence of abnormal seismic activity before the actual occurrence of a major earthquake.

3. Why is the US military Calling the Shots on Humanitarian Relief

Why in the wake of the disaster, is the US military (rather than civilian humanitarian/aid organizations operating under UN auspices) taking a lead role?

The US Pacific Command has been designated to coordinate the channeling of emergency relief? Marine Corps Lt. Gen. Rusty Blackman, commander of the 3rd Marine Expeditionary Force based in Okinawa, has been designated to lead the emergency relief program.

Lieutenant General Blackman was previously Chief of Staff for Coalition Forces Land Component Command, responsible for leading the Marines into Baghdad during “Operation Iraqi Freedom.”

Three “Marine disaster relief assessment teams” under Blackman’s command have been sent to Thailand, Sri Lanka and Indonesia.

US military aircraft are conducting observation missions.

In a bitter irony, part of this operation is being coordinated out of America’s Naval base in Diego Garcia, which was not struck by the tidal wave. Meanwhile, “USS Abraham Lincoln carrier strike group, which was in Hong Kong when the earthquake and tsunamis struck, has been diverted to the Gulf of Thailand to support recovery operations” (Press Conference of Pacific Command, http://www.defenselink.mil/news/Dec2004/n12292004_2004122905.html).

Two Aircraft Carriers have been sent to the region.

Why is it necessary for the US to mobilize so much military equipment? The pattern is unprecedented:

Conway said the Lincoln carrier strike group has 12 helicopters embarked that he said could be “extremely valuable” in recovery missions.

An additional 25 helicopters are aboard USS Bonhomme Richard, headed to the Bay of Bengal. Conway said the expeditionary strike group was in Guam and is forgoing port visits in Guam and Singapore and expects to arrive in the Bay of Bengal by Jan. 7.

Conway said the strike group, with its seven ships, 2,100 Marines and 1,400 sailors aboard, also has four Cobra helicopters that will be instrumented in reconnaissance efforts.

Because fresh water is one of the greatest needs in the region, Fargo has ordered seven ships — each capable of producing 90,000 gallons of fresh water a day — to the region. Conway said five of these ships are pre-positioned in Guam and two will come from Diego Garcia.

A field hospital ship pre-positioned in Guam would also be ordered to the region, depending on findings of the disaster relief assessment teams and need, Conway said. (Ibid)

Why has a senior commander involved in the invasion of Iraq been assigned to lead the US emergency relief program?

The Tsunami Timeline

Sunday 26 December 2004 (GMT)

00.57 GMT: Between 00.57 GMT and 00.59 GMT, an 8.9 magnitude earthquake occurs on the seafloor near Aceh in northern Indonesia. (See <http://ioc.unesco.org/itsu/> and other reports)

00.58 GMT: Saturday 25 December, 2.58 pm Hawaii Time (GMT-10) 26 Dec 00.58 GMT. US government's Pacific Tsunami Warning Center registers the earthquake on its seismic instruments. In other words at the time of its occurrence at 00.58 GMT.

shortly after 01.00 GMT: Earthquake hits several cities in Indonesia, creates panic in urban areas in peninsular Malaysia. The news of the earthquake is reported immediately.

01.30 GMT: Phuket and Coast of Thailand: The tidal wave hits to coastline shortly after 8.30 am, 01.30 GMT

02.30 GMT: Colombo Sri Lanka and Eastern Coast of Sri Lanka, the tidal wave hits the coastal regions close to the capital Colombo, according to report at 8.30 am local time, 02.30 GMT (an hour and a half after the earthquake)

02.45 GMT: India's Eastern Coastline. The tsunami hits India's eastern coast from 6:15 a.m.(2:45 GMT)

04.00 GMT: Male, Maldives: From about 9:00 am (0400 GMT), three hours after the earthquake, the capital, Male, and other parts of the country were flooded by the tsunami. (more than three hours after the earthquake)

11.00 GMT (approximate time according to news dispatches): East Coast of Africa is hit. More than ten hours after the earthquake

For a review of the official statement by NOAA at the Hawaii Center, click

<http://www.noaanews.noaa.gov/stories2004/s2358.htm>

The animation below indicates approximate times at which the tidal wave hits the coastal areas of Indonesia, Thailand, Myanmar, Malaysia, Sri Lanka, India, Bangladesh, The Maldives.

Click on the image to see an animation (650 KB)

(Animation provided by Kenji Satake, National Institute of Advanced Industrial Science and Technology, Japan)

ANNEX I. TEXT OF NOAA WARNINGS

Note the first message points to a Magnitude 8.0 Earthquake, subsequently revised to 8.5 and then 9.

But it states in a routine fashion. This is not a Tsunami Warning. In fact the Bulletin is ambiguous because it in effect misleads.

It suggests that there is no danger in the Pacific. It does not make any statement as to what might happen in the Indian Ocean.

The following messages were transmitted to tsunami warning centres in the Pacific Region between 26 and 27 December 2004:

TSUNAMI BULLETIN NUMBER 001 [initial warning]
PACIFIC TSUNAMI WARNING CENTER/NOAA/NWS
ISSUED AT 0114Z 26 DEC 2004
THIS BULLETIN IS FOR ALL AREAS OF THE PACIFIC BASIN EXCEPT
ALASKA - BRITISH COLUMBIA - WASHINGTON - OREGON - CALIFORNIA.
..... TSUNAMI INFORMATION BULLETIN
THIS MESSAGE IS FOR INFORMATION ONLY. THERE IS NO TSUNAMI WARNING
OR WATCH IN EFFECT.
AN EARTHQUAKE HAS OCCURRED WITH THESE PRELIMINARY PARAMETERS
ORIGIN TIME - 0059Z 26 DEC 2004
COORDINATES - 3.4 NORTH 95.7 EAST
LOCATION - OFF W COAST OF NORTHERN SUMATERA
MAGNITUDE - 8.0
EVALUATION
THIS EARTHQUAKE IS LOCATED OUTSIDE THE PACIFIC. NO DESTRUCTIVE
TSUNAMI THREAT EXISTS BASED ON HISTORICAL EARTHQUAKE AND TSUNAMI
DATA.
THIS WILL BE THE ONLY BULLETIN ISSUED FOR THIS EVENT UNLESS
ADDITIONAL INFORMATION BECOMES AVAILABLE.
THE WEST COAST/ALASKA TSUNAMI WARNING CENTER WILL ISSUE BULLETINS
FOR ALASKA - BRITISH COLUMBIA - WASHINGTON - OREGON - CALIFORNIA.

ITIC Tsunami Bulletin Board
TSUNAMI BULLETIN NUMBER 002
PACIFIC TSUNAMI WARNING CENTER/NOAA/NWS
ISSUED AT 0204Z 26 DEC 2004
[one hour later after the earthquake. The Indonesian and Thai Coast have already been hit and they say there is a possibility of a Tsunami near the Epicentre, when in fact the
Tsumai had already hit. One has the distinct impression of double standards. No danger in the Pacific]
THIS BULLETIN IS FOR ALL AREAS OF THE PACIFIC BASIN EXCEPT
ALASKA - BRITISH COLUMBIA - WASHINGTON - OREGON - CALIFORNIA.
..... TSUNAMI INFORMATION BULLETIN
ATTENTION: NOTE REVISED MAGNITUDE.
THIS MESSAGE IS FOR INFORMATION ONLY. THERE IS NO TSUNAMI WARNING
OR WATCH IN EFFECT.
AN EARTHQUAKE HAS OCCURRED WITH THESE PRELIMINARY PARAMETERS
ORIGIN TIME - 0059Z 26 DEC 2004
COORDINATES - 3.4 NORTH 95.7 EAST
LOCATION - OFF W COAST OF NORTHERN SUMATERA
MAGNITUDE - 8.5
EVALUATION
REVISED MAGNITUDE BASED ON ANALYSIS OF MANTLE WAVES.
THIS EARTHQUAKE IS LOCATED OUTSIDE THE PACIFIC. NO DESTRUCTIVE
TSUNAMI THREAT EXISTS FOR THE PACIFIC BASIN BASED ON HISTORICAL
EARTHQUAKE AND TSUNAMI DATA.
THERE IS THE POSSIBILITY OF A TSUNAMI NEAR THE EPICENTER.
THIS WILL BE THE ONLY BULLETIN ISSUED FOR THIS EVENT UNLESS
ADDITIONAL INFORMATION BECOMES AVAILABLE.
THE WEST COAST/ALASKA TSUNAMI WARNING CENTER WILL ISSUE BULLETINS
FOR ALASKA - BRITISH COLUMBIA - WASHINGTON - OREGON - CALIFORNIA.

ITIC Tsunami Bulletin Board
TSUNAMI BULLETIN NUMBER 003
PACIFIC TSUNAMI WARNING CENTER/NOAA/NWS
ISSUED AT 1535Z 27 DEC 2004
THIS BULLETIN IS FOR ALL AREAS OF THE PACIFIC BASIN EXCEPT
ALASKA - BRITISH COLUMBIA - WASHINGTON - OREGON - CALIFORNIA.
..... TSUNAMI INFORMATION BULLETIN
THIS MESSAGE IS FOR INFORMATION ONLY. THERE IS NO TSUNAMI WARNING
OR WATCH IN EFFECT.
AN EARTHQUAKE HAS OCCURRED WITH THESE PRELIMINARY PARAMETERS
ORIGIN TIME - 0059Z 26 DEC 2004
COORDINATES - 3.4 NORTH 95.7 EAST
LOCATION - OFF W COAST OF NORTHERN SUMATERA
MAGNITUDE - 9.0
EVALUATION
SOME ENERGY FROM YESTERDAYS TSUNAMI IN THE INDIAN OCEAN HAS
LEAKED INTO THE PACIFIC BASIN... PROBABLY FROM SOUTH OF THE
AUSTRALIAN CONTINENT. THIS ENERGY HAS PRODUCED MINOR
SEA LEVEL FLUCTUATIONS AT MANY PLACES IN THE PACIFIC. FOR
EXAMPLE...
50 CM CREST-TO-TROUG AT CALLAO CHILE
19 CM CREST-TO-TROUG AT IQUIQUE CHILE
13 CM CREST-TO-TROUG AT PAGO PAGO AMERICAN SAMOA
11 CM CREST-TO-TROUG AT SUVA FIJI
50 CM CREST-TO-TROUG AT WAITANGI CHATHAM IS NEW ZEALAND
65 CM CREST-TO-TROUG AT JACKSON BAY NEW ZEALAND
18 CM CREST-TO-TROUG AT PORT VILA VANUATU
06 CM CREST-TO-TROUG AT HILO HAWAII USA
22 CM CREST-TO-TROUG AT SAN DIEGO CALIFORNIA USA
HOWEVER... AT MANZANILLO MEXICO SEA LEVEL FLUCTUATIONS WERE
AS MUCH AS 2.6 METERS CREST-TO-TROUG PROBABLY DUE TO FOCUSING
OF ENERGY BY THE EAST PACIFIC RISE AS WELL AS LOCAL RESONANCES.
THIS IS TO ADVISE THAT SMALL SEA LEVEL CHANGES COULD CONTINUE
TO BE OBSERVED ACROSS THE PACIFIC OVER THE NEXT DAY OR TWO
UNTIL ALL ENERGY FROM THIS EVENT IS EVENTUALLY DISSIPATED.
THIS WILL BE THE FINAL BULLETIN ISSUED FOR THIS EVENT UNLESS
ADDITIONAL INFORMATION BECOMES AVAILABLE.
THE WEST COAST/ALASKA TSUNAMI WARNING CENTER WILL ISSUE BULLETINS
FOR ALASKA - BRITISH COLUMBIA - WASHINGTON - OREGON - CALIFORNIA.

source:

<http://ioc.unesco.org/itsu/contents.php?id=136>

ANNEX II. 26 Dec 2004. Seismic Activity on Dec 26, 2004

(click <http://www.pgc.nrcan.gc.ca/seisplots/long-period/200412/20041226.PGC.LHZ.24hr.gif>

Note: extreme seismic activity prior to 01.00 GMT

Global Seismic Activity in the Days prior to the Disaster Soource, The Hindu, <http://www.hindu.com/2004/12/27/stories/2004122712212000.htm>

December 26

The Andaman Islands, India region: 5.8, 5.7, 5.7, 6.1 6.0 5.8 and 5.8 on the Richter scale; the Nicobar Islands: 7.3 and 6.0; Off W Coast Of Northern Sumatra: 5.9, 5.8 and 8.9; and Northern Sumatra, Indonesia: 5.9.

December 24

Java, Indonesia 4.6; Vanuatu Region 5.3; Fiji Region 5.1; and North Of Macquarie Island 5.5.

December 23

North Of Macquarie Island 8.1; and Central Alaska 4.5.

December 22

Southern East Pacific Rise 6.1; Off The Coast Of Oregon 4.9; South Sandwich Islands Region 4.5; Guatemala 4.3; Rota Region, Northern Mariana Islands 4.5; and Taiwan 4.3.

December 21

Halmahera, Indonesia 5.4; Southern Alaska 5.1; and Hokkaido, Japan Region 5.6.

December 20

Western Turkey 5.3; Cayman Islands Region 4.4; Galapagos Triple Junction Region 5.4; Central Mid-Atlantic Ridge 4.9; Izu Islands, Japan Region 4.7; Valparaiso, Chile 2.8; Tonga 4.9; Libertador O Higgins, Chile 3.0; Coquimbo, Chile 3.4; and Near The Coast Of Central Peru 5.0.

December 19

Valparaiso, Chile 4.0 and 3.6; Alaska Peninsula 5.2; Fiji Region 5.2; Mindanao, Philippines 5.4; South Of Panama 4.7; Panama 5.5; Coquimbo, Chile 3.6; Near The East Coast Of Honshu, Japan 5.3; Western Australia 2.9; Vanuatu Region 5.3; and Northern Peru 4.9.

ANNEX III. The Richter Scale

US scientists in Hawaii had initially indicated that the earthquake was of a magnitude of 8.0 (ten times weaker than in the case a 9.0 earthquake on the Richter scale).

How can an error of this nature be made, with very sophisticated measuring equipment?

According to Natural Resources Canada:

“The magnitude of an earthquake is a measure of the amount of energy released. Each earthquake has a unique magnitude assigned to it. This is based on the amplitude of seismic waves measured at a number of seismograph sites, after being corrected for distance from the earthquake. Magnitude estimates often change by up to 0.2 units, as additional data are included in the estimate.

The Richter scale is logarithmic, that is an increase of 1 magnitude unit represents a factor of ten times in amplitude. The seismic waves of a magnitude 6 earthquake are 10 times greater in amplitude than those of a magnitude 5 earthquake. However, in terms of energy release, a magnitude 6 earthquake is about 31 times greater than a magnitude 5. The intensity of an earthquake varies greatly according to distance from the earthquake, ground conditions, and other factors. The Modified Mercalli Intensity Scale is used to describe earthquake effects.” (<http://www.pgc.nrcan.gc.ca/seismo/eqinfo/richter.htm>)

The following criteria are given by Natural Resources, Canada:

M=8: “Great” earthquake, great destruction, loss of life over several 100 km (1906 San Francisco, [1949 Queen Charlotte Islands](#)).

M=9: Rare great earthquake, major damage over a large region over 1000 km (Chile 1960, Alaska 1964, and [west coast of British Columbia, Washington, Oregon, 1700](#)).

Source Natural Resources Canada: <http://www.pgc.nrcan.gc.ca/seismo/eqinfo/richter.htm>

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