

The Eureka Earthquake of January 9, 2010, Recent Tsunamis, and Lessons for California



September 29 M8.0, 7.9 Samoa

QuickTime™ and a
decompressor
are needed to see this picture.

April 4 M 7.2 Baja

QuickTime™ and a
decompressor
are needed to see this picture.

January 9 M 6.5 offshore Eureka



February 27 M 8.8 Chile

Lori Dengler, Humboldt State University
Prevention First October 20, 2010



A Quick Report Card

Earthquake-resistant design QuickTime
decompressor
are needed to see non-structural damage me™ and a
mpressor
see this picture.

What Californians do during the earthquake me™ and a
mpressor
see this picture.

Tsunami education QuickTime
decompressor
are needed to see Educating transients me™ and a
mpressor
see this picture.

The new *advisory* QuickTime
decompressor
are needed to see Understanding what it means me™ and a
mpressor
see this picture.

Beginning to think tsunami when the ground shakes QuickTime
decompressor
are needed to see

Getting in the car to evacuate me™ and a
mpressor
see this picture.

Professional emergency response planning QuickTime
decompressor
are needed to see

Some events will knock your best plans out me™ and a
mpressor
see this picture.

The earthquake grade

Earthquake-resistant design

QuickTime
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are needed to see

QuickTime™ and a
decompressor
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decompressor
are needed to see this picture.

Concepción

Santiago

Roads, bridges, lifelines

me™ and a
npressor
see this picture.



Tabul

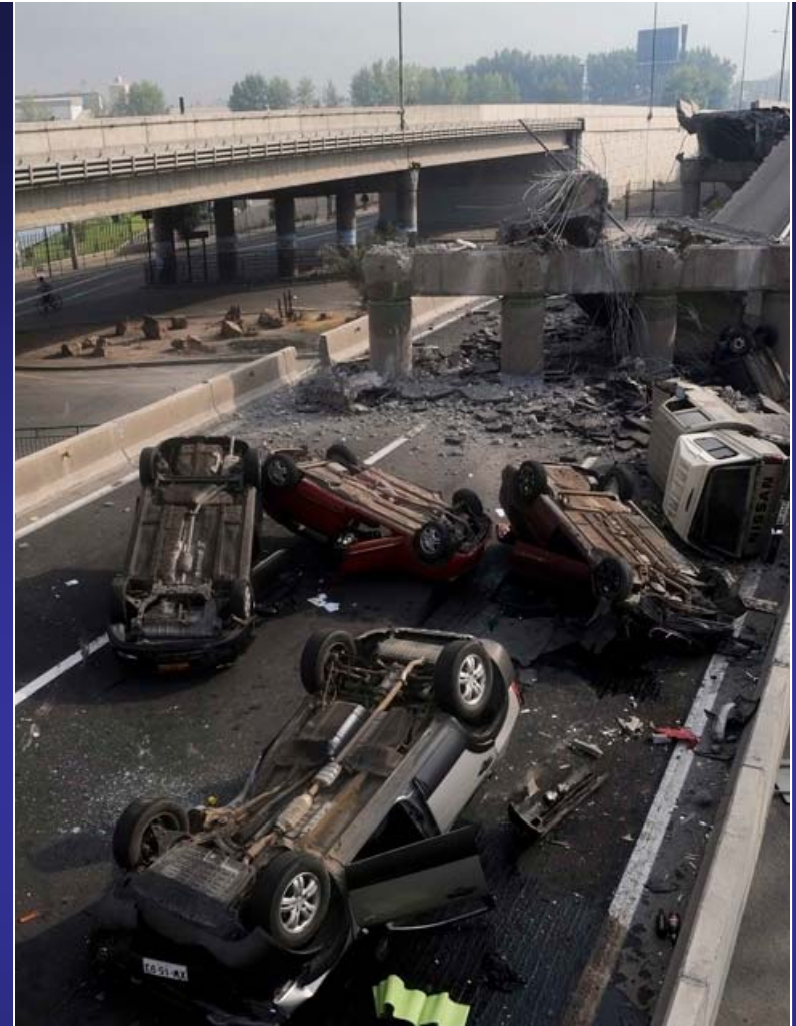
REGION V

Authorities shut down the Lo Gallardo bridge,
The road F-98-G closed due to landslides
Ruta H-40 road's Coinco bridge was shut down.
Ruta H-634 road was shut down.

REGION VII

Ruta K-60 road closed due to collapsed bridges
Escalones overpass collapsed.....

Report March 2, 2010



Santiago

Non-structural damage

me™ and a
mpressor
see this picture.

QuickTime™ and a
decompressor
are needed to see this picture.

Chile



Eureka

QuickTime™ and a
decompressor
are needed to see this picture.

Chile



Calexico

Responding the wrong way while the ground is shaking

me™ and a
mpressor
see this picture.

QuickTime™ and a
decompressor
are needed to see this picture.

North Coast Response

<u>What People Did</u>	<u>Percent</u>
Run outside	10.6%
Walk outside	10.9%
Drop, cover, hold-on	12.1%
Move to doorway	24.6%
Stay in one spot	30.9%
Took no action	10.9%

Chris Durant, Times-Standard reporter runs out of his office on January 9, 2010

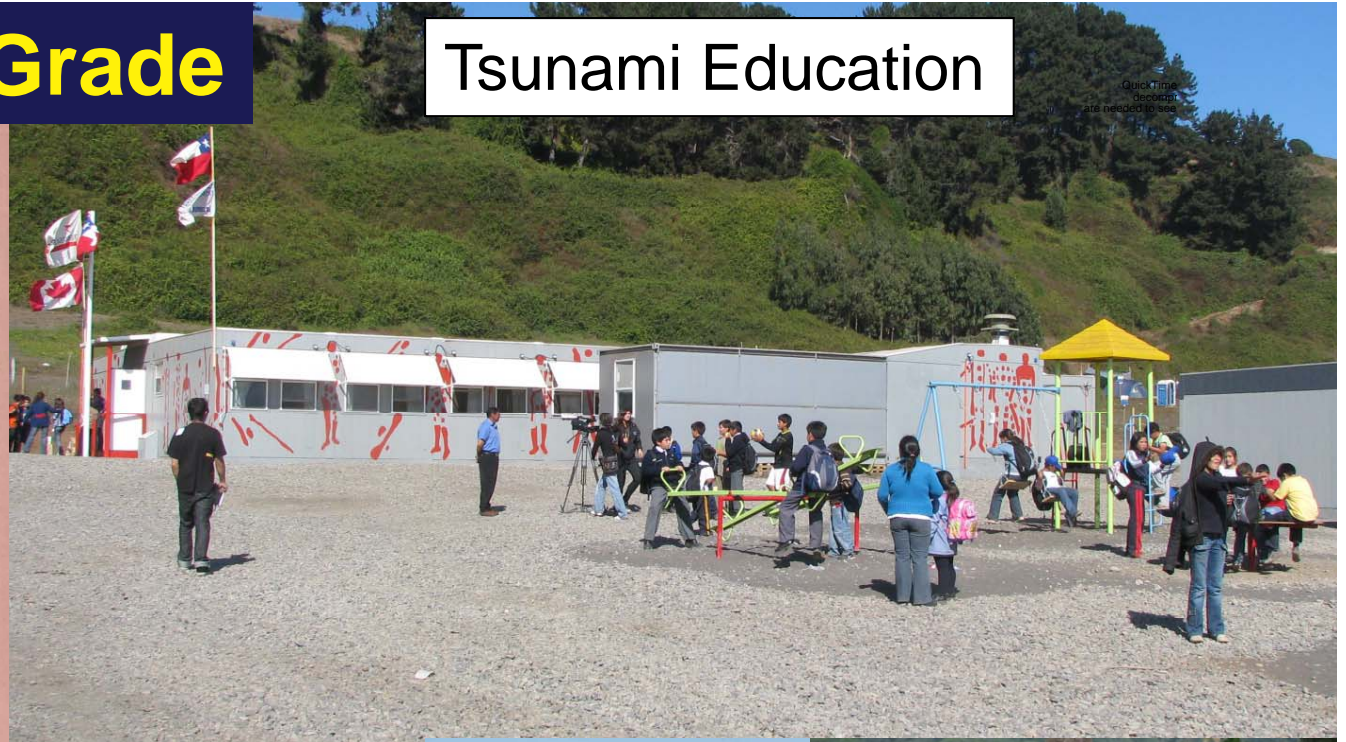
DROP, COVER, HOLD ON !!

Register TODAY and participate tomorrow

in the Great California ShakeOut shakeout.org

The Tsunami Grade

Tsunami Education



No education for transient populations

me™ and a
ripressor
see this picture.



The New Advisory Alert Level

QuickTime
decompressor
are needed to see

QuickTime™ and a
decompressor
are needed to see this picture.

Strong currents in ports and harbors. No
flooding on land normally dry expected.

LOTS of Confusion about what it means

me™ and a
repressor
see this picture.

Samoa tsunami and the California coast:

TSUNAMI INFORMATION STATEMENT **NUMBER 1**

NWS WEST COAST/ALASKA TSUNAMI WARNING CENTER PALMER AK

1104 AM PDT TUE SEP 29 2009

NO WARNING... NO WATCH AND NO ADVISORY IS IN EFFECT FOR
THE STATES AND PROVINCES LISTED ABOVE.

EVALUATION

SEA LEVEL READINGS INDICATE A TSUNAMI WAS GENERATED WHICH
MAY HAVE BEEN DESTRUCTIVE ALONG COASTS NEAR THE
EARTHQUAKE EPICENTER.

**A DAMAGING TSUNAMI IS NOT EXPECTED ALONG THE CALIFORNIA/
OREGON/WASHINGTON/ BRITISH COLUMBIA AND ALASKA COASTS**
ALTHOUGH SOME OF THESE AREAS MAY EXPERIENCE NON-
DAMAGING SEA LEVEL CHANGES.

But then the analysis changes:

BULLETIN

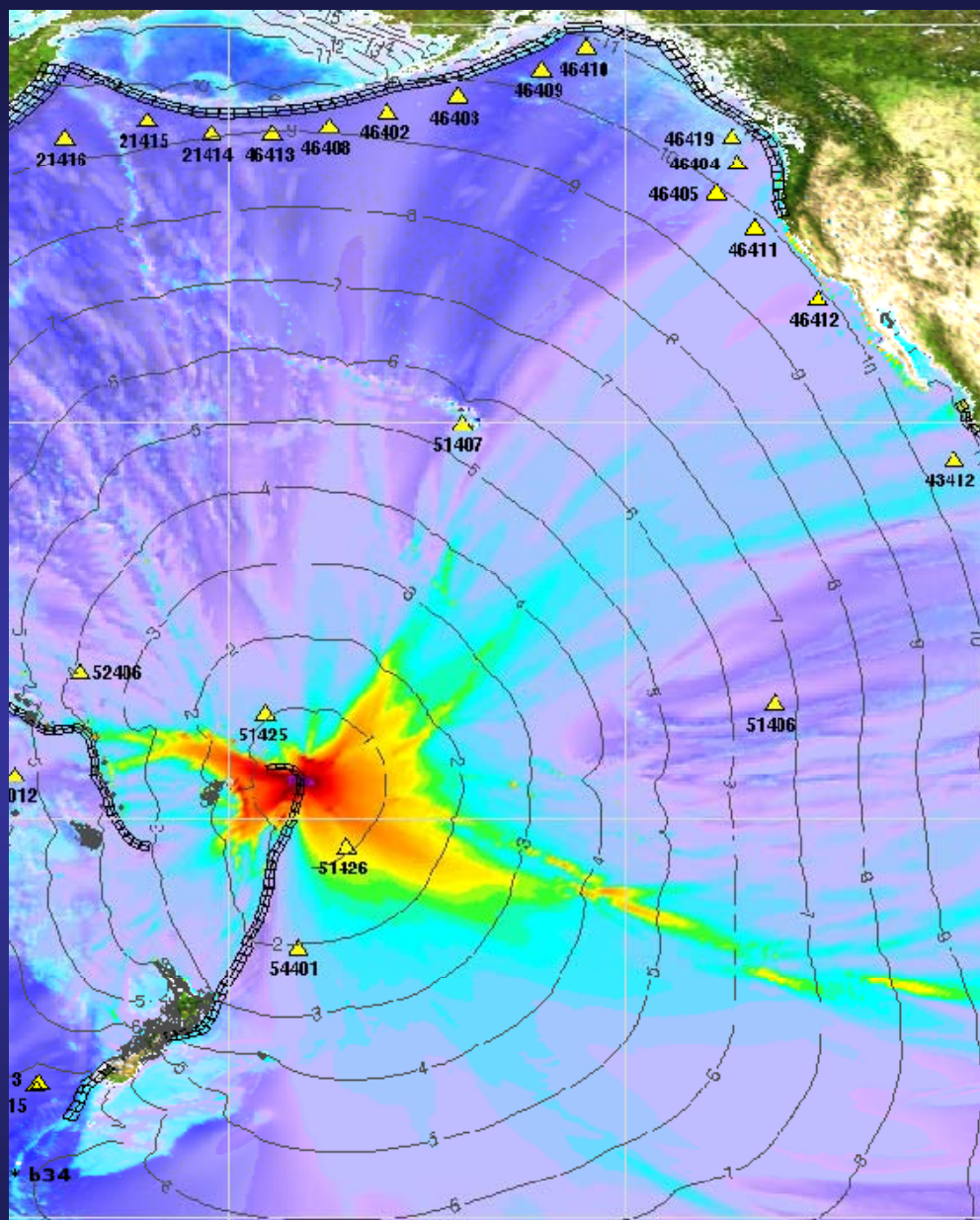
TSUNAMI MESSAGE NUMBER 3

NWS WEST COAST/ALASKA TSUNAMI WARNING CENTER PALMER AK
302 PM PDT TUE SEP 29 2009

...A TSUNAMI ADVISORY IS IN EFFECT WHICH INCLUDES THE
COASTAL AREAS OF CALIFORNIA AND OREGON FROM THE
CALIFORNIA-MEXICO BORDER TO THE OREGON-WASHINGTON
BORDER...

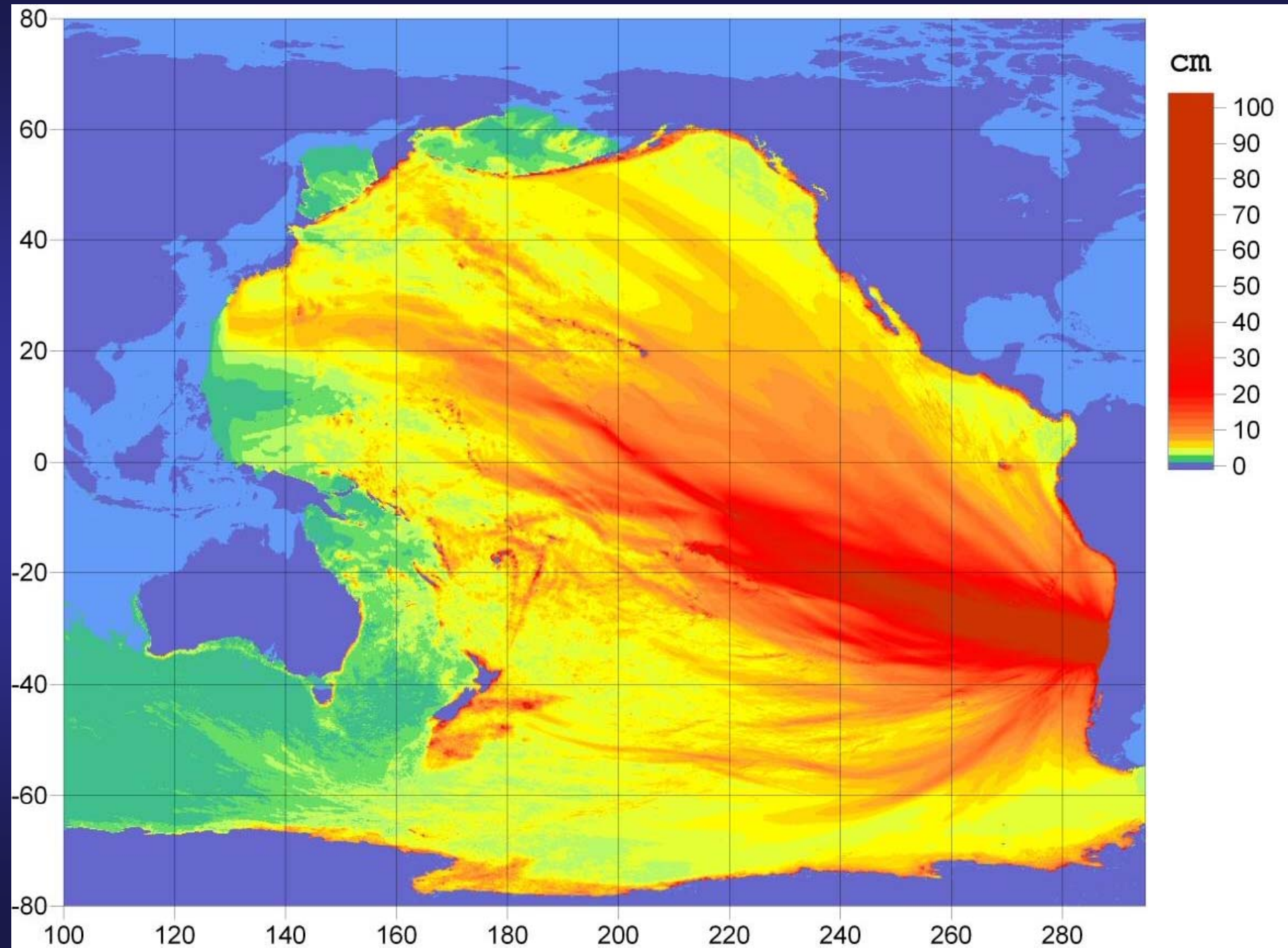
...THIS MESSAGE IS INFORMATION ONLY FOR COASTAL AREAS OF
WASHINGTON - BRITISH COLUMBIA AND ALASKA FROM THE
OREGON-WASHINGTON BORDER TO ATTU ALASKA...

First time the new *advisory* bulletin issued by WCATWC



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decompressor
are needed to see this picture.

Similar story for Chile

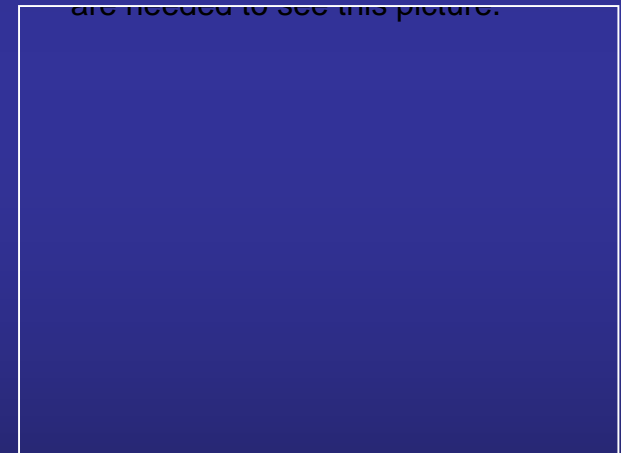


.....But with greater impact

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decompressor
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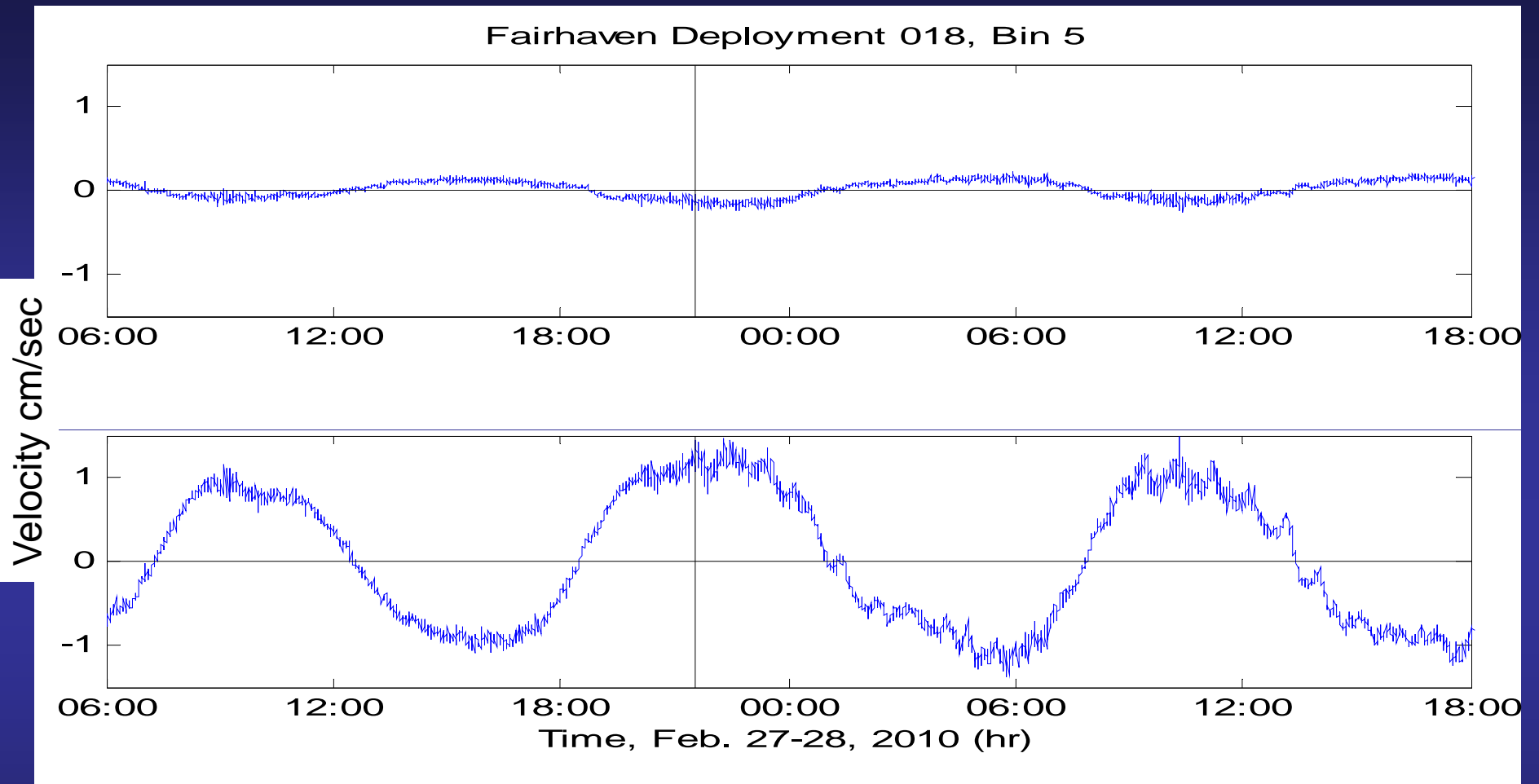


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Measuring currents

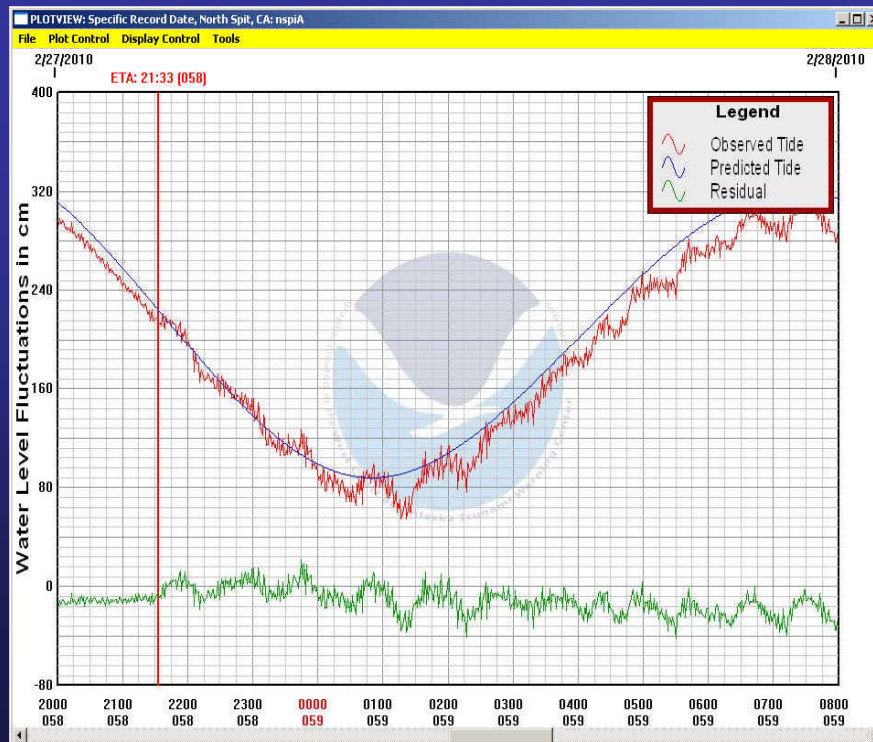


First Acoustic Doppler Current Profiler deployed to specifically study tsunamis
Fairhaven dock, Humboldt Bay

Measuring currents

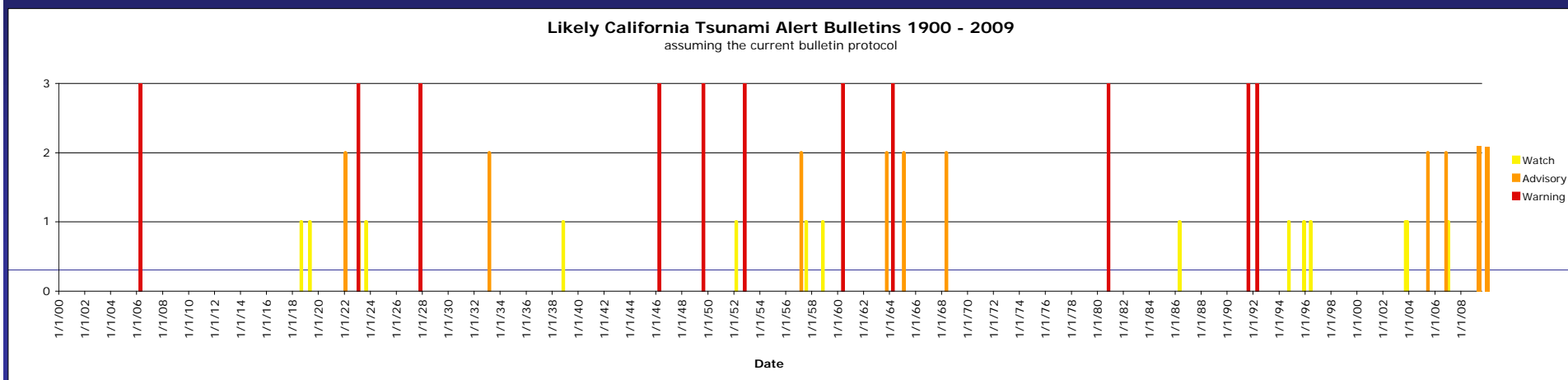
are needed to see the picture.

ADCP



North Spit tide gauge

**Alert bulletins aren't as uncommon as you may think.
So you better learn to understand them and have a
response plan in place!**



11 tsunami warning bulletins - 4 distant, 7 local

100% of distant events (1946, 1953, 1960, 1964) caused damage

0% of local events caused damage

10 tsunami advisory bulletins - 8 distant, 2 local

3 distant events (1957, 2006, 2010) caused damage

13 tsunami watch bulletins - all distant

There is a 16% chance that a new dispatcher will receive an alert bulletin in their first 6 months on the job

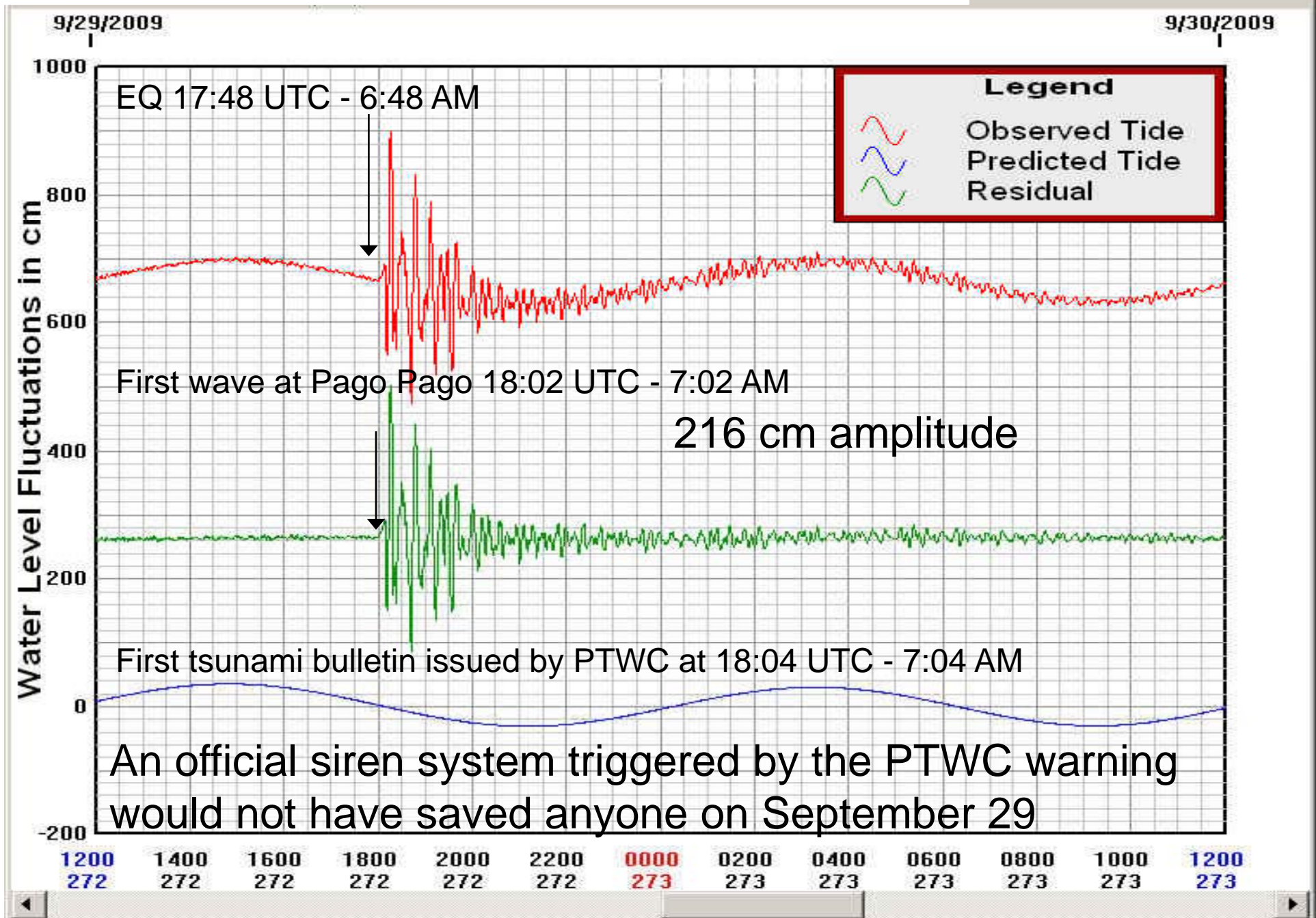
Beginning to think tsunami when the ground shakes

QuickTime
decompr
are needed to see



Responding quickly to the *Natural Warning* saved lives in Samoa

Why You Shouldn't WAIT for an Official Warning



Driving cars to evacuate caused problems

me™ and a
npressor
see this picture.



Emergency training and response planning

QuickTime
decompi
are needed to see



Policeman in Iloca



Director of Radio Bio Bio, Concepción



Some events will knock your best plans out

Important Lessons:

Be able to improvise

**Hold exercises where you cannot access
technology**

Expect to be on your own for days!!