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United States Department of the Interior

U. S. GEOLOGICAL SURVEY

Western Region, Geospatial Information Office
345 Middlefield Road, MS:955

Menlo Park, CA 94025-3591

May 21, 2009

John Greenewald, Jr.
[REDACTED]

REF:USGS-2009-00046

Dear Mr. Greenewald:

This is in response to your electronic Freedom of Information Act (FOIA) request dated March 10, 2009, in which you cited:

- "According to the UPI newswire, "Residents of Orange County, California, reported a mysterious shaking that experts said was not caused by an earthquake or space shuttle. Dozens of residents across the county reported the shaking, which they said mostly caused windows and doors to rattle, at about 9:15 a.m. Tuesday, a time that Edwards Air Force Base said did not line up with any space shuttle activity, the Orange County Register reported Thursday. Bob Dollar, a seismologist at the U.S. Geological Survey, ruled out an earthquake as the cause of the shaking."

You requested a copy of all documents relating to this incident, which includes records of earthquakes (if any exist) or any possible explanation/investigation into the event. To include all documents that may pertain to this request, which includes, but is not limited to, emails, letters, memos, reports, etc.

We have completed our search, and the USGS has the following records that are responsive to your request. The cut off search date is March 19, 2009. This is the second and final batch of documents we are providing to you under this request, you should have received the first batch on April 8, 2009 via Federal Express.

Of the located records, certain portions of these documents contain information that is protected from release by Exemption 2, and has been redacted from the copies of the records that are enclosed. The redactions are on pages 12, 14 and 19.

The records that are responsive to your request include E-Mails between the USGS and the California Institute of Technology. The California Institute of Technology is a private entity and is not under any statute of Federal or State.

In this case the internal personnel rules and practices are the exclusive or primary concern of the California Institute of Technology. Consequently, the U.S. Geological Survey provided the California Institute of Technology with notice of the FOIA request and the opportunity to object

to the release of the information. The California Institute of Technology has objected to the release of the information that exposes their internal personnel rules and practices. The California Institute of Technology made this objection on the basis that the release of information in the E-Mails could result in the alteration, loss, damage, or destruction of data contained in their computer systems.

The California Institute of Technology asserted that the information contained in the documents are predominantly internal, and its disclosure significantly risks circumvention of their regulations or statutes and any access by the general public is strictly barred. Exemption 2 permits an agency to withhold internal personnel rules and practices of an agency, and the disclosure of which would allow circumvention of a statute or agency regulation, or impede the effectiveness of the agency's activities.

After considering the objections of California Institute of Technology and reviewing the information at issue, the U.S. Geological Survey agrees with the California Institute of Technology and concludes that the information identified by the California Institute of Technology in the E-Mails as being internal personnel rules and practices of an agency is protected from public disclosure by Exemption 2 of FOIA (5 U.S.C. §552(b)(2)).

In addition to myself, the decision to deny this request was made in consultation with Attorney Deborah Bardwick, Department of the Interior, the Office of the Solicitor, San Francisco Field Office. In accordance with 43 CFR §2.28(a) (2), you may appeal this denial to:

Freedom of Information Act Appeals Officer
U.S. Department of the Interior
1849 C Street, NW
MS-6556 MIB
Washington, D.C. 20240

Your appeal must be in writing and received no later than 30 workdays after the date of this letter or 30 workdays after the records have been made available. A copy of your original request and this denial letter should accompany the appeal as well as a brief statement of the reasons why you believe this initial decision to be in error. The appeal should be marked "FREEDOM OF INFORMATION APPEAL" both on the envelope and the face of the letter.

The fee incurred in responding to your request is less than \$30.00 and is not being charged in accordance with 43 CFR 2.16(b)(2).

Should you have any questions, feel free to contact me at (650) 329-4035.

Sincerely,



Judy Cearley
U.S. Geological Survey
Western Region - FOIA Representative

From: [REDACTED]
Subject: **Orange County Felt Reports**
Date: March 4, 2009 12:22:15 AM PST
To: "dollar@gps.caltech.edu" <dollar@gps.caltech.edu>, "kate@gps.caltech.edu" <kate@gps.caltech.edu>

Email address is not relevant to request, as the author used his son's as he had already shut down & realized he forgot to respond to a message.

*same for
Page 2*

Kate,

The CIIM map is for felt reports at 9:30 PM in Orange County for the M2.2 event near Fontana at 9:30 AM this morning (12 hours earlier).

-Bob

From: Kate Hutton <katehutton@gmail.com>
Subject: **Fwd: Orange County Felt Reports**
Date: March 4, 2009 5:52:58 AM PST
To: Bob Dollar <dollar@gps.caltech.edu>, [REDACTED]

Sorry, Mike for the extraneous e-mail.

Bob, you hit the nail on the head. I did a newtrig this morning ... Sonics!

Kate

----- Forwarded message -----
From: **Kate Hutton** <katehutton@gmail.com>
Date: Wed, Mar 4, 2009 at 5:33 AM
Subject: Re: Orange County Felt Reports
To: [REDACTED]

I'm gonna do a newtrig & see if I get anything. Kate

On Wed, Mar 4, 2009 at 5:31 AM, Kate Hutton <katehutton@gmail.com> wrote:
Oops. Sorry. Well, I was asleep at the time!

Kate

On Wed, Mar 4, 2009 at 12:22 AM, [REDACTED] wrote:

Kate,

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-Bob

From: Kate Hutton <katehutton@gmail.com>

Subject: **sonics in Orange County last night**

Date: March 4, 2009 6:08:19 AM PST

To: ksvitil@caltech.edu, Deborah Williams-Hedges <debwms@caltech.edu>, Bob Dollar
<dollar@gps.caltech.edu>, Egill Hauksson <hauksson@gps.caltech.edu>

Bob Dollar & I got a few calls last night from the media about "earthquakes" felt in Orange County. We did not see any earthquakes, but we do see a prominent sonic boom at about 9:19 to 9:22 pm (depending on the exact location) last night in the area.

Kate

From: Bob Dollar <dollar@gps.caltech.edu>
Subject: media contact : sonics in Orange County last night
Date: March 4, 2009 9:30:50 AM PST
To: Erik Pounders <epounders@usgs.gov>
Cc: Dollar Bob <dollar@gps.caltech.edu>, Dollar Bob <dollar@usgs.gov>, Susan Hough E <hough@usgs.gov>, Given Doug <doug@usgs.gov>, Hutton Kate <kate@gps.caltech.edu>, Hauksson Egill <hauksson@gps.caltech.edu>

Erik,

I spoke with Gary Robbins, Orange County Register twice last night between 23:20 & 23:45 local.

Gary called me on my cell phone at 23:21. He was apologetic but sounded very frustrated and stressed due to no earthquakes on our web sites but hundreds of phone calls, emails and twitter messages.

Called Kate as duty seismo - woke her up. We both checked systems and events. We agreed that it was probably not an earthquake. Kate asked me to call Gary back.

Hundreds of shaking reports beginning about 21:30 local. Felt by Gary personally.

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From: Bob Dollar <dollar@gps.caltech.edu>
Subject: **Re: sonics in Orange County last night**
Date: March 4, 2009 9:30:15 AM PST
To: Kate Hutton <katehutton@gmail.com>
Cc: Dollar Bob <dollar@gps.caltech.edu>

Kate,

Is it possible to get a picture of the sonic time series, for example,
in DRP format? Or even from Jiggle?

I would like to have it for my gallery of events.

bob

From: Kate Hutton <katehutton@gmail.com>
Subject: **Re: sonics in Orange County last night**

Date: March 4, 2009 9:40:42 AM PST

To: Bob Dollar <dollar@gps.caltech.edu>

3 Attachments, 1.0 MB [Save](#) [Slideshow](#)

Here is a sampling from Jiggle. I would say it's coming from the S. I'd have to do another earlier newtrig to track it back to SD County. Maybe I'll try that.

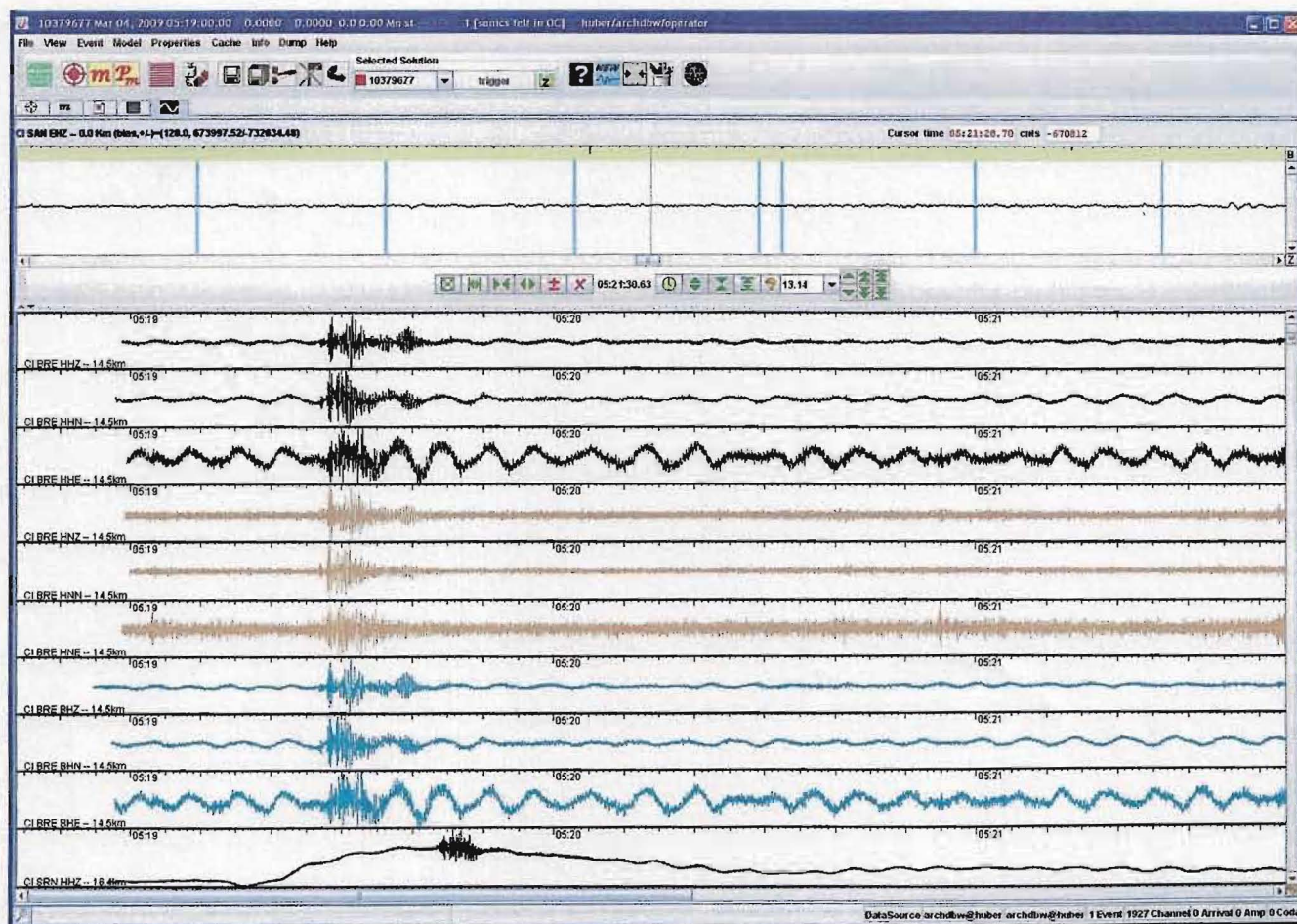
Kate

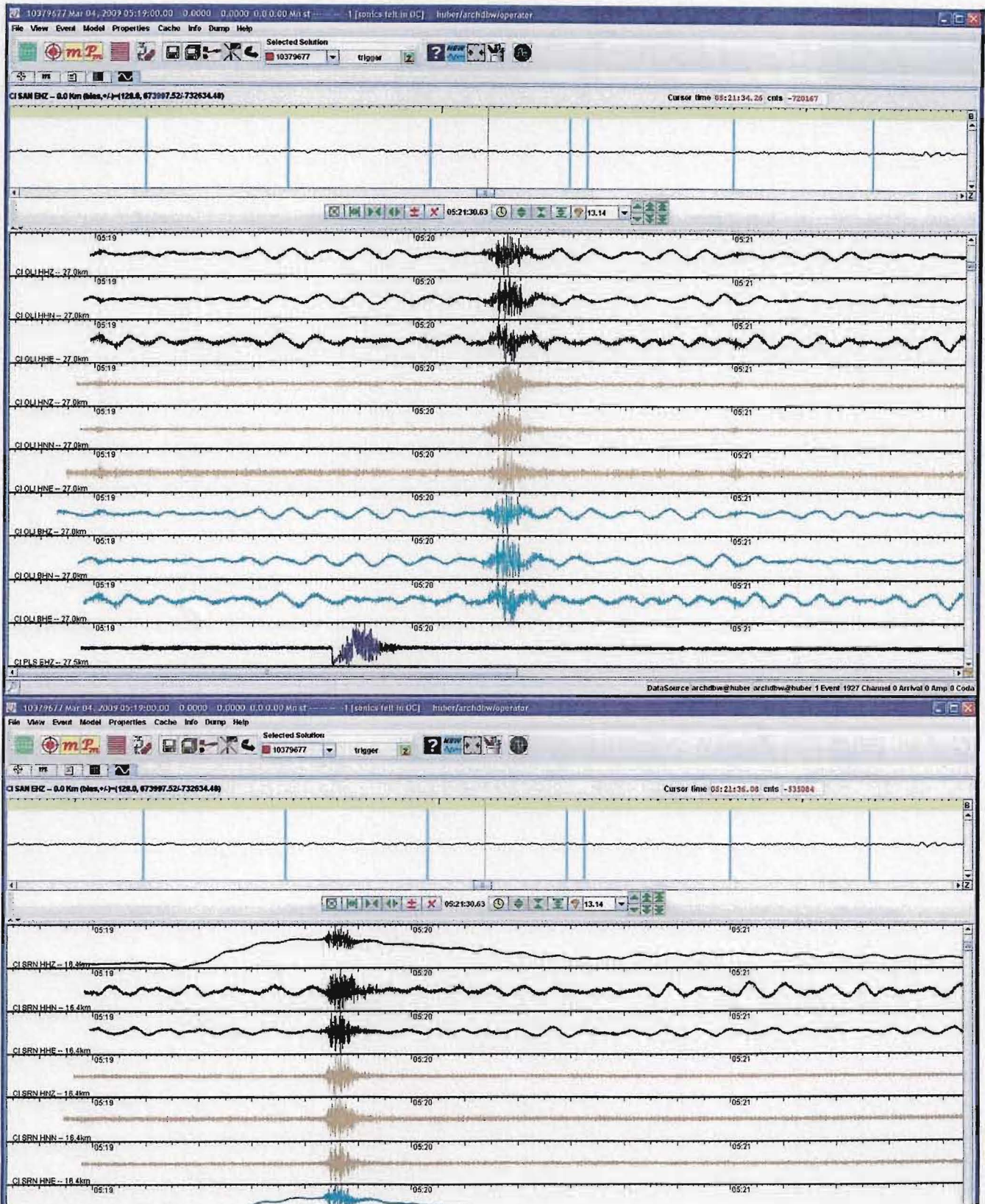
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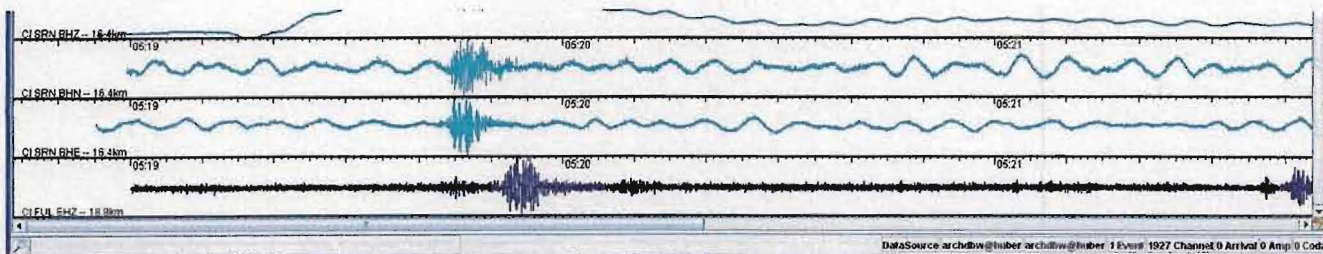
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Bob







From: Susan E Hough <hough@usgs.gov>
Subject: **Re: media contact : sonics in Orange County last night**
Date: March 4, 2009 10:03:23 AM PST
To: Bob Dollar <dollar@gps.caltech.edu>
Cc: Erik Pounders <epounders@usgs.gov>, Dollar Bob <dollar@gps.caltech.edu>, Dollar Bob <dollar@usgs.gov>, Given Doug <doug@usgs.gov>, Hutton Kate <kate@gps.caltech.edu>, Hauksson Egill <hauksson@gps.caltech.edu>

Hi Bob,
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Sue

-----Bob Dollar <dollar@gps.caltech.edu> wrote: -----

To: Erik Pounders <epounders@usgs.gov>
From: Bob Dollar <dollar@gps.caltech.edu>
Date: 03/04/2009 09:30AM
cc: Dollar Bob <dollar@gps.caltech.edu>, Dollar Bob <dollar@usgs.gov>, Susan Hough E <hough@usgs.gov>, Given Doug <doug@usgs.gov>, Hutton Kate <kate@gps.caltech.edu>, Hauksson Egill <hauksson@gps.caltech.edu>
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Kate

11

From: Kate Hutton <katehutton@gmail.com>
Subject: **Re: media contact : sonics in Orange County last night**
Date: March 4, 2009 10:08:05 AM PST
To: Susan E Hough <hough@usgs.gov>
Cc: Bob Dollar <dollar@gps.caltech.edu>, Erik Pounders <epounders@usgs.gov>, Dollar Bob <dollar@usgs.gov>, Given Doug <doug@usgs.gov>, Hutton Kate <kate@gps.caltech.edu>, Hauksson Egill <hauksson@gps.caltech.edu>, Benjamin Wu <bwu@gps.caltech.edu>, Scheckel Nick <nick@gps.caltech.edu>, Anthony Guarino <aguarino@gps.caltech.edu>

EXEMPTION # 2

Yes, I agree, [REDACTED] I could have done it first thing this am, though, if I'd thought of it. Meanwhile, I'll send add the other Duty Seismos to this e-mail reply, so they can be reminded to include you in any e-mails.

Kate

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Kate

From: Kate Hutton <katehutton@gmail.com>
Subject: **Re: media contact : sonics in Orange County last night**
Date: March 4, 2009 10:10:32 AM PST
To: Susan E Hough <hough@usgs.gov>
Cc: Bob Dollar <dollar@gps.caltech.edu>, Erik Pounders <epounders@usgs.gov>, Dollar Bob <dollar@usgs.gov>, Given Doug <doug@usgs.gov>, Hutton Kate <kate@gps.caltech.edu>, Hauksson Egill <hauksson@gps.caltech.edu>, Benjamin Wu <bwu@gps.caltech.edu>, Scheckel Nick <nick@gps.caltech.edu>, Anthony Guarino <aguarino@gps.caltech.edu>

Never mind, I was thinking of scsn.org.

You are totally right. We should have updated cisin.org. Are the instructions for that on the Wiki? A link should be included in our checklist ...

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On Wed, Mar 4, 2009 at 10:08 AM, Kate Hutton <katehutton@gmail.com> wrote:

Yes, I agree, [REDACTED] EXEMPTION #2. I could have done it first thing this am, though, if I'd thought of it. Meanwhile, I'll send add the other Duty Seismos to this e-mail reply, so they can be reminded to include you in any e-mails.

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Kate

From: Kate Hutton <katehutton@gmail.com>
Subject: **Re: sonics in Orange County last night**
Date: March 4, 2009 10:16:03 AM PST
To: Bob Dollar <dollar@gps.caltech.edu>

Bob, with the earlier waveforms, I see it coming ashore at around Dana point, from the S or SSW. Kate

On Wed, Mar 4, 2009 at 9:40 AM, Kate Hutton <katehutton@gmail.com> wrote:

Here is a sampling from Jiggle. I would say it's coming from the S. I'd have to do another earlier newtrig to track it back to SD County. Maybe I'll try that.

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Subject: **Re: sonics in Orange County last night**

Date: March 4, 2009 10:36:01 AM PST

To: Kate Hutton <katehutton@gmail.com>

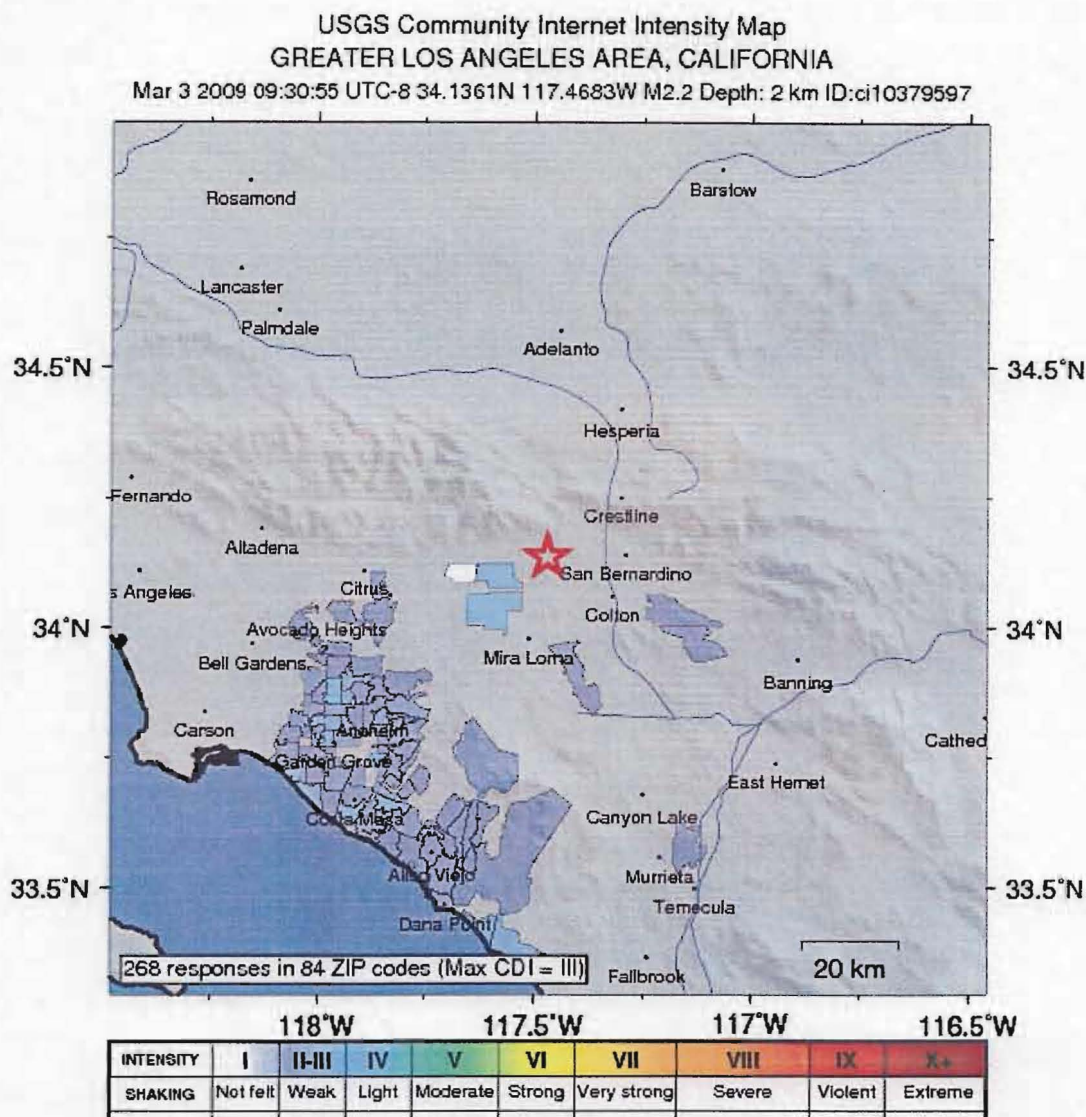
Cc: Dollar Bob <dollar@gps.caltech.edu>

1 Attachment, 106 KB [Save](#) [Slideshow](#)

Kate,

I agree. Here is the CIIM. Told Gary last night that it looked as if it started near Dana Point and went over Anaheim and Citrus.

bob



DAMAGE	none	none	none	Very light	Light	Moderate	Moderate/Heavy	Heavy	V. Heavy
--------	------	------	------	------------	-------	----------	----------------	-------	----------

Processed: Wed Mar 4 00:32:27 2009

From: Egill Hauksson <ehauksson@gmail.com>
Subject: **Re: media contact : sonics in Orange County last night**
Date: March 4, 2009 10:39:42 AM PST
To: Kate Hutton <katehutton@gmail.com>
Cc: Susan E Hough <hough@usgs.gov>, Bob Dollar <dollar@gps.caltech.edu>, Erik Pounders <epounders@usgs.gov>, Dollar Bob <dollar@usgs.gov>, Given Doug <doug@usgs.gov>, Hutton Kate <kate@gps.caltech.edu>, Benjamin Wu <bwu@gps.caltech.edu>, Scheckel Nick <nick@gps.caltech.edu>, Anthony Guarino <aguarino@gps.caltech.edu>
Reply-To: hauksson@gps.caltech.edu

Kate,

Only Peggy Hellweg or Doug Neuhauser can update CISON. We have no access, and that is why we maintain SCSN.org.

Egill

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Kate

From: Bob Dollar <dollar@gps.caltech.edu>
Subject: **sonic update to OC Register**
Date: March 4, 2009 11:47:20 AM PST
To: Robbins Gary <grobbins@ocregister.com>
Cc: Dollar Bob <dollar@gps.caltech.edu>

Gary,

This email is in response to your text message this morning from the jury room.

This morning Kate Hutton reviewed seismograms from the event last night.

These data are consistent with a sonic event coming onshore near Dana Point and traveling northward inland. The energy travelled across our seismic sensor network at the velocity of a compressional wave in air rather than the velocity of a similar wave through the ground, which is much faster. There was no S phase.

Additionally, the felt descriptions (doors & windows being rattled but no building shaking) is consistent with a compressional wave such as a sonic but with no shear wave which one would expect in an earthquake.

(I have BCC'd this reply to other seismologists here, to protect email addresses.)

bob

From: Bob Dollar <dollar@gps.caltech.edu>
Subject: **more media contacts**
Date: March 4, 2009 3:27:40 PM PST
To: Erik Pounders <epounders@usgs.gov>
Cc: Dollar Bob <dollar@gps.caltech.edu>, Dollar Bob <dollar@usgs.gov>

Elaine Hogue
Ch. 7
818.863.7600

called apprx 15:00

call from Golden 15:08 to 15:14

plz call
Mike Landa
CBS
714.979.1070
on tape interview about 15:17 to 15:20

From: Bruce W Presgrave <presgrave@usgs.gov>
Subject: Southern California event Mar 03 at 17:30 UTC
Date: March 4, 2009 3:37:49 PM PST
To: David J Wald <wald@usgs.gov>, Vince Quitariano <vinceq@usgs.gov>
Cc: Dollar Bob <dollar@usgs.gov>, David H Oppenheimer <oppen@usgs.gov>, John Bellini <bellini@usgs.gov>, Donald L Blakeman <blakeman@usgs.gov>

Hi Dave and Vince,

Bob Dollar called us this afternoon to tell us that most if not all of the DYFI reports associated with event ci10379597 (March 03 at 17:30 UTC--09:30 PST) are in fact a sonic boom which the military has confirmed is from military exercises off the coast, and about 12 hours later than the quake. Caltech located the boom at 05:19 UTC on March 04. In fact, a large percentage of the felt reports for this event were posted about 12 hours after this quake. Like a similar "event" in Monterey Bay at 16:40 UTC on March 4, this DYFI map shows a clear pattern of something coming from off the coast.

Bob, can you send Vince Quitariano the coordinates of the sonic boom you located so we can re-associate the felt reports.

David O., this may be the "smoking gun" for the event I wrote you about up north earlier today.

Best regards,
Bruce

From: John R Evans <jrevans@usgs.gov>

Subject: Re: sonic boom

Date: March 4, 2009 4:29:02 PM PST

To: Rich Davies <davies@westerndisastercenter.org>, David Oppenheimer <oppen@usgs.gov>, Bob Dollar <dollar@usgs.gov>

Hi Rich,

I know nothing. Are you drawing a parallel between the Orange Co event and what you sensed in Scotts Valley? Please describe what you sensed.

Sonic booms do register on seismic nets and can be evaluated back to a ground track, but this is not done routinely, so far as I know. Indeed, one of our Pasadena scientists some years back got chastised by military folks for publishing such a result. As if Aviation Leak didn't get there ahead of us

Hi David and Bob,

Can either of you add anything?

Cheers,
John

John R Evans
jrevans@usgs.gov

Usually in Menlo Park:
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345 Middlefield Rd, MS-977
Menlo Park CA 94025-3591
650-329-4753

Intermittently in Albuquerque:
Albuquerque Seismological Laboratory
U.S. Geological Survey
P.O. Box 82010
Albuquerque NM 87198-2010
505-846-1793

On 04 Mar 2009, at 4:19 PM, Rich Davies wrote:

Have you folks plotted the "trajectory / ground motion" of the sonic boom ?

I see it was also occurring in So Cal last evening.
<http://cbs2.com/local/Quake.Shake.Rattle.2.950567.html>

I heard/felt the "event" this AM at ~9:15 in Scott Valley

Richard Davies

Western Disaster Center
NASA Research Park
PO Box 230
Moffett Field, CA 94035-0230
www.westerndisastercenter.org
davies@westerndisastercenter.org
Tel: 650-776-5839

From: Bob Dollar <dollar@gps.caltech.edu>
Subject: **Re: Southern California event Mar 03 at 17:30 UTC**
Date: March 4, 2009 6:02:34 PM PST
To: Bruce W Presgrave <presgrave@usgs.gov>
Cc: David J Wald <wald@usgs.gov>, Vince Quitoriano <vinceq@usgs.gov>, David H Oppenheimer <oppen@usgs.gov>, John Bellini <bellini@usgs.gov>, Donald L Blakeman <blakeman@usgs.gov>, Dollar Bob <dollar@usgs.gov>, Hutton Kate <kate@gps.caltech.edu>, Given Doug <doug@usgs.gov>, Dollar Bob <dollar@gps.caltech.edu>

Vince, et. al.,

We don't attempt to locate sonics.

I'd suggest using
33.55 -117.80
as a starting estimate for the point where the coast
line was crossed (feet dry).

Tomorrow we can work up something a bit more
accurate. But it is closer to a line source so I think the best
we should expect is to identify the first station with signal.

> sonic boom which the military has confirmed
> is from military exercises off the coast

Bruce, you indicated that the military has claimed ownership.
Did you talk to somebody? What is the source? To my
knowledge, nobody here has received confirmation from
the Navy. I am paraphrased as saying that it was probably
a high speed jet. (Not my words).

So do we have a verifiable statement from the Navy?

We will take a closer at the first station tomorrow.

· bob

From: Vince Quitoriano <vinceq@usgs.gov>
Subject: **Re: Southern California event Mar 03 at 17:30 UTC**
Date: March 4, 2009 6:12:15 PM PST
To: Bob Dollar <dollar@gps.caltech.edu>
Cc: Bruce W Presgrave <presgrave@usgs.gov>, David J Wald <wald@usgs.gov>, David H Oppenheimer <oppen@usgs.gov>, John Bellini <bellini@usgs.gov>, Donald L Blakeman <blakeman@usgs.gov>, Dollar Bob <dollar@usgs.gov>, Hutton Kate <kate@gps.caltech.edu>, Given Doug <doug@usgs.gov>

All,

I created two events (us2009_002 and us2009_003) to capture the (probable) sonic booms near LA and the Central California. Most but not all of the entries were transferred automatically; I will need to check the entries manually tomorrow.

- Vince

Bob Dollar wrote:

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From: Bruce W Presgrave <presgrave@usgs.gov>
Subject: Re: Southern California event Mar 03 at 17:30 UTC
Date: March 4, 2009 7:09:16 PM PST
To: Bob Dollar <dollar@gps.caltech.edu>
Cc: John Bellini <bellini@usgs.gov>, Donald L Blakeman <blakeman@usgs.gov>, Dollar Bob <dollar@gps.caltech.edu>, Dollar Bob <dollar@usgs.gov>, Given Doug <doug@usgs.gov>, Hutton Kate <kate@gps.caltech.edu>, David H Oppenheimer <oppen@usgs.gov>, Vince Quitarano <vinceq@usgs.gov>, David J Wald <wald@usgs.gov>

Hi Bob,

Hmmm... I was told that *you* had received confirmation that it was from military exercises, and that *you* had obtained a location for the sonic source. Bummer. This would not be the first time that someone here has misinterpreted what they heard on the telephone. Sorry 'bout that.

In any case, all three California events (one in LA area, the other 2 in the Monterey Bay area) certainly look like reports from offshore sonic booms (or offshore earthquakes).

So, I think we're OK with the interpretation, but apparently it is not as "confirmed" as we had thought it was.

Vince, I think if you add another "sonic boom?" event at 17:15 UTC on March 4, based on David Oppenheimer's email, I think it will associate well with nearly all the felts for the Bay area event of 16:40 UTC (nc40232649).

Thanks,
Bruce

From:
Bob Dollar <dollar@gps.caltech.edu>
To:
Bruce W Presgrave <presgrave@usgs.gov>
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David J Wald <wald@usgs.gov>, Vince Quitarano <vinceq@usgs.gov>, David H Oppenheimer <oppen@usgs.gov>, John Bellini <bellini@usgs.gov>, Donald L Blakeman <blakeman@usgs.gov>, Dollar Bob <dollar@usgs.gov>, Hutton Kate <kate@gps.caltech.edu>, Given Doug <doug@usgs.gov>, Dollar Bob <dollar@gps.caltech.edu>
Date:
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bob

From: Bob Dollar <dollar@gps.caltech.edu>
Subject: stations for sonic 20090304 0519z
Date: March 5, 2009 9:38:24 AM PST
To: Hutton Kate <kate@gps.caltech.edu>
Cc: Dollar Bob <dollar@gps.caltech.edu>

Kate,

Here is the list of possible stations for sonic 20090304 0519z.

SDD
KML
STG
LLS
FMP
STS
LBW1,2
BRE
SRN
OLI
PSR

First station would be great. And anything you think appropriate.

bob

From: Kate Hutton <katehutton@gmail.com>
Subject: **here are your picks**
Date: March 5, 2009 9:38:49 AM PST
To: Bob Dollar <dollar@gps.caltech.edu>
 1 Attachment, 1.9 KB [Save](#) ▼



OC_sonic_picks.txt (1.9 KB)

evld	date	time	lat	lon	z	mag	mt	et	who	cm	vm	ver	10379705 Mar 04, 2009 05:19:21.91	33.0000 -118.0000
0.0	0.00	Mn sn njs	CI 02	1										
KML	CI	ZEHZ	eP	2200903040518	2447	0	0			0	674	9		
SDD	CI	ZHHZ	eP	2200903040518	2838-999106					0	690 60	27	774	
LLS	CI	ZHHZ	eP	2200903040518	4899-999106					0	763 60	3	151	
STG	CI	ZHHZ	iPU	1200903040518	5199-999159					0	769 60	16	430	
SAN	CI	ZEHZ	eP	2200903040518	5808-999106					0	790 60	7	132	
BRE	CI	ZHHZ	eP	2200903040519	2686-999106					0	898 60	1	254	
SRN	CI	ZHHZ	eP	2200903040519	4266 487106					0	942 60	11	182	
PLS	CI	ZHHZ	eP	2200903040519	4636 834106					0	956 60	22	241	
FUL	CI	ZEHZ	eP	2200903040519	51601333106					0	972 60	4	130	
OLI	CI	ZHHZ	eP	2200903040520	12943338106					0	1054 60	3	151	
RHC	CI	ZEHZ	eP	2200903040520	2768 0 0					0	1113	359		
WLT	CI	ZHHZ	eP	2200903040520	33585291103					0	1123 60	2	181	
CHN	CI	ZHHZ	eP	2200903040520	42356127 97					0	1149 60	14	163	
RUS	CI	ZHHZ	eP	3200903040520	42876146 48					0	1171 60	356	174	
MLS	CI	ZHHZ	eP	3200903040520	52337062 43					0	1189 60	19	29	

From: Bob Dollar <dollar@gps.caltech.edu>
Subject: **Re: here are your picks**
Date: March 5, 2009 10:21:16 AM PST
To: Kate Hutton <katehutton@gmail.com>
Cc: Dollar Bob <dollar@gps.caltech.edu>

Kate,

Thanks.

Does KML have the first energy or just the first pickable energy?

I think I have parsed most of the time correctly, except for the seconds.
In ISO date-time format:

KML.CI.ZEHZ eP 2 2009-03-04T05:18: 2447 0 0
SDD.CI.ZHHZ eP 2 2009-03-04T05:18: 2838-999106
LLS.CI.ZHHZ eP 2 2009-03-04T05:18: 4899-999106

I am guessing, for example, that 2447 is 24.47 seconds at KML. Does that look right?

Any idea what the "0 0" or equivalently "-999106" represents?

Unless you know, I am going to ask Allan to explain it to me.

Thanks again, I hope this works.

-bob.

From: Kate Hutton <katehutton@gmail.com>
Subject: **Re: here are your picks**
Date: March 5, 2009 10:33:46 AM PST
To: Bob Dollar <dollar@gps.caltech.edu>
1 Attachment, 5.0 MB [Save](#)

Here is a different view, that should make the times clear.

DPP & SOL may have had something, but they have other noise disturbances as well, so I don't trust it. If you want to see it in Jiggle, come on over.

Kate

On Thu, Mar 5, 2009 at 10:21 AM, Bob Dollar <dollar@gps.caltech.edu> wrote:
Kate,

Thanks.

Does KML have the first energy or just the first pickable energy?

I think I have parsed most of the time correctly, except for the seconds.
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LLS.CI.ZHHZ eP 2 2009-03-04T05:18: 4899-999106

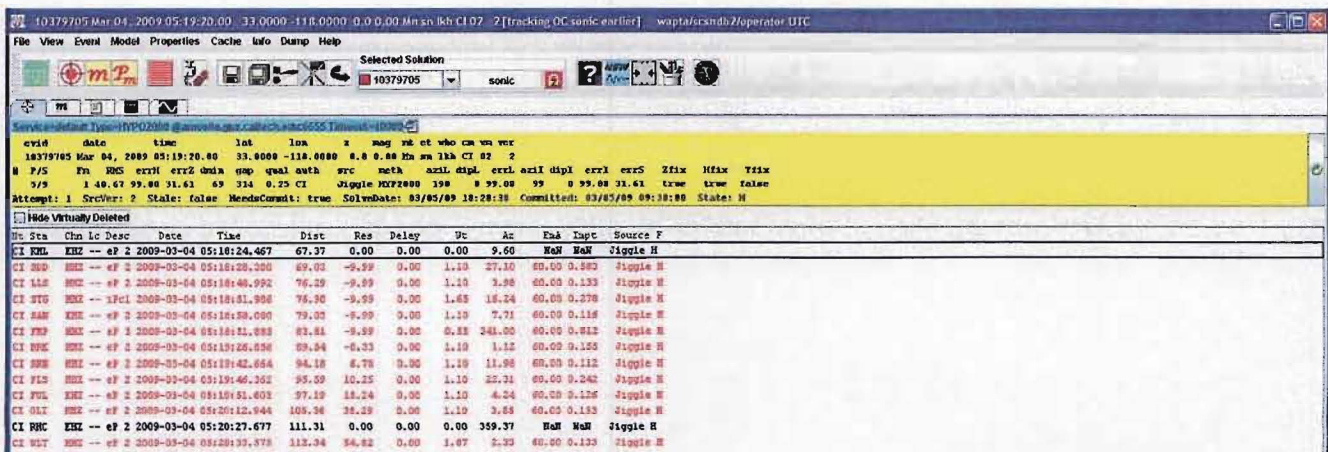
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Thanks again, I hope this works.

bob



Stn	Chn	Desc	Date	Time	Dist	Res	Delay	Uc	As	Esa	Tagc	Source	F
KML	ZEHZ	-- eP 2	2009-03-04	05:18:24.467	67.37	0.00	0.00	0.00	9.60			Jiggle H	
CI	SDP	RHZ	-- eP 2	2009-03-04 05:18:28.200	89.03	-9.59	0.00	1.10	27.10	80.00	0.083	Jiggle H	
CI	LLE	RHZ	-- eP 2	2009-03-04 05:18:40.992	76.29	-9.59	0.00	1.10	3.98	80.00	0.133	Jiggle H	
CI	STG	RHZ	-- 1Pc1	2009-03-04 05:18:51.998	76.90	-9.59	0.00	1.65	18.24	80.00	0.278	Jiggle H	
CI	MAN	RHZ	-- eP 2	2009-03-04 05:18:58.080	79.03	-9.59	0.00	1.10	7.71	80.00	0.118	Jiggle H	
CI	YEP	RHZ	-- eP 2	2009-03-04 05:18:51.883	81.81	-9.59	0.00	0.81	241.00	80.00	0.812	Jiggle H	
CI	RUC	RHZ	-- eP 2	2009-03-04 05:19:26.856	89.94	-9.33	0.00	1.10	1.12	80.00	0.155	Jiggle H	
CI	SWB	RHZ	-- eP 2	2009-03-04 05:19:42.664	94.18	-6.78	0.00	1.10	11.98	80.00	0.112	Jiggle H	
CI	VLB	RHZ	-- eP 2	2009-03-04 05:19:46.162	95.59	10.25	0.00	1.10	25.31	80.00	0.242	Jiggle H	
CI	PUL	RHZ	-- eP 2	2009-03-04 05:19:51.603	97.19	18.24	0.00	1.10	4.24	80.00	0.126	Jiggle H	
CI	OLT	RHZ	-- eP 2	2009-03-04 05:20:12.944	105.34	38.29	0.00	1.10	3.68	80.00	0.133	Jiggle H	
CI	RUC	RHZ	-- eP 2	2009-03-04 05:20:27.677	111.31	0.00	0.00	0.00	359.37	80.00	0.133	Jiggle H	
CI	OLT	RHZ	-- eP 2	2009-03-04 05:20:39.578	112.34	54.82	0.60	1.07	2.33	80.00	0.133	Jiggle H	

11 LHM RMZ -- EP 2 2009-03-04 05120142.952 118.95 62.18 0.00 0.00 14.04 50.00 0.000 Jiggie H
C1 J03 RMZ -- EP 3 2009-03-04 05120142.672 117.08 62.27 0.00 0.48 395.23 60.00 0.002 Jiggie H
C2 HLA RMZ -- EP 3 2009-03-04 05120142.328 118.87 72.53 0.00 0.43 20.00 60.00 0.024 Jiggie H

DataSource: ncsndb2@wapta ncsndb2@wapta: 1 Event: 1036 Channel: 16 Arrival: 0 Amp: 0 Code:

From: John R Evans <jrevans@usgs.gov>

Subject: **Re: sonic boom**

Date: March 5, 2009 10:49:45 AM PST

To: Rich Davies <davies@westerndisastercenter.org>, Bob Dollar <dollar@usgs.gov>, David Oppenheimer <oppen@usgs.gov>

Hi All,

Interesting discussion. I've also seen something in BSSA a few years back about locating boom tracks. Perhaps we should add this to the routine processing?

Given Aviation Leak summaries of "donuts on a rope" high-altitude trails left by something producing a very deep rumble rather than a boom (they speculate it is a ducted (thus pulsed) rocket driving hypersonic waverider (puts the shock beneath the leading edge to trade drag for lift) -- a possible successor to the SR-71 Blackbird/Habu) there is certainly a strong possibility of correlation with Groom Lake. This aircraft has been seen in several locations in the southwest in the last decade and may be associated with call sign "Dark Star" overheard in Texas and the (probably planted) project name Aurora.

Suspect the DOD would be quite annoyed with us but that Aviation Leak might even provide a bit of seed money if we wanted to pursue that addition to our processing.

Note that another source of sonics is large meteors, generally bolides (meteors that break up). I got a very good sample of that at the one and only shot I ever witnessed, in the hills above Calaveras Res many ages ago. Brilliant flash and persistent, scintillating trail several minutes before shot time and large boom a few seconds before shot time (transit crudely consistent with 70-100 km altitude) -- we thought the shot had gone prematurely. The 100 "Healy-corders" were probably running -- nice study if those data could be located. We might be able to estimate impact locations which is of interests to planetary scientists and the public.

Boom tracks on <<http://quake.usgs.gov/recenteqs/latest.htm>> -- way cool.

Cheers,
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On 05 Mar 2009, at 7:36 AM, Rich Davies wrote:

http://www.santacruzsentinel.com/localnews/ci_11840107

Yep ...I was thinking of the work a few years back by SoCal folks who said they had a correlation of sonic booms and activity at Groom Lake / Area 51

I heard/felt the 9:15AM "boom"yesterday ... was sitting at the computer and figured it was a mini quake pretty much under the house ... but nothing on-line ... also there really was no shaking just abrupt "boom"

Richard Davies
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Tel: 650-776-5839

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Date: March 5, 2009 11:19:03 AM PST
To: Kate Hutton <katehutton@gmail.com>
Cc: Dollar Bob <dollar@gps.caltech.edu>

Kate,

Thanks. That really helps.

I am on my way over, but first I am forwarding to you
a Menlo email on the sonic.

bob

From: Bob Dollar <dollar@gps.caltech.edu>
Subject: Fwd from Menlo: sonic boom
Date: March 5, 2009 11:20:52 AM PST
To: Hutton Kate <kate@gps.caltech.edu>
Cc: Dollar Bob <dollar@gps.caltech.edu>

Begin forwarded message:

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Tel: 650-776-5839

From: Kate Hutton <katehutton@gmail.com>
Subject: **Re: Fwd from Menlo: sonic boom**
Date: March 5, 2009 11:22:44 AM PST
To: Bob Dollar <dollar@gps.caltech.edu>

Bob -

I don't think that is what this event looks like. The wave packet is relatively short, indicating to me a "boom" rather than a rumble (contrary to the felt reports).

Kate

On Thu, Mar 5, 2009 at 11:20 AM, Bob Dollar <dollar@gps.caltech.edu> wrote:

Begin forwarded message:

From: John R Evans <jrevans@usgs.gov>
Date: March 5, 2009 10:49:45 AM PST
To: Rich Davies <davies@westerndisastercenter.org>, Bob Dollar <dollar@usgs.gov>, David Oppenheimer <oppen@usgs.gov>
Subject: Re: sonic boom

Hi All,

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Boom tracks on <<http://quake.usgs.gov/recenteqs/latest.htm>> -- way cool.

Cheers,
John

John R Evans
jrevans@usgs.gov

Usually in Menlo Park:
U.S. Geological Survey
345 Middlefield Rd, MS-977

45

Menlo Park CA 94025-3591
650-329-4753

Intermittently in Albuquerque:
Albuquerque Seismological Laboratory
U.S. Geological Survey
P.O. Box 82010
Albuquerque NM 87198-2010
505-846-1793

On 05 Mar 2009, at 7:36 AM, Rich Davies wrote:

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davies@westerndisastercenter.org
Tel: 650-776-5839
From: John R Evans [mailto:jrevans@usgs.gov]
Sent: Wednesday, March 04, 2009 4:29 PM
To: Rich Davies; David Oppenheimer; Bob Dollar
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From: Kate Hutton <katehutton@gmail.com>
Subject: **Re: Fwd from Menlo: sonic boom**
Date: March 5, 2009 11:23:33 AM PST
To: Bob Dollar <dollar@gps.caltech.edu>

The paper in BSSA was by someone from UW. If you give me a minute, I can probably dig up the reference.

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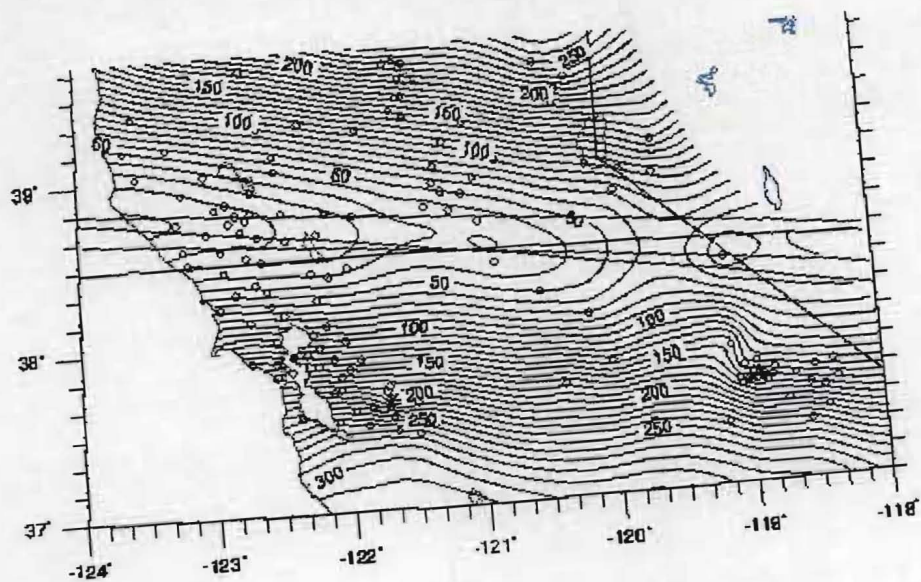
Moffett Field, CA 94035-0230

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From: Bob Dollar <dollar@gps.caltech.edu>
Subject: **Re: sonic boom**
Date: March 5, 2009 3:57:27 PM PST
To: <oppen@usgs.gov>
Cc: John R Evans <jrevans@usgs.gov>, Rich Davies <davies@westerndisastercenter.org>, Dollar Bob .
<dollar@gps.caltech.edu>, Dollar Bob <dollar@usgs.gov>

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bob

From: "Rich Davies" <davies@westerndisastercenter.org>
Subject: RE: sonic boom
Date: March 5, 2009 6:08:10 PM PST
To: "Bob Dollar" <dollar@gps.caltech.edu>, <oppen@usgs.gov>
Cc: "John R Evans" <jrevans@usgs.gov>, "Dollar Bob" <dollar@usgs.gov>
Reply-To: <davies@westerndisastercenter.org>

I'm VERY interested in the bolide issue ... I've been invited to brief at both the 2004 and 2007 Planetary Defense Conferences ... I will not be attending the 2009 conference in Spain next month ... tried in vain to organize a 100 yr event for Tunguska to raise public awareness (a lesson I learned from 1906/2006 EQ events that you folks did).

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Sent: Thursday, March 05, 2009 3:57 PM
To: oppen@usgs.gov
Cc: John R Evans; Rich Davies; Dollar Bob; Dollar Bob
Subject: Re: sonic boom

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From: Kate Hutton <katehutton@gmail.com>
Subject: **sonic paper**
Date: March 6, 2009 12:37:23 PM PST
To: Bob Dollar <dollar@gps.caltech.edu>

The reference for the paper in question is

Qamar, A. 1995, Space shuttle and meteoroid -- tracking supersonic objects in the atmosphere with seismographs, Seismol. Res. Lett., 66, 6-12.

Unfortunately, SRL is not electronic & I have not layed my hands on my own copy yet. I'll let you know if I find it.

Kate

From: Bob Dollar <dollar@gps.caltech.edu>
Subject: **Re: sonic paper**
Date: March 6, 2009 1:27:20 PM PST
To: Kate Hutton <katehutton@gmail.com>
Cc: Dollar Bob <dollar@gps.caltech.edu>

Thanks.

bob

From: Kate Hutton <katehutton@gmail.com>
Subject: **Fwd: [California's Earthquake Forum] Sciencedude Opens X-File On Mystery Shaking In O.C.**
Date: March 8, 2009 8:47:33 AM PST
To: Bob Dollar <dollar@gps.caltech.edu>

----- Forwarded message -----

From: **Kim Noyes** <kimnoyes@gmail.com>
Date: Mar 5, 2009 4:03 PM
Subject: [California's Earthquake Forum] Sciencedude Opens X-File On Mystery Shaking In O.C.
To: CaliforniaDisasters <californiadisasters@yahoogroups.com>, California's Earthquake Forum
<californiasearthquakeforum@yahoogroups.com>, Hoaxes and Myths <hoaxesandmyths@yahoogroups.com.au>

Sciencedude opens X-File on mystery shaking in O.C.

March 5th, 2009, 1:28 pm · posted by Gary Robbins, science writer-editor

Where are Mulder and Scully when you need them?

Orange County experienced an "X-Files" sort of moment at about 9:15 p.m. Tuesday, when thousands of doors and windows across the county rattled and vibrated, but the rest of people's homes remained still. Scores of readers, especially in South County, also reported hearing a loud noise that sounded like a sonic boom. A brief, second round of rattling happened moments later.

The incident startled and frightened many people, who said they thought an intruder was trying to break into their homes, or that an earthquake had happened and they didn't know the details.

My Sciencedude column received more than 500 comments from readers, some of who attributed the rattling to a passing asteroid, flights by secret military aircraft and bombing exercises at Camp Pendleton. We still don't know exactly what caused the event. But it was probably a sonic boom from a passing military jet, experts say.

Here are answers to questions raised by readers:

ASTEROID: 2009 DD45, a 65-foot-wide asteroid, passed unusually close to Earth this week. But "the asteroid made its closest approach at 5:45 a.m. Monday, when it was 41,000 miles away," says Don Yeoman, an asteroid expert at the Jet Propulsion Laboratory. "The asteroid didn't come close to our atmosphere, and you would have needed air to hear sound."

PENDLETON BOMBING: Camp Pendleton, immediately south of San Clemente, had publicly announced that it might set off high explosives Tuesday in an isolated spot in the eastern area of the base, behind foothills. It's not uncommon for military operations to produce sounds and vibrations heard in south Orange County. But the explosions aren't strong enough to cause vibrations as far away as Seal Beach (which happened) unless unusual atmospheric conditions exist. The National Weather Service says the weather was normal Tuesday night.

Second Lt. Riley Whaley, a spokesman for the base, offered a convoluted explanation for Tuesday's activities, saying: "While a particular event between the times you specific (9 p.m. to 9:45 p.m.) is not known to have taken place, it

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is possible that explosives were being used during that time."

SONIC BOOM: In Southern California, the Marines fly Hornet fighter jets and the Navy flies Hornets and Super Hornets. These aircraft can fly fast enough to produce a sonic boom heard over a wide area. Neither the Navy or nor the Marines have publicly announced whether their aircraft were flying in or near Orange County on Tuesday night. But a jet might be the culprit here, according to Bob Dollar, a U.S. Geological Survey seismologist who looked into matters when we asked if an earthquake produced the rattling and vibrations.

Dollar said, "This morning (Wednesday) Kate Hutton (of Caltech) reviewed seismograms from the event last night in Orange County. The energy travelled across our seismic sensor network at the velocity of a compressional wave in air rather than the velocity of a similar wave through the ground, which is much faster. There was no S phase (wave).

"Additionally, the felt descriptions (doors & windows being rattled but no building shaking) is consistent with a compressional wave such as a sonic (boom) but with no shear wave which one would expect in an earthquake."

Dollar said the vibrations were more consistent with the sonic boom produced by a jet.

SECRET MILITARY PLANES: In the past, the military and private contractors have flown experimental and highly advanced aircraft over Southern California that have produced sonic booms. The aircraft include Lockheed Skunk Works SR-71 Blackbirds. But that plane went out of service in the late 1990s. Boeing Phantom Works also has worked on advanced aircraft in Southern California. But the projects are largely secret, so details about such flights wouldn't be known.

SPACE SHUTTLE: On Nov. 29, shuttle Endeavour landed at Edwards Air Force Base. It produced a sonic boom that was widely heard across Southern California. The boom rattled some windows. But no shuttles were in flight Tuesday. Discovery is scheduled to lift off next week.

WIND GUSTS: Several readers said they thought the rattling of winds and doors was caused by a gust of wind. The weather service says there were no strong countywide wind gusts Tuesday night.

SPACE ALIENS: Several readers also suggested, tongue in cheek, that the rattling was caused by invading space aliens. "They are here to take over the earth," wrote a reader with the screen name twasanlien. With the Dow Jones below 7,000 points, it's unlikely that aliens are interested in us at this particular moment.

Source: <http://sciencedude.freedomblogging.com/2009/03/05/sciencedude-opens-x-file-on-mystery-shaking-in-oc/21039/>

--

Check out <http://groups.yahoo.com/group/californiadisasters/>

Check out my blog at <http://eclecticarcania.blogspot.com/>

Check out my Myspace Profile at <http://www.myspace.com/kimusinterruptus>

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From: John R Evans <jrevans@usgs.gov>
Subject: **Re: sonic boom**
Date: March 9, 2009 10:11:04 AM PST
To: <davies@westerndisastercenter.org>
Cc: "'Bob Dollar'" <dollar@gps.caltech.edu>, <oppen@usgs.gov>, "'Dollar Bob'" <dollar@usgs.gov>

Hi All,

Dang, this really is fun and Rich suggests useful. Certainly the Columbia's last shock might inform debris searches -- was it used for that?

So Rich, given we are all hosed here, do you suppose you could find money to fund an MS student (or Kate?) to work up such a system for the ANSS networks? Our needs are very tiny compared to aerospace budgets so maybe some petty cash ...

Cheers,
John

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~~bob~~

From: grobbins@ocregister.com
Subject: **Question from Gary Robbins, OC Register**
Date: March 12, 2009 1:16:39 PM PST
To: Bob Dollar <dollar@gps.caltech.edu>

Bob,

There have been 11 small quakes in/near Orange County in 12 days. What are we make of this? Here's the story....

<http://sciencedude.freedomblogging.com/2009/03/12/oc-area-records-11th-earthquake-in-12-days/21297/>

Thanks,
Gary

Gary Robbins, science writer
The Orange County Register
grobbins@ocregister.com
W: 714-796-7970
C: 714-642-5218

Read the latest science news at the Sciencedude blog:
ocregister.com/sciencedude

From: grobbins@ocregister.com
Subject: Orange County Register needs help on 2 separate issues, please
Date: March 17, 2009 11:09:17 AM PST
To: kate@gps.caltech.edu, dollar@gps.caltech.edu, hough@gps.caltech.edu, hudnut@usgs.gov
Cc: given@gps.caltech.edu

Hello Drs. Hutton, Hough, Dollar, Hudnut and Given.
This is Gary Robbins at the Orange County Register.

I could use your insights on two separate issues.

1. Over the past two weeks, there has been a growing series of small earthquakes in the Chino Hills, not far from where the Yorba Linda trend produced the 5.4 quake last July. The uptick in seismic activity has a lot of people nervous. Could you put this shaking into perspective for me? Is it likely just background noise? Does it mean something more? I'm trying to calm people's nerves, but explain what's going on. Below, you'll see a link to my latest story.

9th small quake occurs on north border of OC
<http://sciencedude.freedomblogging.com/2009/03/16/7th-small-quake-hits-northern-edge-of-oc/21877/>

2. Many of you are aware that, about 2 weeks ago, a very strange event occurred in Orange County. At 9:15 p.m. on a Tuesday night, windows and doors rattled and shook in every city in Orange County. Oddly, the rest of people's homes didn't shake at all. We've tried to figure out what might have happened by talking to USGS, Camp Pendleton and the US Navy (which flies F-18s that go supersonic). They said they weren't doing anything that would cause this phenomena.

Then, late yesterday, between 3:15 p.m. and 4:15 p.m. on March 16, we had a smaller recurrence of this event. Again, the shaking and rattling was felt countywide. There were no earthquakes during that period capable of causing such an event.

I have been deluged by emails from readers asking for an explanation. I don't have one. Could you provide some insight?

Previous stories:

March 16th
Mysterious shaking returns to O.C.
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March 5
Sciencedude opens X-File on mysterious shaking in O.C.
<http://sciencedude.freedomblogging.com/2009/03/05/sciencedude-opens-x-file-on-mystery-shaking-in-oc/21039/>

March 3
Boom likely caused by military jet
<http://sciencedude.freedomblogging.com/2009/03/03/small-quake-felt-across-orange-county/20853/>

Gary Robbins, science writer
The Orange County Register
grobbins@ocregister.com
W: 714-796-7970
C: 714-642-5218

From: "Susan Hough" <hough@gps.caltech.edu>
Subject: **Re: Orange County Register needs help on 2 separate issues, please**
Date: March 17, 2009 11:28:34 AM PST
To: grobbins@ocregister.com
Cc: kate@gps.caltech.edu, dollar@gps.caltech.edu, hough@gps.caltech.edu, hudnut@usgs.gov, given@gps.caltech.edu

Hi Gary,

I sent a response to question 1 last week -- no change in the answer since then! Re: things that went bump on the night two weeks ago, all evidence points to a sonic boom. When I went to grad school I lived in UCSD student housing, just a few miles from Miramar, which at the time was home to the "Top Gun" school. My husband and I learned quickly to tell the difference between quakes and sonic booms: the latter caused windows and doors (esp. our sliding glass doors!) to rattle, but did not shake the structure as a whole. I.e., hanging objects didn't swing, pictures on the walls didn't rattle, etc.

It isn't our place as USGS scientists to comment or speculate on what the military is doing! My understanding as a private citizen is that they are not always at liberty to divulge information.

Hope all is well down in OC land!

Sue

Hello Drs. Hutton, Hough, Dollar, Hudnut and Given.
This is Gary Robbins at the Orange County Register.

I could use your insights on two separate issues.

1. Over the past two weeks, there has been a growing series of small earthquakes in the Chino Hills, not far from where the Yorba Linda trend produced the 5.4 quake last July. The uptick in seismic activity has a lot of people nervous. Could you put this shaking into perspective for me? Is it likely just background noise? Does it mean something more? I'm trying to calm people's nerves, but explain what's going on. Below, you'll see a link to my latest story.

9th small quake occurs on north border of OC
<http://sciencedude.freedomblogging.com/2009/03/16/7th-small-quake-hits-northern-edge-of-oc/21877/>

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