



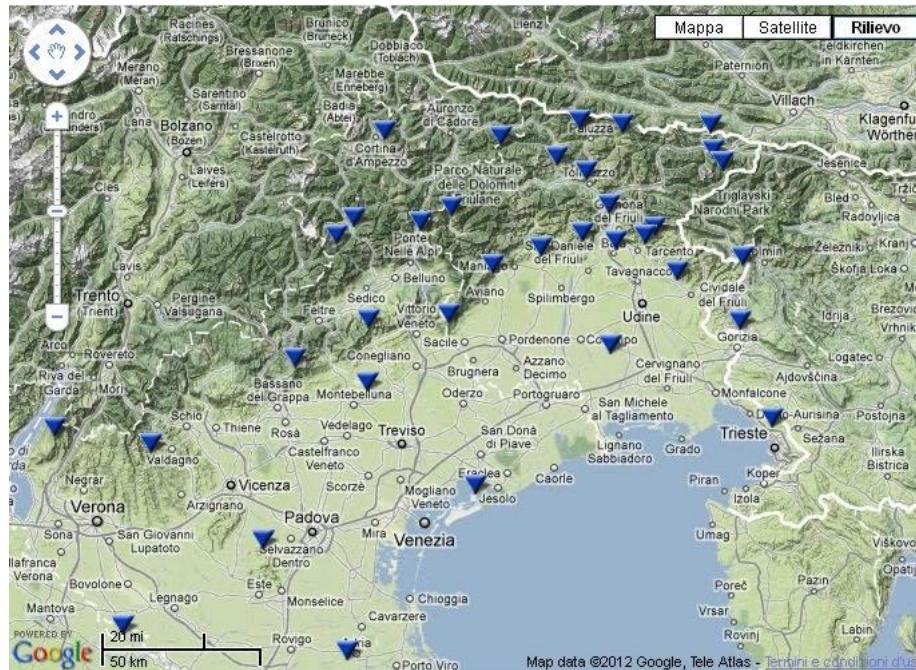
Antelope RT usage @ OGS

Damiano Pesaresi

dpesaresi@inogs.it

QAUG Trieste February 2012

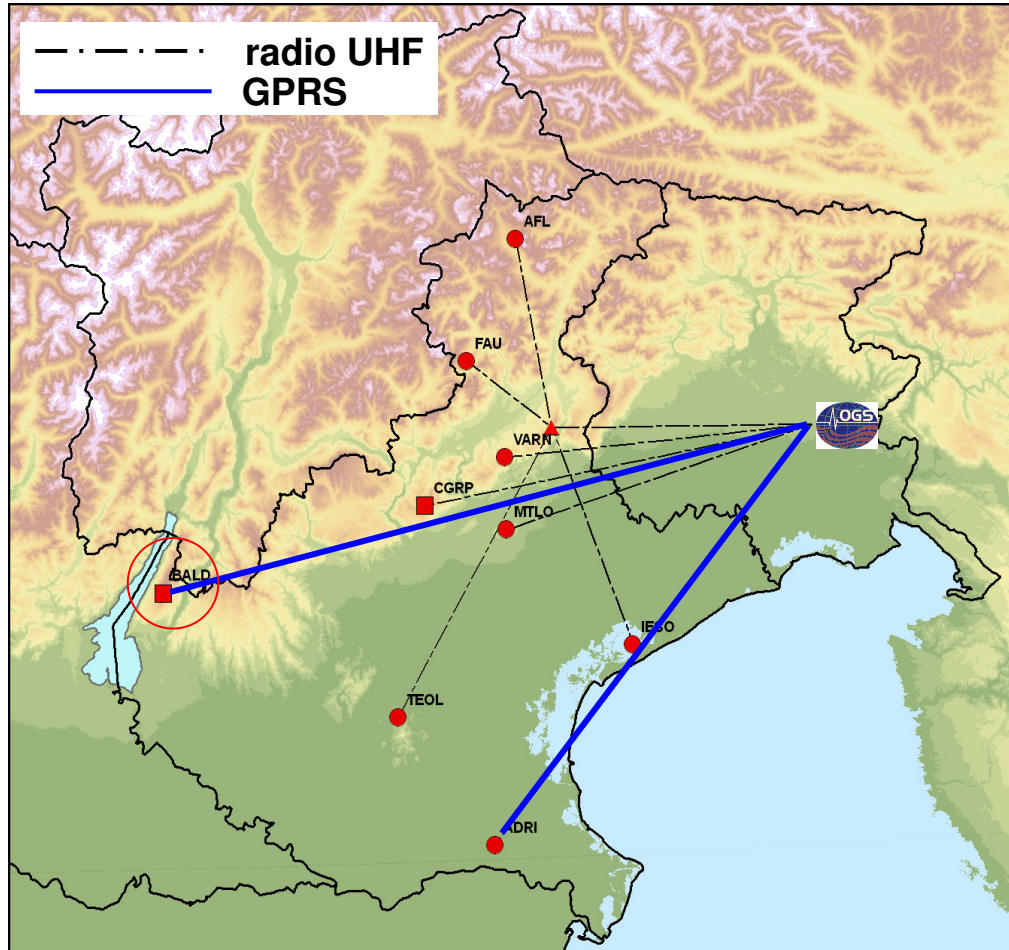
NE Italy Seismic Network - OGS



- 14 BB stations
 - Q330 + STS-2/Trillium 40/120s
 - real time, continuous

- 21 SP stations
 - Mars88 + Lennartz 1sec
 - real time, on trigger

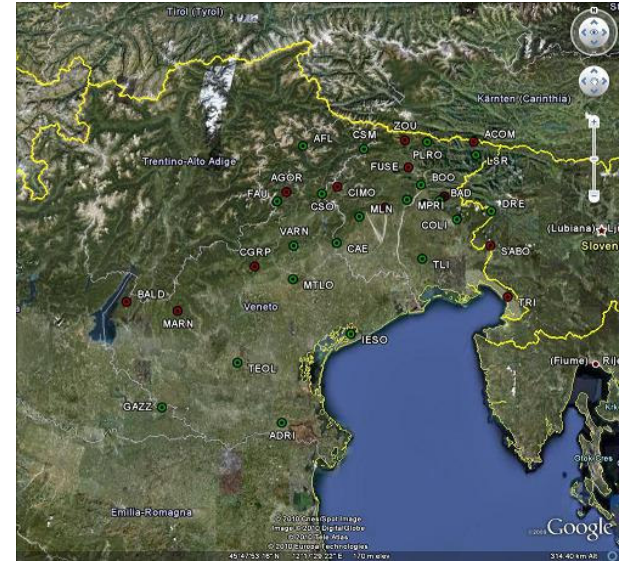
How is data transmitted?



- Digital UHF radio system
 - bandwidth 19.2kb/s
 - shared frequencies
- GPRS modem
- Satellite (2 sites: BALD, CLUD)

OGS-CRS: monitoring NE Italy seismicity

- 2 people on call duty H24 for 1 week
 - 1 seismologist + 1 technician
- Intervention in office for events with $M > 3.5$
- OGS staff intervention at Civil Protection headquarters for events with $M > 4.5$



CRS headquarters in Udine (Italy)

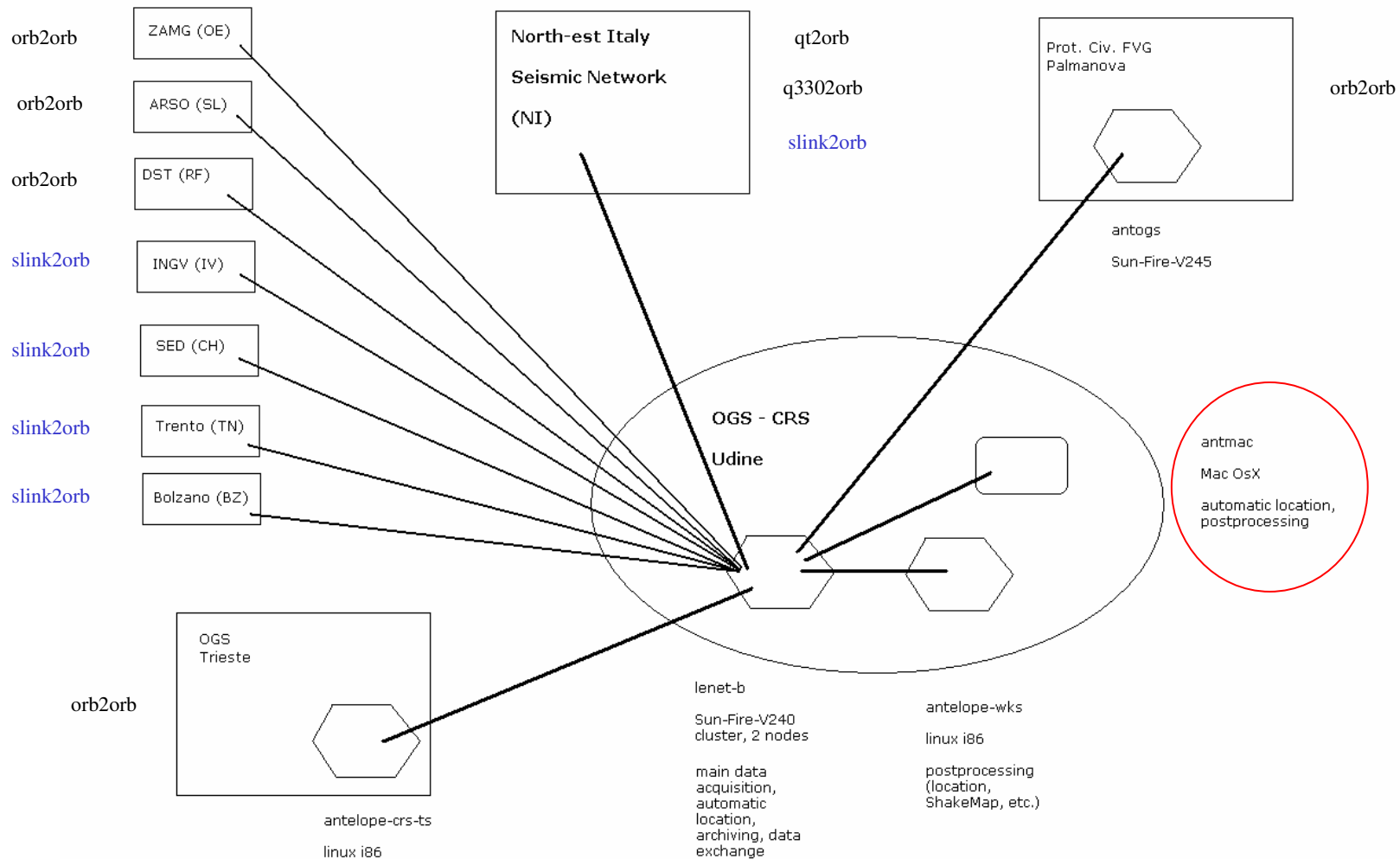
Intervention at CRS headquarters for:

- operations checking
- review / confirmation of the location with magnitude (picking of S waves)
- control over any replicas of earthquake
- maintain the link with the structures of the regional Civil Protections

OGS Virtual Seismic Network (~100 real-time stations)



OGS Antelope configuration



main rtxexec processes table

Processes &Tbl{

orbserver orbserver -p \$ORB orbserver

orbexport orbserver -p \$ORBEXPORT
orbexport

orbinIV orbserver -p \$ORBIV orbinIV

qt2orb qt2orb -dataorb \$ORB -cmdorb
\$ORB -calib_db \$DB -v

q3302orb q3302orb -calib_db \$DB -S

qt4 / 2000 - 000 1000 1000

main OGS Antelope load averages

load averages: 1.36, 1.44, 1.38;
15:32:25

up 79+03:26:20

108 processes: 104 sleeping, 2 running, 2 on cpu

CPU states: 76.1% idle, 18.5% user, 5.4% kernel, 0.0% iowait, 0.0% swap

Memory: 4096M phys mem, 81M free mem, 20G total swap, 18G free swap

PID	USERNAME	LWP	PRI	NICE	SIZE	RES	STATE	TIME	CPU	COMMAND
15952	rt	87	19	0	1043M	562M	cpu/1	30.5H	18.07%	orbserver
16174	rt	1	59	0	93M	22M	sleep	317:42	1.50%	orbdetect
8933	rt	55	59	0	41M	18M	run	136:44	0.83%	q3302orb
16170	rt	1	58	0	39M	18M	sleep	188:07	0.74%	cdorb2db
15998	rt	8	59	0	109M	69M	sleep	46:35	0.24%	orbserver
16168	rt	1	59	0	59M	13M	sleep	3:05	0.16%	orb2db
24172	rt	1	59	0	3056K	1976K	cpu/0	0:00	0.15%	top
16189	rt	1	59	0	6216K	2688K	sleep	25:07	0.13%	orb2orb
16098	rt	13	59	0	24M	4504K	sleep	18:11	0.11%	qt2orb
16150	rt	1	59	0	6232K	2640K	sleep	16:29	0.08%	orb2orb
16134	rt	1	59	0	21M	3136K	sleep	15:58	0.08%	slink2orb
16148	rt	1	59	0	6304K	2832K	sleep	14:21	0.07%	orb2orb
15940	rt	1	59	0	31M	11M	sleep	14:17	0.06%	perl
16152	rt	1	59	0	6216K	2632K	sleep	14:20	0.06%	orb2orb
16155	rt	1	59	0	6232K	2736K	sleep	13:48	0.06%	orb2orb

main OGS orb sources & clients

orbserver 2/22/2012 (053) 14:34:50.704

Version 'Release 5.1-64 SunOS 5.10 2011-04-28 '

Pid 15952 @ crs-v240-b:/database (158.110.30.133), port #7000

Started Wed 2012-046 Feb 15 9:40:49 by rt, running 7 days 4.9
hours

ring buffer last initialized Tue 2011-263 Sep 20 9:34:13

Maximum 1000.0 Mbytes packet data

Maximum 2500010 packets

Maximum 1000 sources

52 clients

421 sources

156994 opens 156942 closes 0 errors 0 rejections

Total Output rate = 2271.513 kbps

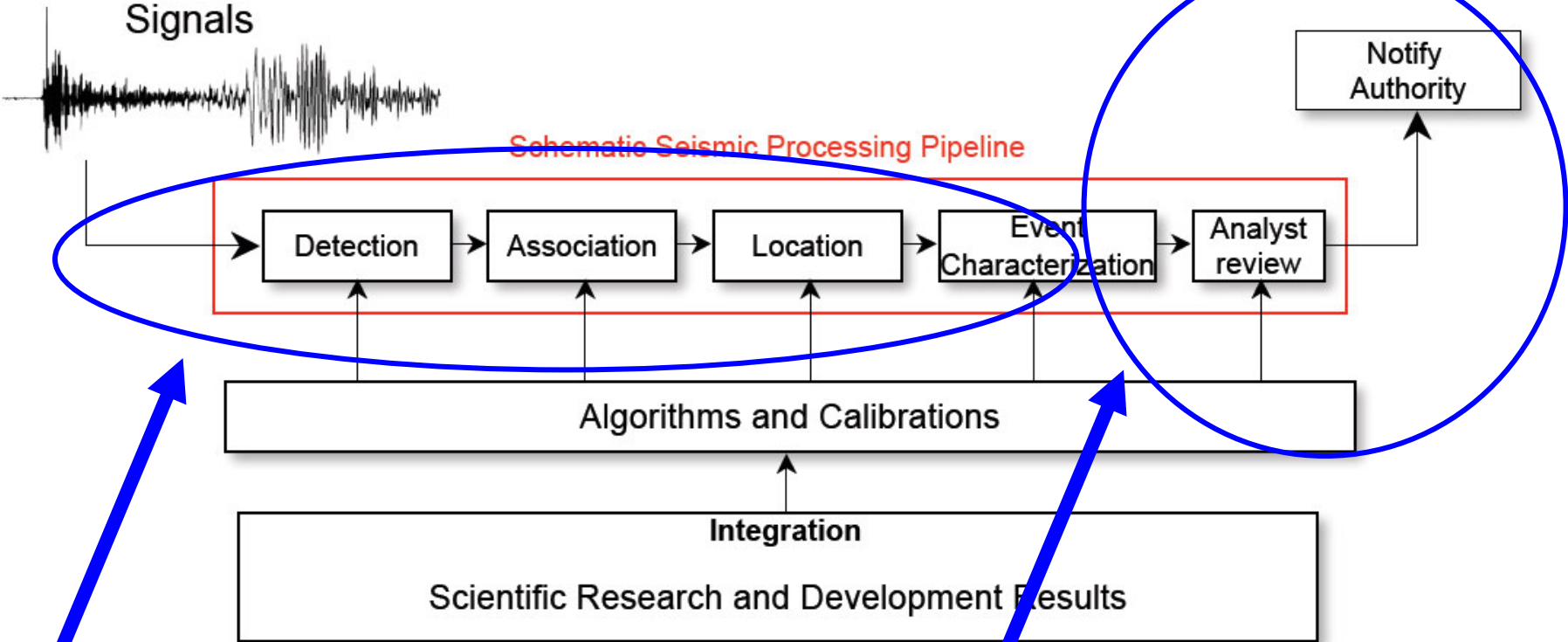
Total Input rate = 214.773 kbps

Total Output packet rate = 1124.570 pkts/s

Total Input packet rate = 184.106 pkts/s

Earthquake detection and notification

Real-time operational monitoring systems



BRTT Antelope

CRS procedures

OGS adds-on for Antelope

- PickServer (using Lomax viewer)
- Comprehensive Alarm routines with re-location control
 - Output: email, fax, SMS, web
- M882orb and ORION2orb plugins
- Data archive (OASIS)
- Drumplot

- *ShakeMap*
- *SeisComP (data exchange)*

OGS PickServer (v. 2)

CRS Pickserver: dipesaresi - Mozilla Firefox

pickserver.crs.inogs.it/pickserver.php

EVENT SELECT

Antelope antelope_15min

2010 01 All

Filter by Label: none

- 11 21:35:01 Md=2.6 CASINA (EMILIA)
- 12 12:48:39 Md=2.7 LUN (PAG) (CROAZIA)
- 12 13:35:42 Md= ?
- 12 22:00:32 Md= ? CIMA DI GRION (ALTO ADIGE)
- 12 22:12:51 Md=2.6 POSTOJNA (SLOVENIA)
- 13 00:27:45 Md=2.1 POSTOJNA (SLOVENIA)
- 13 02:17:59 Md=1.7 GOLFO DI TRIESTE
- 13 03:03:12 Md=2.1 POSTOJNA (SLOVENIA)
- 14 02:13:26 Md=2.2 POSTOJNA (SLOVENIA)
- 14 04:34:48 Md=2.5 FICAROLO (VENETO)
- 14 19:05:33 Md=2.1 MERANO (ALTO ADIGE)
- 15 14:20:54 Md=4.0 POSTOJNA (SLOVENIA)
- 15 14:31:11 Md=2.0 POSTOJNA (SLOVENIA)

ORIGIN MAP

PICKING SETS/ORIGINS

Save Delete Clone to my Current Add to my Current Link to Bulletin Link to Report Clone to PS1 .blt .dat .hpl

Picks	Origin time UTC	Site	M _D	M _L	Lat Lon	Depth (km)	Δ N-S	Δ E-W	Hor. Err	Gap	RMS	Qual.	Owner	Label	Last change (UTC)	Agent	Pin	Slet
33	2010-01-30 19:20:34.51	PIELUNGO (FRIULI)	1.85		46.3263 12.8583	9.5 ± 1	0	0	0.4	114	0.16	B B B	PickServer 1	-	2011-03-29 10-16-03	H71	A	<input checked="" type="radio"/>
33	2010-01-30 19:20:34.51	PIELUNGO (FRIULI)	1.85		46.3263 12.8583	9.5 ± 1	0	0	0.4	114	0.16	B B B	asnidarcig (current)	-	2011-03-29 10-16-03	H71	A	<input type="radio"/>

Send prelim. ALARM Send Final ALARM

PICK & LOCATE

SAC download SG2K read-only Hypo71

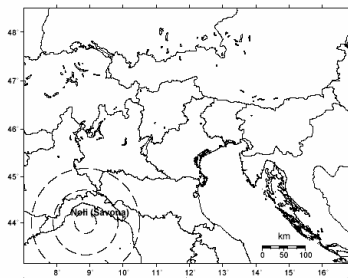
Net	Station	Ch	Z	N	E	P	i/e	±	P time	P Res	P Err.	H71 wgt	W2	Auth	S	i/e	S time	S Res	S err	H71 W	W2	Auth	S-P	Coda	Coda time	Auth	Md	WA	M _L	Dist Km
	FUSE	HH	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	ie	+	19:20:37.225	-0.29	0.0076	0	0	none	<input checked="" type="checkbox"/>	ie	19:20:38.610	-0.24	0.0951	2	2	none	2.38	<input checked="" type="checkbox"/>	19:21:07.760	none	1.8			15
	MPRI	SH	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	i	-	19:20:37.350	-0.03	0.0049	0	0	none	<input checked="" type="checkbox"/>	ie	19:20:39.858	-0.24	0.1158	2	2	none	2.51	<input checked="" type="checkbox"/>	19:21:05.428	none	1.8			14
	PALA	HH	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	i	-	19:20:37.031	0.06	0.0018	0	0	none	<input checked="" type="checkbox"/>	ie	19:20:38.864	-0.02	0.072	2	2	none	1.83	<input checked="" type="checkbox"/>	19:21:10.487	none	1.9			11

Alarms



SEGNALAZIONE DI TERREMOTO
 Evento n. 7681
 del 01/02/2009 ore 15:52:01

Fax n.7681_1
 Prima segnalazione



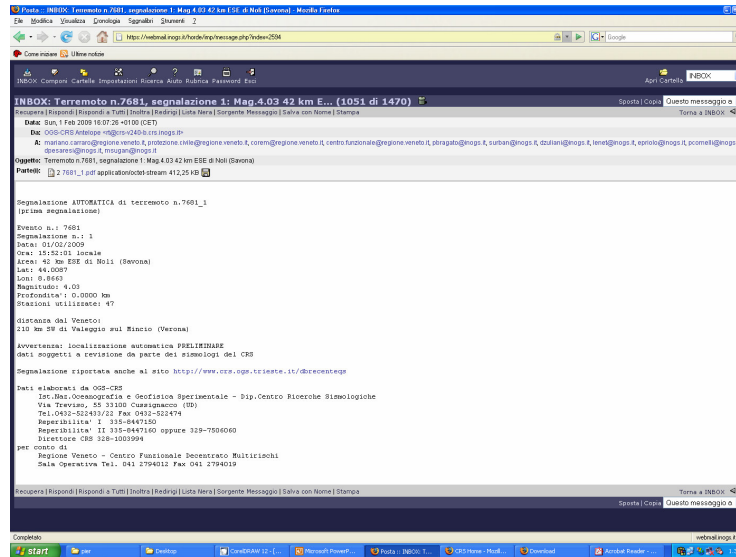
Data: 01/02/2009
 Ora: 15:52:01 locale
 Area: 42km ESE di Noli (Savona)

Epicentro: 44.009°lat (44°00'31")
 8.866°lon(08°51'58")
 Magnitudo: 4.0 (ML Richter)
 Profondità: 0.0 km

AVVERTENZA: localizzazione preliminare AUTOMATICA
 dati soggetti a revisione da parte dei sismologi del CRS

Struttura responsabile dell'elaborazione dell'Avviso: OGS-CRS
 Ist.Naz. Oceanografia e Geofisica Sperimentale - Dip. Centro Ricerche Sismologiche
 Tel. 0432-52243/22 Fax 0432 522474
 Repertibilita' I 3358447150 Repertibilita' II 3358447160 oppure 3297506060
 Direttore CRS 329 1003964
 Segnalazione pubblicata sul sito <http://www.crs.inogs.it>

fax



e-mail

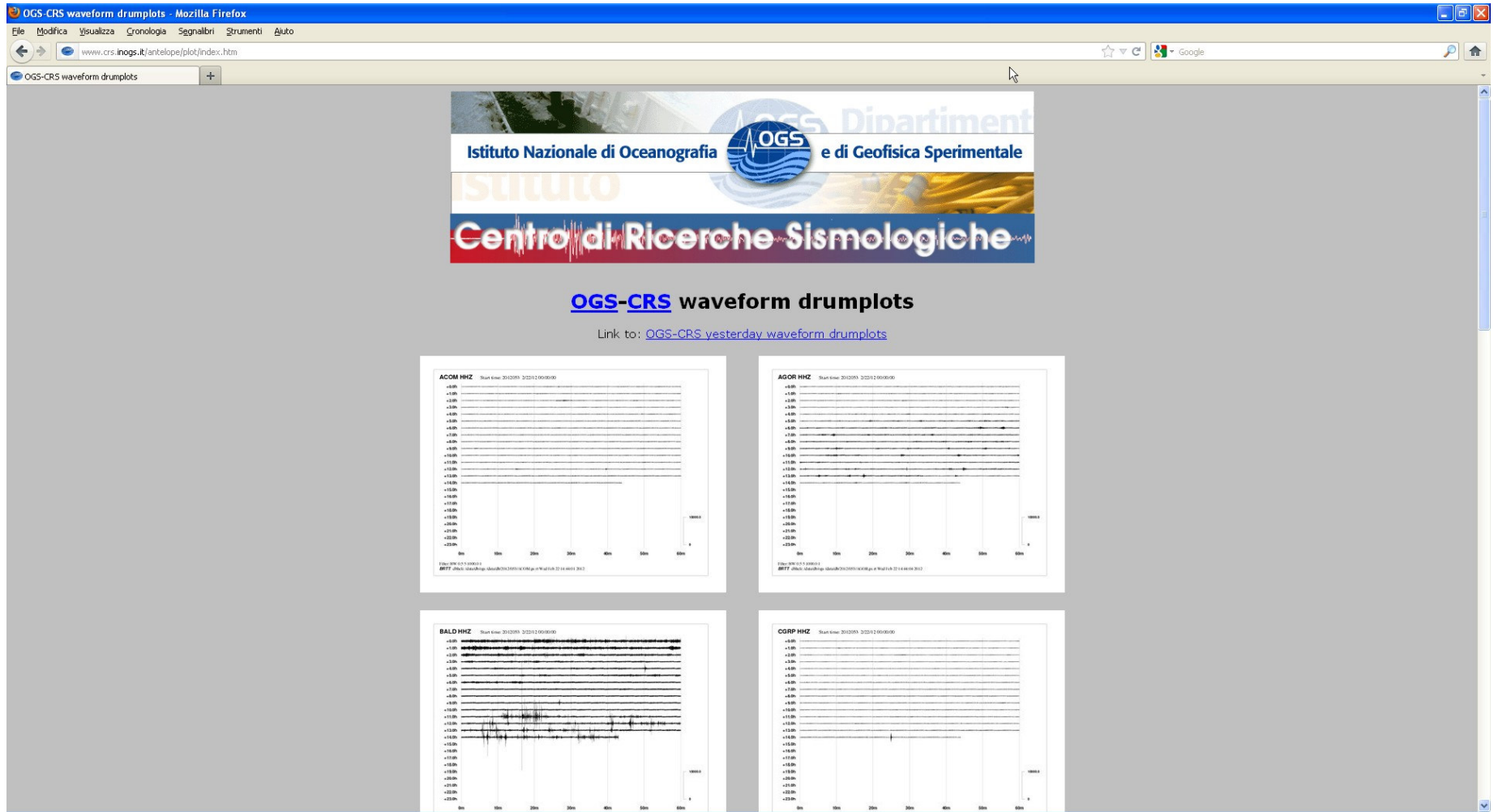
sms

**OGS-CRS Terremoto n.7681
 segnalazione n.1
 Mag4.03 H15:52:01
 del 01/02/2009
 42km ESE di Noli(Savona)
 lat44.0087 lon8.8663
 rep 3358447150**



web

OGS dbheli



OGS Real Time Seismology:

<http://rts.crs.inogs.it/>

The screenshot shows the OGS Real Time Seismology website. The browser window title is "RealTime Seismology - Windows Internet Explorer" and the address bar shows "http://rts.crs.inogs.it/". The website header includes "Centro Ricerche Sismologiche" and "RealTime Seismology" with the OGS logo. A "News" section on the left contains an "Event notification" for a seismic event on 2010-03-19 at 06:35:40, with location (lat. 44.7669, lon. 9.9557) and magnitude 2.4. A search form is also present. The main content area features a "last update at 2010-03-19 07:59:20" and a map of Northern Italy with colored pins indicating seismic events. A legend below the map defines pin colors by magnitude (M) and duration. To the right, an "event list" displays a series of seismic events with their dates, times, and magnitudes.

RealTime Seismology

News

Event notification
2010-03-19 06:35:40

Notification of a new event; location (lat. 44.7669, lon. 9.9557); mag. 2.4

→ news archive → read more

HOME STATION INFO SHAKEMAP MOMENT TENSORS CONTACTS

last update at 2010-03-19 07:59:20

event list

- 2010-03-19 06:35:40 MI: 2.4
- 2010-03-19 05:12:53 MI: 1.6
- 2010-03-18 22:13:43 MI: 1.5
- 2010-03-18 17:07:12 MI: 1.6
- 2010-03-18 10:51:34 MI: 1.4
- 2010-03-17 10:31:31 MI: 2.2
- 2010-03-17 01:04:41 MI: 1.9
- 2010-03-16 19:09:41 MI: 1.4
- 2010-03-16 18:33:38 MI: 1.8
- 2010-03-13 02:09:22 MI: 2.4
- 2010-03-12 06:35:29 MI: 1.3
- 2010-03-12 04:53:14 MI: 1.9
- 2010-03-11 19:31:00 MI: 3.3
- 2010-03-10 19:57:10 MI: 2.4
- 2010-03-10 08:41:41 MI: 1.6
- 2010-03-09 00:26:15 MI: 1.4
- 2010-03-07 19:13:43 MI: 1.6
- 2010-03-07 15:26:30 MI: 2.2
- 2010-03-07 04:27:48 MI: 3.4
- 2010-03-06 23:36:15 MI: 2.0

Legend:

- M < 3.5
- 3.5 < M < 4.5
- 4.5 < M < 5.5
- M > 5.5
- 0-12 hours
- 12-24 hours
- 1-3 days
- 3-7 days
- 7-14 days

Done (☺):

- Migration core Antelope (SUN cluster) from 4.10 to 5.1-64
- Split event determination and graphics on PowerMAC from main acquisition on SUN cluster
 - Reliability (2 machines)
- Migration from orbampmag to orbevproc
- Migration from orb2db to cdorb2db + db2msd

Work in progress (☹):

- orbdetect tuning
 - BB continuous
 - SP trigger
 - Local/teleaseismic bandwidth
 - S phases
- orbassoc tuning (grid, windows, station weighting and grouping, etc.)

The OGS Antelope Real-Time Team



Paolo Comelli
CRS Director
pcomelli@inogs.it



Pier Luigi Bragato
Seismic Monitoring Networks
And Data Management
Responsible
pbragato@inogs.it

The OGS Antelope Real-Time Team



Damiano Pesaresi
Architecture,
Archive
dpesaresi@inogs.it



Paolo Di Bartolomeo
PickServer,
Web display
pdibartolomeo@inogs.it

The OGS Antelope Real-Time Team



Denis Sandron
Magnitudo,
Catalogue
dsandron@inogs.it



Luca Moratto
ShakeMaps,
RT configuration
lmoratto@inogs.it

EGU2012 SM1.3/GI1.7

Improving seismic networks performances: from site selection to data integration

CO Meeting Organizer EGU2012 - Mozilla Firefox

File Modifica Visualizza Cronologia Segnalibri Strumenti Aiuto

meetingorganizer.copernicus.org/EGU2012/session/10081

CO Meeting Organizer EGU2012

 **European Geosciences Union**
General Assembly 2012
Vienna | Austria | 22 - 27 April 2012

EGU.edu

Menu

- Home
- Information
- Deadlines & Milestones
- Session Programme
- Abstract Management
- Guidelines
- EGU on Renewables
- Registration
- Accommodation
- Venue
- Letter of Invitation
- Exhibition
- Townhall & Splinter
- Support & Distinction
- Photocontest
- EGU Today
- Find the EGU on
- Press & Media
- Imprint

[Back to Programme Group]

SM1.3/GI1.7
Improving seismic networks performances: from site selection to data integration

Convener: D. Pesaresi &
Co-Convener: F. Vernon &
[Convener Login](#)

The number and quality of seismic stations and networks in Europe continually improves, nevertheless there is always scope to optimize their performance. In this session we welcome contributions from all aspects of seismic network: installation, operation and management. This includes site selection; equipment testing and installation; planning and implementing communication paths; policies for redundancy in data acquisition, processing and archiving; and integration of different datasets including GPS and OBS.

PSD - [PSD5_1](#) - SM1.3/GI1.7 - Improving seismic networks performances: from site selection to data integration (co-organized)

Seismology:

ESC2012 DAP-2

Improving seismic networks performances: from site selection to data integration



European Seismological Commission
33-rd General Assembly

August 19-24, 2012 - Moscow, Russia

Seismology without boundaries



DAP-2 Improving seismic networks performances: from site selection to data integration

Conveners:

Dr. Damiano Pesaresi, Seismic Data Acquisition Coordinator, Istituto Nazionale di Oceanografia e di Geofisica Sperimentale - OGS, Centro di Ricerche Sismologiche, email dpesaresi@inogs.it.

Ph.D. Frank L. Vernon, USArray Transportable Array Data Acquisition Manager, University of California San Diego (UCSD), e-mail flvernon@ucsd.edu

Symposium scope:

The number and quality of seismic stations and networks in Europe continually improves, nevertheless there is always scope to optimize their performance. In this session we welcome contributions from all aspects of seismic network installation, operation and management. This includes site selection; equipment testing and installation; planning and implementing communication paths; policies for redundancy in data acquisition, processing and archiving; and integration of different datasets including GPS and OBS. We also welcome contributions on virtual seismic networks on small or large scale, discussing ideas about neighbouring national networks sharing stations near the borders in order to enhance the performance of the networks.

Comments: no

Sign in and
submit an abstract

THANKS!

dpesaresi@inogs.it

+39-0432-522433

Damiano Pesaresi, Pier Luigi Bragato, Paolo Comelli, Dario Slejko, Angela Saraò, Paolo Di Bartolomeo, Giorgio Durì, Paolo Bernardi, Michele Bertoni, Elvio Del Negro, Denis Sandron, Luca Moratto
and all the **OGS-CRS** team!