Centro di Ricerche Sismologiche

CRS

Antelope usage @ OGS

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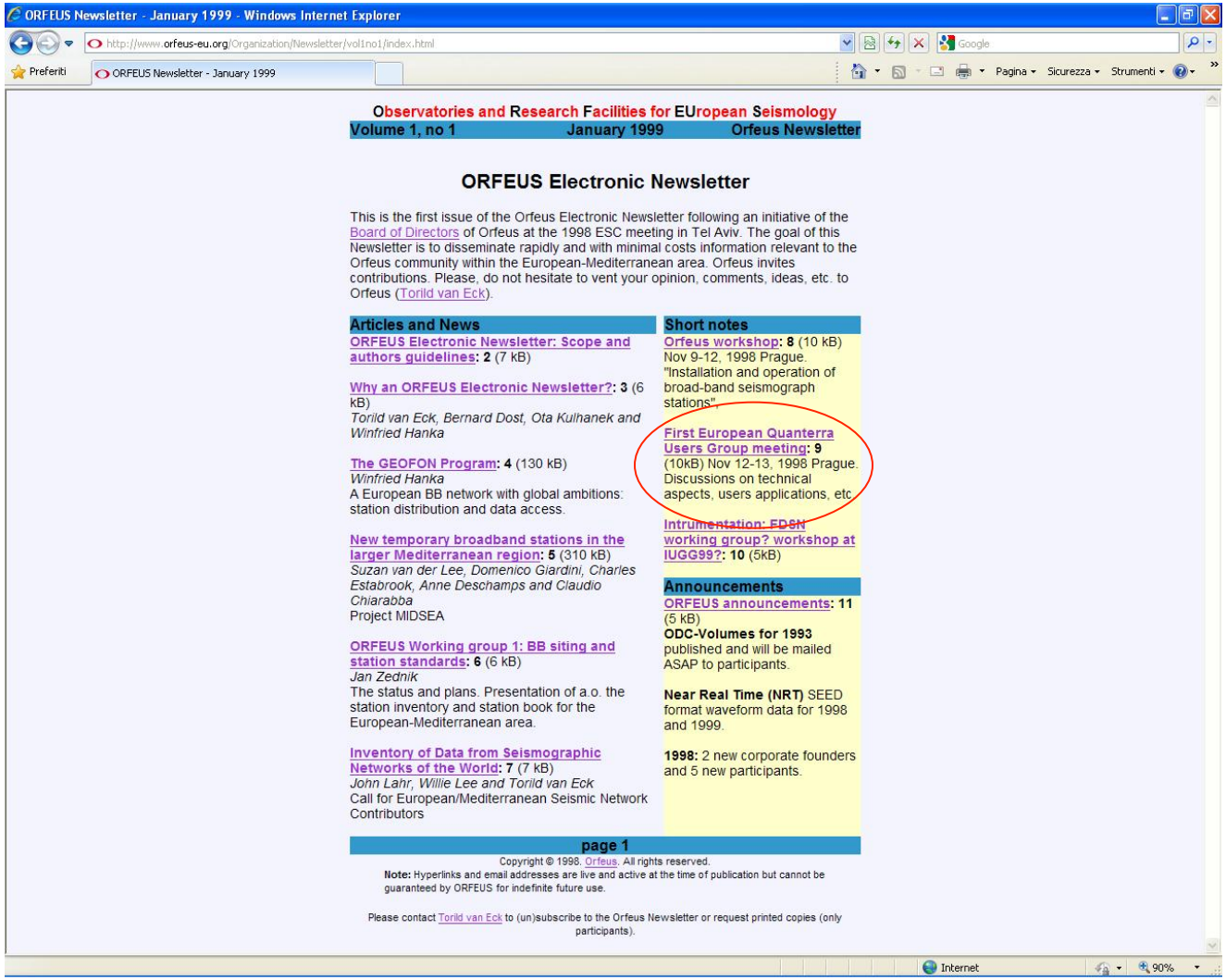
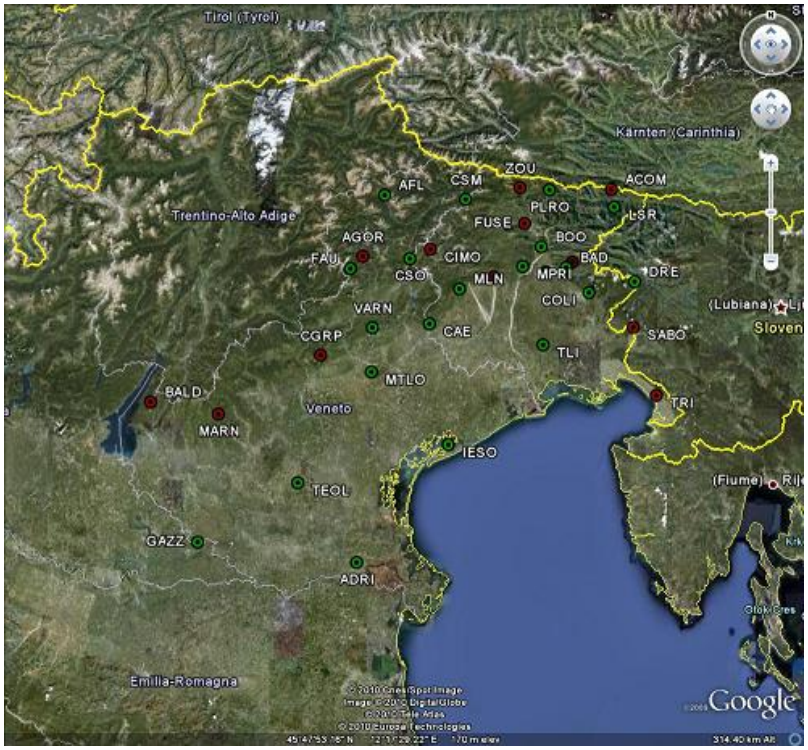
Nice to be back since 1998!

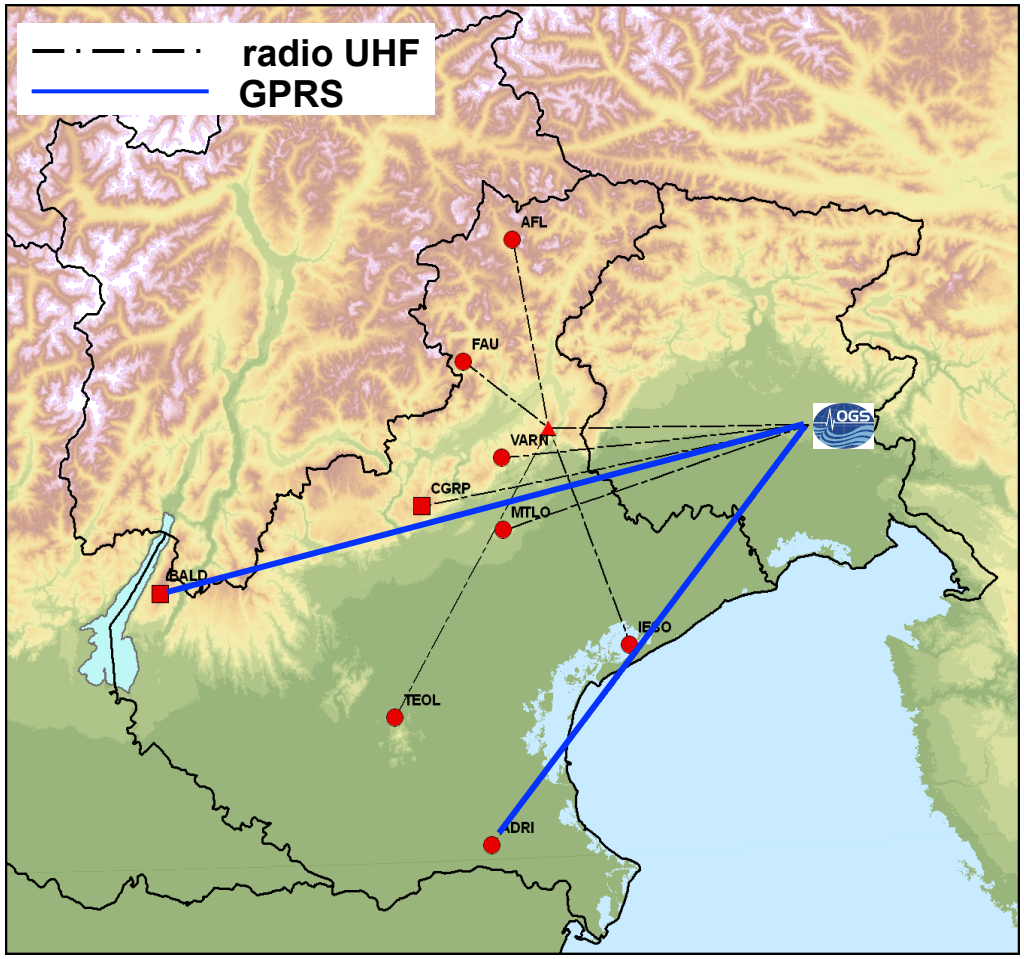


NE Italy Seismic Network - OGS



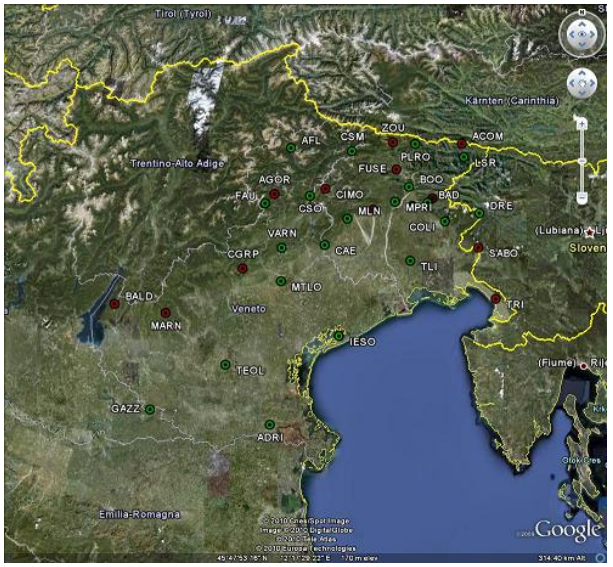
- 12 BB stations
  - mostly Q330 + STS-2
  - real time, continuous
- 22 SP stations
  - Mars88 + Lennartz 1sec
  - real time, on trigger

How is data transmitted?



- UHF radio system with digital transmission
  - bandwidth 19.2kb/s
  - shared frequencies
- GPRS modem
- *Satellite currently under test*

OGS-CRS: monitoring NE Italy seismicity



- 2 people on call duty H24 (seismologist + 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 and magnitude (picking of S waves)
- control over any replicas of earthquake
- maintain the link with the regional structures of the Civil Protection

Data acquisition with Antelope @ OGS: how it all started

INTERREG III A Italia-Austria

2000-2006

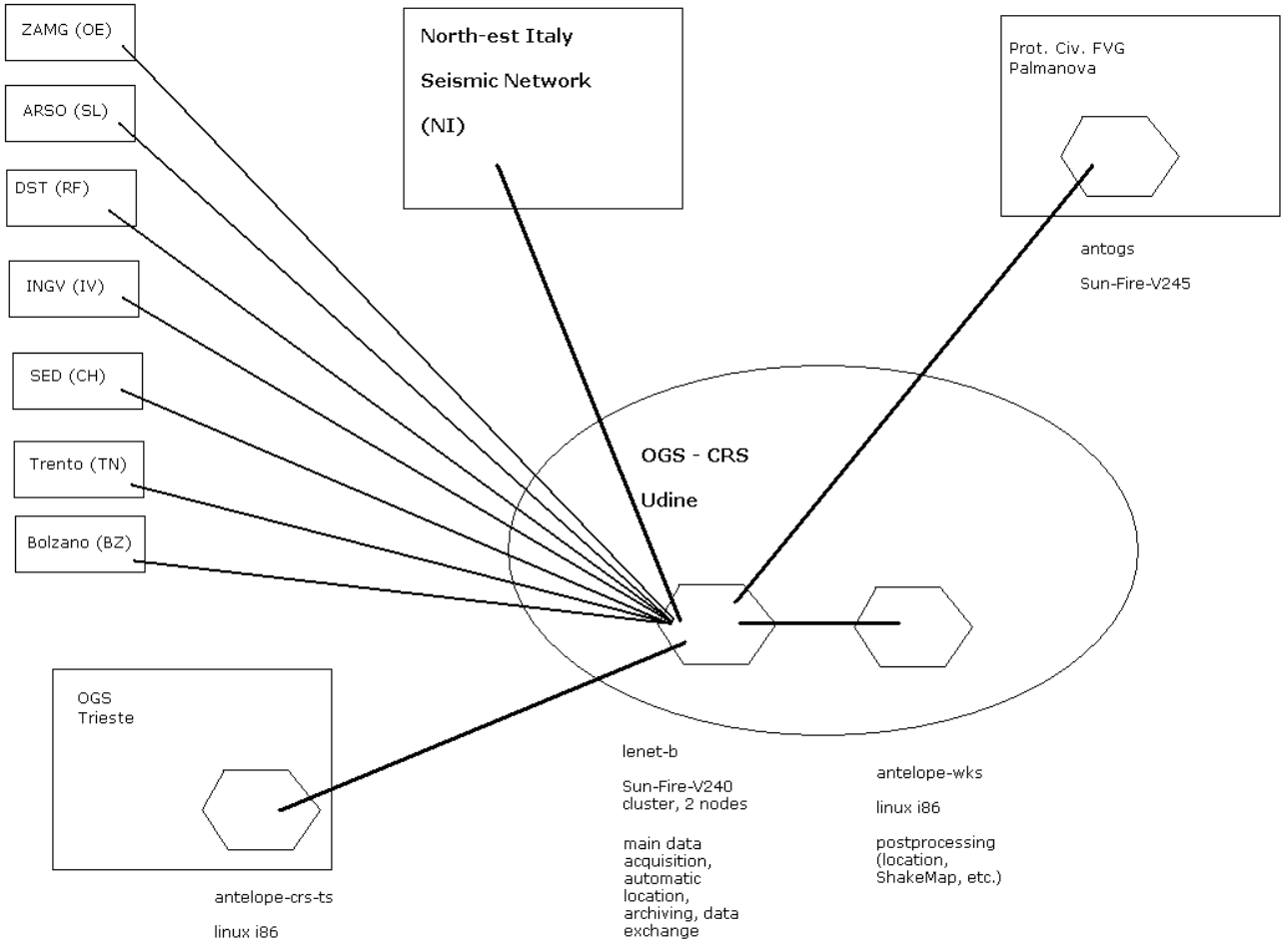
"SEISMOLOGICAL NETWORKS WITHOUT FRONTIERS IN THE SOUTH EASTERN ALPS"

Participants:

- ZAMG (Vienna, Austria)
- OGS (Udine, Italy)
- DST (Trieste, Italy)
- ARSO (Ljubljana, Slovenia), external

Data contribution: ~100 stations!

OGS Antelope configuration



main rtexec processes table

```
Processes &Tbl{
orbserver                       orbserver -p $ORB orbserver
orbexport                       orbserver -p $ORBEXPORT orbexport
orbvino                         orbserver -p $ORBVINO orbvino
orbsor                          orbserver -p $ORBSOR orbsor
orbasain                        orbserver -p $ORBASAIN orbasain
qt2orb                          qt2orb -dataorb $ORB -cmdorb $ORB -calib_db $DB -v
q3302orb                        q3302orb -v -calib_db $DB -S state/q3302orb -v OGS dataorb $ORB
TN2orb                          slink2orb  -v -dc $DB -dm $DB -S state/TN2orb -pf pf/TN2orb.pf $TNSEISCOMP $ORB
MN2orb                          slink2orb -v -dc $DB -dm $DB -S state/MN2orb -pf pf/MN2orb.pf $INGVSC $ORB
DST2orb                         orb2orb -m '((NI|RF|IT)_.*|MN_TRI)_(H|E|S)(H|L|G|N)(Z|N|E).*' -r 'NI_(ACOM|AGOR|BALD|CGRP|CIMO|CUSI|FUSE|MPR2|SABO|VINO|ZOU2)_.*' -S state/
        DST2orb $DSTORB $ORB
ARSO2orb                        orb2orb -m 'SL_(ROBS|CADS|VOJS|GORS|SKDS|JAVS|KNDS|CEY|GBAS|MOZS|LJU|VNDS).*_(H|E|S)(H|L|G|N)(Z|N|E).*' -S state/ARSO2orb $ARSOORB
        $ORB
ZAMG2orb                        orb2orb -m 'OE_(ABTA|ARSA|DAVA|FETA|KBA|MOA|MYKA|RETA|SOKA|WTTA)_(H|E|S)(H|L|G|N)(Z|N|E).*' -S state/ZAMG2orb $ZAMGORB $ORB
SI2orb                          orb2orb -S state/SI2orb -m 'SI_.*_(H|E|S)(H|L|G|N)(Z|N|E).*' $SIORB $ORB
CH2orb                          slink2orb -v -dc $DB -dm $DB -S state/CH2orb -pf pf/CH2orb.pf $SEDSC $ORB
orb2db                          orb2db -v -S state/orb2db -r 'FV_.*' $ORB $DB
orb2db_FV                       orb2db  -v -S state/orb2db_FV -m 'FV_.*' -p pf/orb2db_FV.pf $ORB $DB
orb2dbt                         orb2dbt -v -state state/orb2dbt -overwrite $ORB $DB
orbdetect                       orbdetect  -v -onlypicks -out $ORB $ORB $DB
orbassoc                        orbassoc  -v -select /db/detection $ORB $ORB dbmaster/ttgrid
orbmb                           orbampmag -pf pf/orbmb -v -state state/orbmb -use_if_not_defining -auth_expr mb -next_target_orbmag orbml -make_magtables $ORB $ORB $DB
orbml                           orbampmag -pf pf/orbml_Bragato_Tento_Gasperini -v -state state/orbml -use_if_not_defining -auth_expr ml -target_orbmag orbml -next_target_orbmag orbms -
        make_magtables $ORB $ORB $DB
orbms                           orbampmag -pf pf/orbms -v -state state/orbms -use_if_not_defining -auth_expr ms -target_orbmag orbms -make_magtables $ORB $ORB $DB
orb2export                      orb2orb -m 'FV_.*|NI_(ACOM|CGRP|CIMO|CUSI|FUSE|MPR2|SABO|ZOU2)_(H|E|S)(H|L|G|N)(Z|N|E).*' -S state/orb2export -r '/.*|.*/pf.*' $ORB $ORBEXPORT
exportVINO                      orb2orb -m 'NI_VINO_.*|qt2orb.*' -S state/exportVINO $ORB $ORBVINO
orb2sor                         orb2orb -S state/orb2sor -m '((FV|NI|RF|IT|SI|SL|OE)_.*|MN_TRI)_(H|E|S)(H|L|G|N)(Z|N|E).*' -r 'NI_(AGOR|BALD)_.*' $ORB $ORBSOR
orb_alert_friuli                orbptrigger  -background -select "/pf/orbmag" -state state/orbptrigger_friuli $ORB /database/AlertFriuli/alert_friuli @origin.evid@ @origin.orid@
orb_alert_veneto                orbptrigger -background -select "/pf/orbmag" -state state/orbptrigger_veneto $ORB /database/AlertVeneto/alert_veneto @origin.evid@ @origin.orid@
orb_alert_TN                    orbptrigger -background -select "/pf/orbmag" -state state/orbptrigger_TN $ORB /database/AlertTrentino/alert_trentino @origin.evid@ @origin.orid@
orbtrigger_topkserver           orbptrigger -background -select "/db/origin" -state state/orbptrigger_topkserver $ORB /database/topkserver/orbtrigger_topkserver %evid% %orid% %time% %lat%
        %lon% %depth% %ml% %lddate%
orbtrigger_orb2db_evid          orbptrigger  -background -select "/db/origin" -state state/orbptrigger_orb2db_evid $ORB /database/evdb/orb2db_evid %evid%
orbtrigger_towebpcfvg           orbptrigger -background -select "/pf/orbmag" -state state/orbptrigger_towebpcfvg $ORB /database/towebpcfvg/towebpcfvg.pl @origin.evid@ @origin.orid@
orbtrigger_toShakeMap           orbptrigger  -background -select "/db/origin" -state state/orbptrigger_toShakeMap $ORB /database/toShakeMap/orbtrigger_toShakeMap %evid% %orid% %auth%
        %time% %lat% %lon% %depth% %ml% %lddate%
}
```

main OGS Antelope load averages

load averages: 1.59, 1.50, 1.45; up 162+03:36:56 14:38:25
138 processes: 136 sleeping, 2 on cpu
CPU states: 26.9% idle, 67.3% user, 5.9% kernel, 0.0% iowait, 0.0% swap
Memory: 4096M phys mem, 241M free mem, 20G total swap, 19G free swap

PID	USERNAME	LWP	PRI	NICE	SIZE	RES	STATE	TIME	CPU	COMMAND
7754	rt	1	0	0	40M	31M	cpu/0	0:13	45.20%	perl
3829	rt	95	59	0	1042M	498M	sleep	42.9H	18.21%	orbserver
1268	root	27	59	0	874M	746M	sleep	860:45	2.37%	java
4013	rt	1	49	0	133M	34M	sleep	615:14	1.67%	orbdetect
3937	rt	1	59	0	107M	39M	sleep	211:35	1.28%	orb2db
6852	rt	1	59	0	16M	9136K	sleep	0:00	0.75%	dtterm
3867	rt	35	59	0	57M	8720K	sleep	150:22	0.46%	q3302orb
3859	rt	4	59	0	108M	94M	sleep	99:00	0.25%	orbserver
3879	rt	1	59	0	49M	2680K	sleep	34:43	0.17%	slink2orb
7843	rt	1	59	0	3088K	1888K	cpu/1	0:00	0.15%	top
4054	rt	1	59	0	5248K	1768K	sleep	51:51	0.12%	orb2orb
3838	rt	8	59	0	108M	54M	sleep	31:43	0.11%	orbserver
1410	sysop	1	59	0	3968K	2240K	sleep	318:27	0.09%	seedlink
3825	rt	1	59	0	25M	5120K	sleep	20:21	0.07%	perl
3877	rt	1	59	0	49M	2600K	sleep	14:44	0.06%	slink2orb

main OGS orb sources & clients

orbserver 3/19/2010 (078) 13:59:17.697

Version 'Release 4.10 SunOS 5.10 2008-05-02 '

Pid 3829 @ lenet-b:/database (158.110.30.6), port #XXXX

Started Tue 2010-068 Mar 09 13:22:16 by rt, running 10 days 0.6 hours

ring buffer last initialized Thu 2008-311 Nov 06 11:24:27

Maximum 1000.0 Mbytes packet data

Maximum 2500010 packets

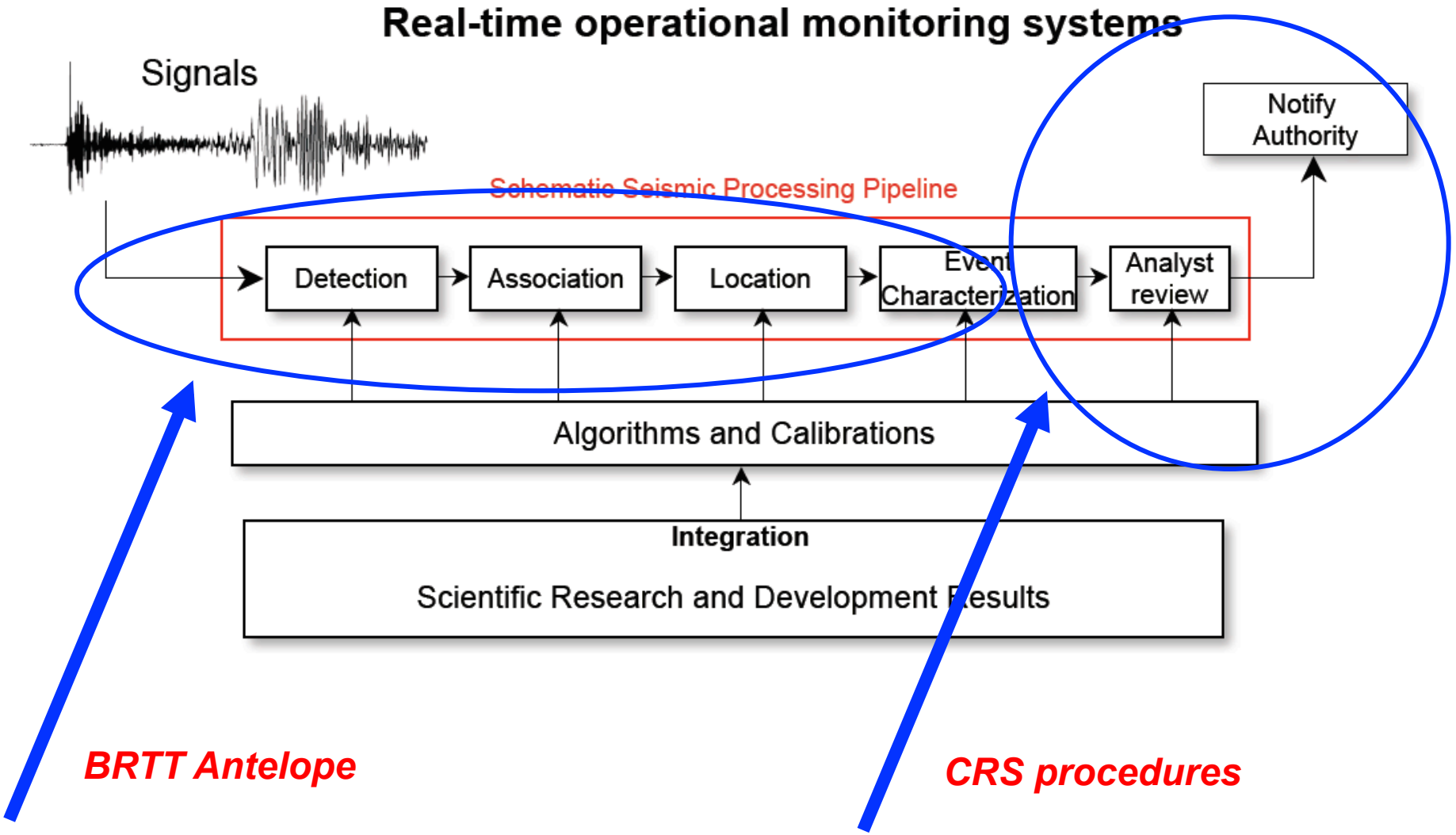
Maximum 1000 sources

58 clients

376 sources

291079 opens 291021 closes 0 errors 0 rejections

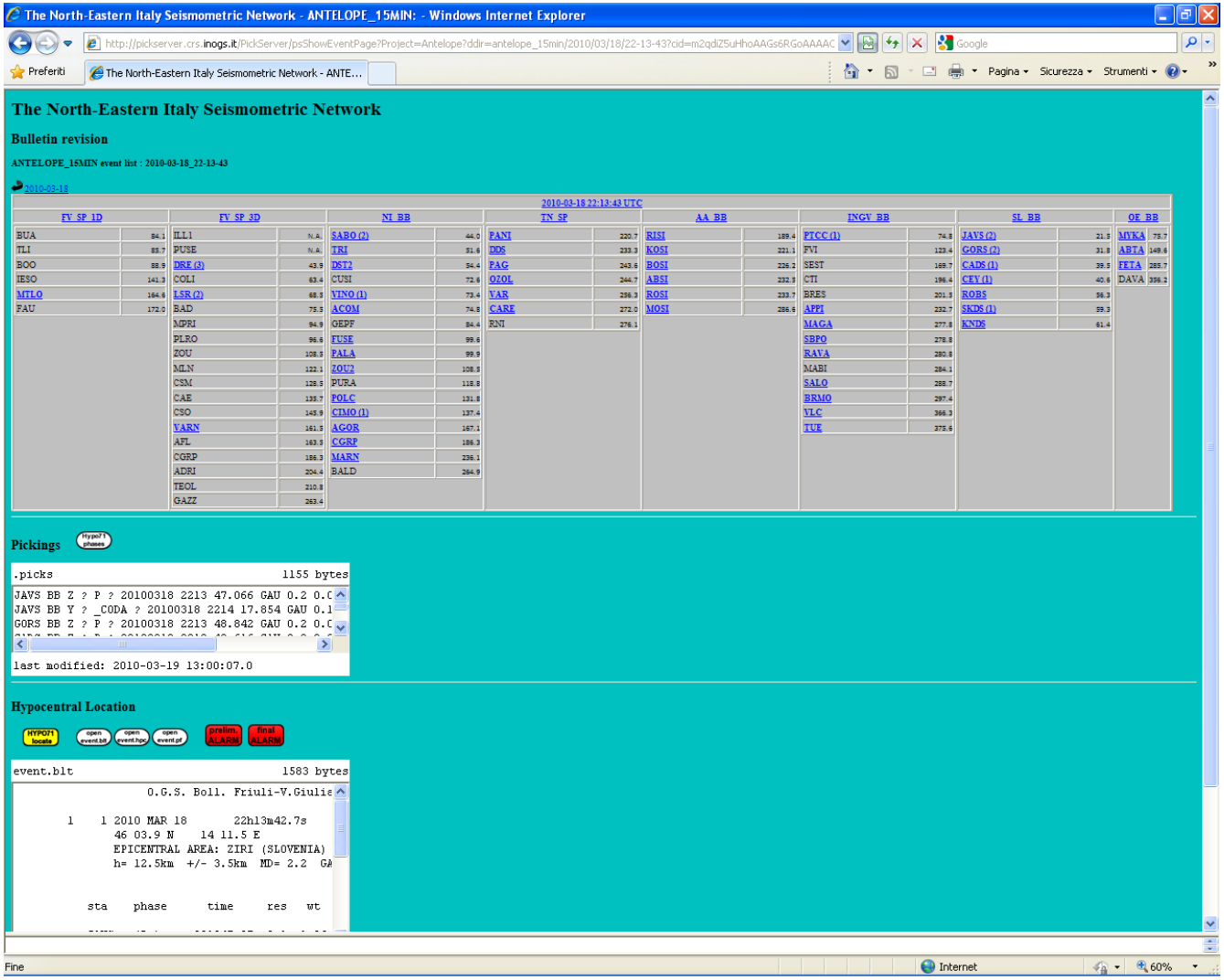
Earthquake detection and notification



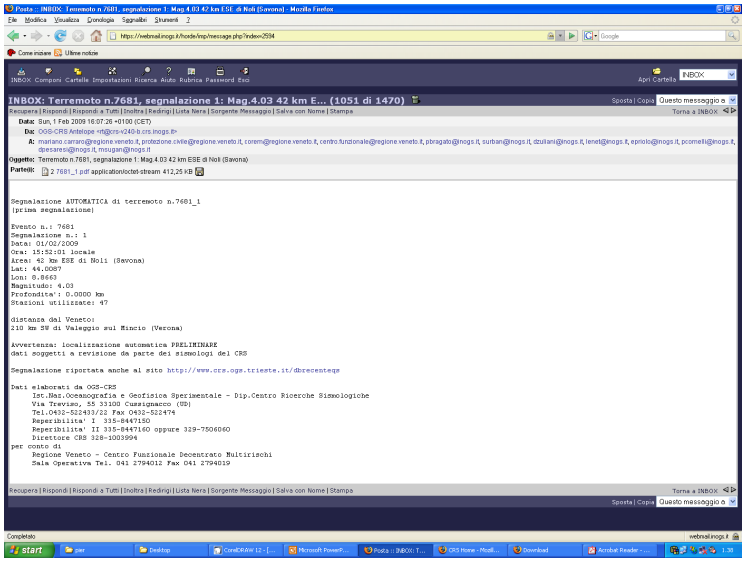
OGS customized sw for Antelope

- PickServer
- Comprehensive Alarm routines with ri-location control
  - Output: email, fax, SMS, web
- M882orb and ORION2orb plugins
- data archive
- drumplot
- *ShakeMap*
- *SeisComP (data exchange)*

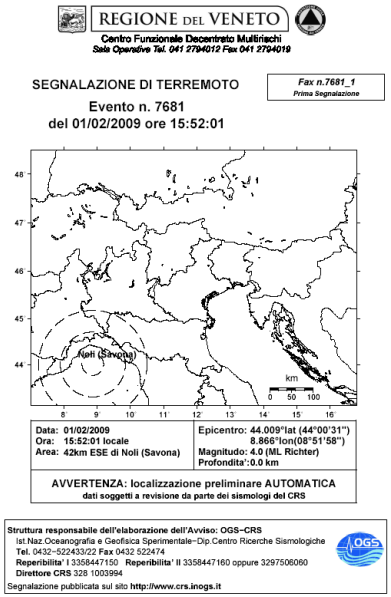
OGS PickServer



Alarms



e-mail



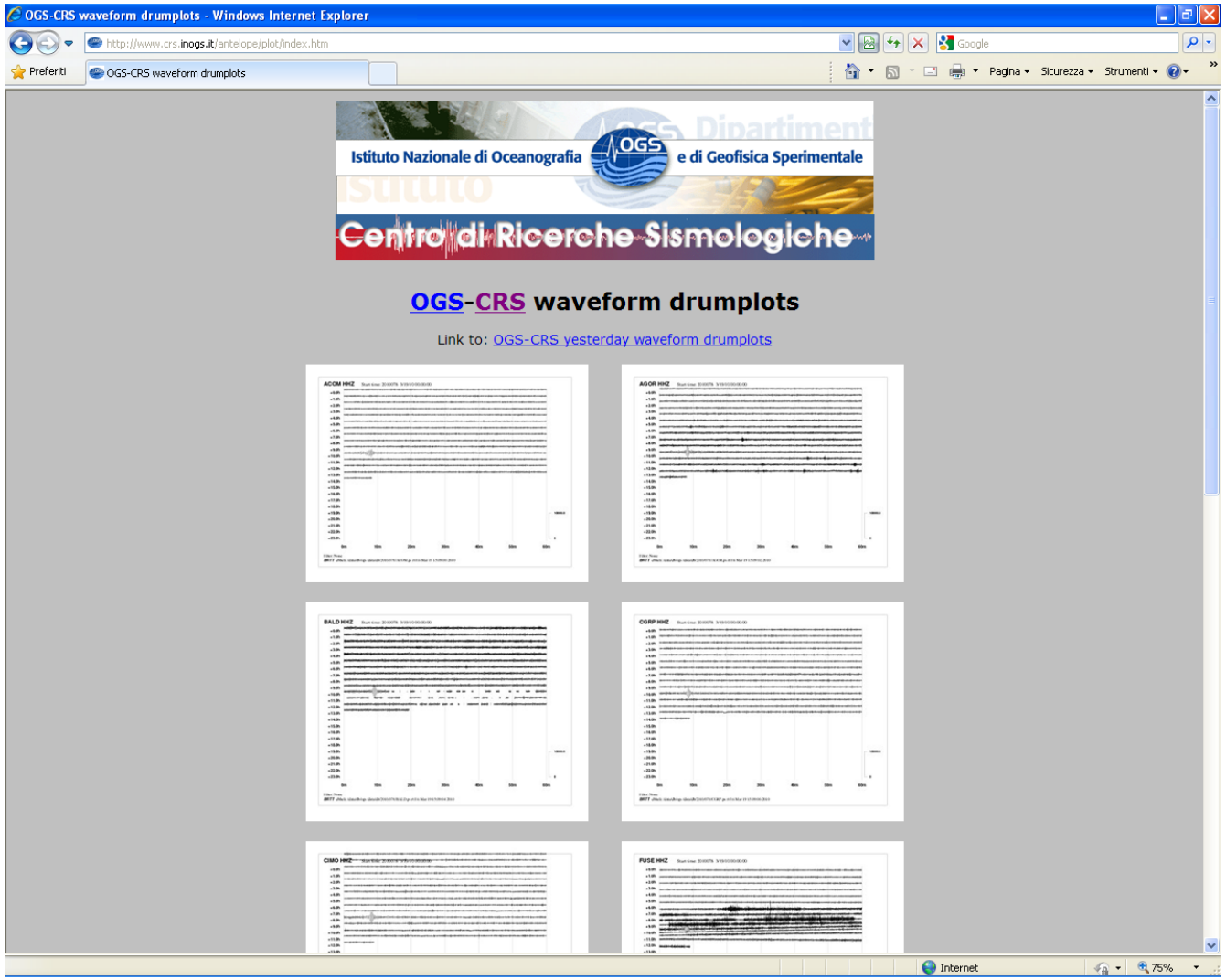
fax

sms

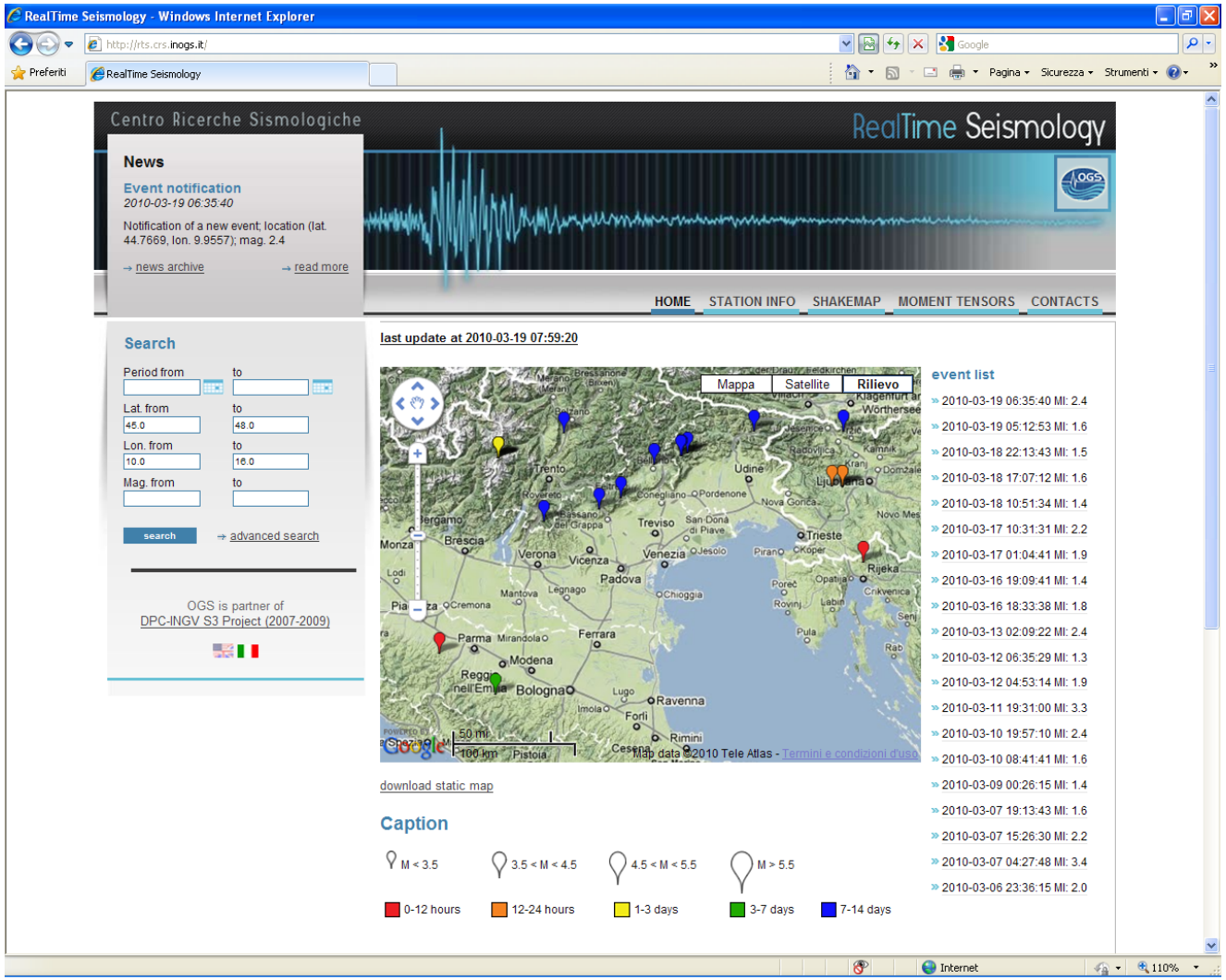
OGS-CRS Terremoto n.7681
segnalazione n.1
Mag4.03 H15:52:01
del 01/02/2009
42km ESE di Noli(Savona)
lat44.0087 lon8.8663
rep 3358447150

web

OGS dbheli


OGS-CRS waveform drumplots - Windows Internet Explorer
http://www.crs.inogs.it/antelope/plot/index.htm
OGS-CRS waveform drumplots
Istituto Nazionale di Oceanografia e di Geofisica Sperimentale
Centro di Ricerche Sismologiche
OGS-CRS waveform drumplots
Link to: OGS-CRS yesterday waveform drumplots
ACOM HHZ
AGOR HHZ
BALD HHZ
CGRP HHZ
CIMO HHZ
FUSE HHZ
Internet
75%

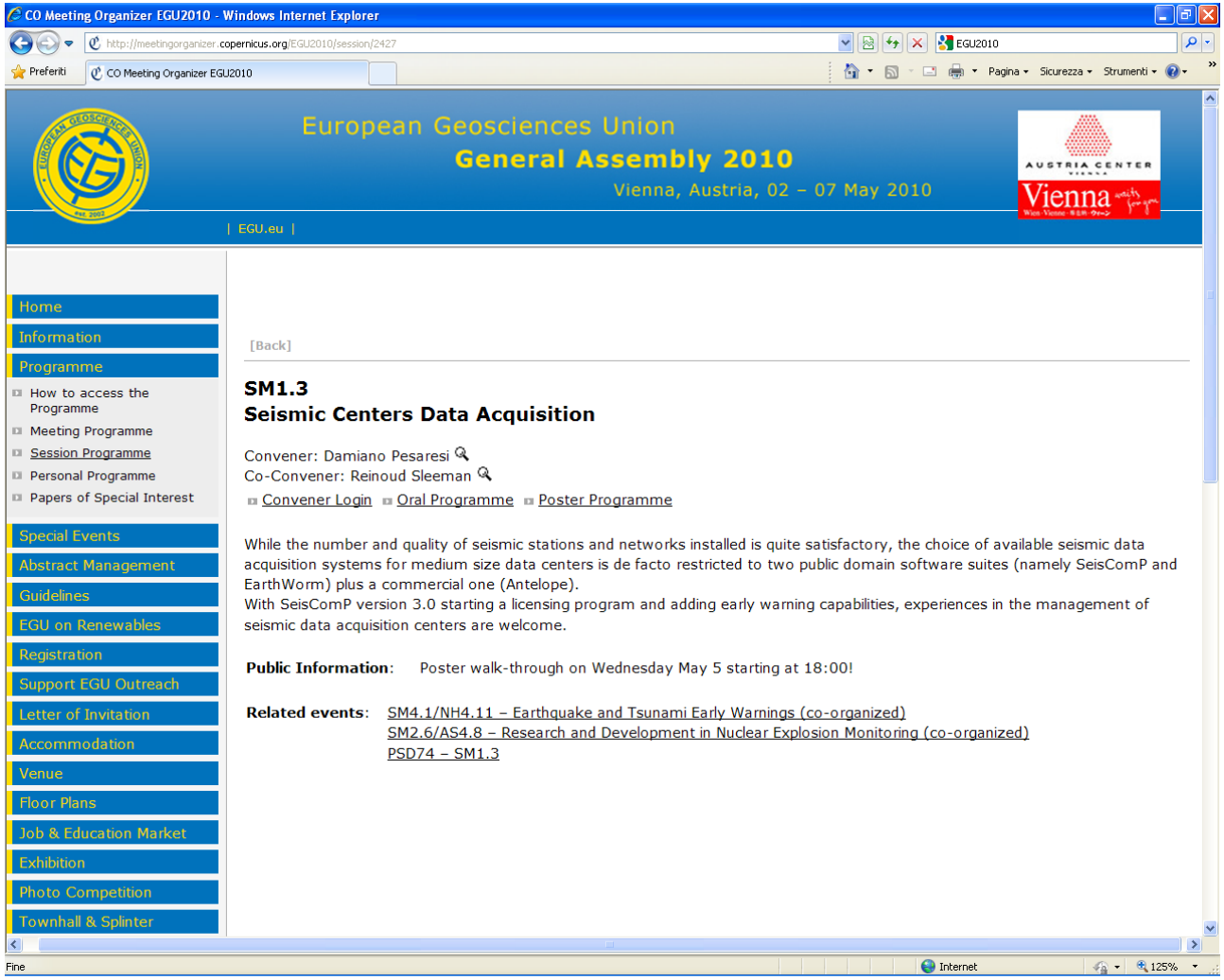
OGS Real Time Seismology



To do:

- Migration from 4.10 to 4.11 (wait 4.12?)
- Migration from orbampmag to orbevproc
- Archive policy revision (back to rtbackup?)
- dbdetect tuning
  - BB continuous
  - SP trigger
  - S phases?
- orbassoc tuning (grid, windows, etc.)

EGU2010 SM1.3
Seismic Centers Data Acquisition



THANKS!

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and all the **OGS-CRS** team!