



**PROTEZIONE CIVILE**  
Presidenza del Consiglio dei Ministri  
Dipartimento della Protezione Civile



**National Accelerograph Network (RAN)  
of the  
Civil Defense Department in Italy (DPC)  
maintained by  
Open System & Service Department**

Mathias Franke, Manager OSS

Antelope User Group Meeting

San Diego, CA

January 14 – 16, 2015



**OPEN SYSTEMS & SERVICES**  
**K I N E M E T R I C S**

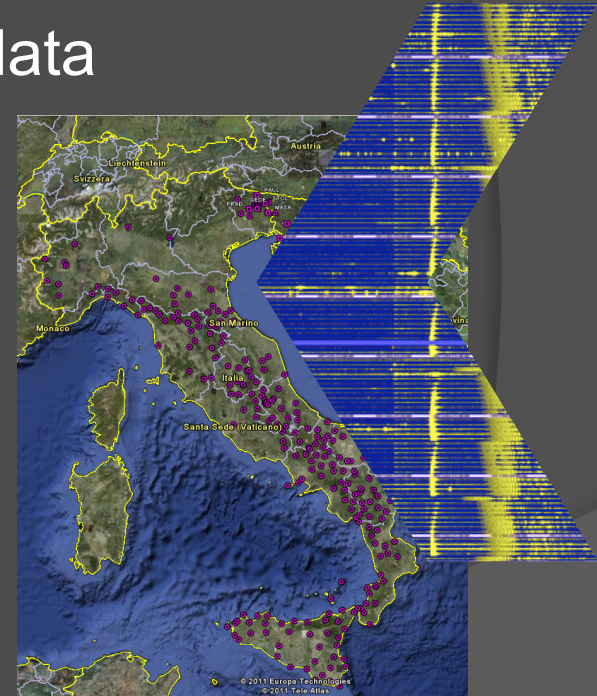
# What does OSS for the Italian National Accelerograph Network (RAN)?

- OSS supports Italy's Civil Defense Department (DPC) in its efforts to provide a high-available accelerograph network by carry out
  - Data Center operation (2 IT personnel)
  - Data Center update & maintenance (onsite visits every 9 months)
  - Station upgrade & scheduled maintenance (continuous effort)
  - Station unscheduled maintenance (5 days response)
  - Temporary station installation (as needed)
  - Educational outreach program (1+ temporary installation at a school)
- Station availability since interception (Oct 2012) of service contracts
  - Daily station availability: 98.3%
  - Goal: 98%



# ASPEN Open System Solution

- Based on the Antelope Environmental Software
- Open architecture for interoperability, data exchange and custom programming
- Real-Time monitoring with data driven minimum latency processing
- Extensive SOH monitoring
- Redundant Servers (upgraded Nov. 2014)
- Robust platform for information dissemination



# RAN By Numbers

- Station Total: 291
- By Com-Link

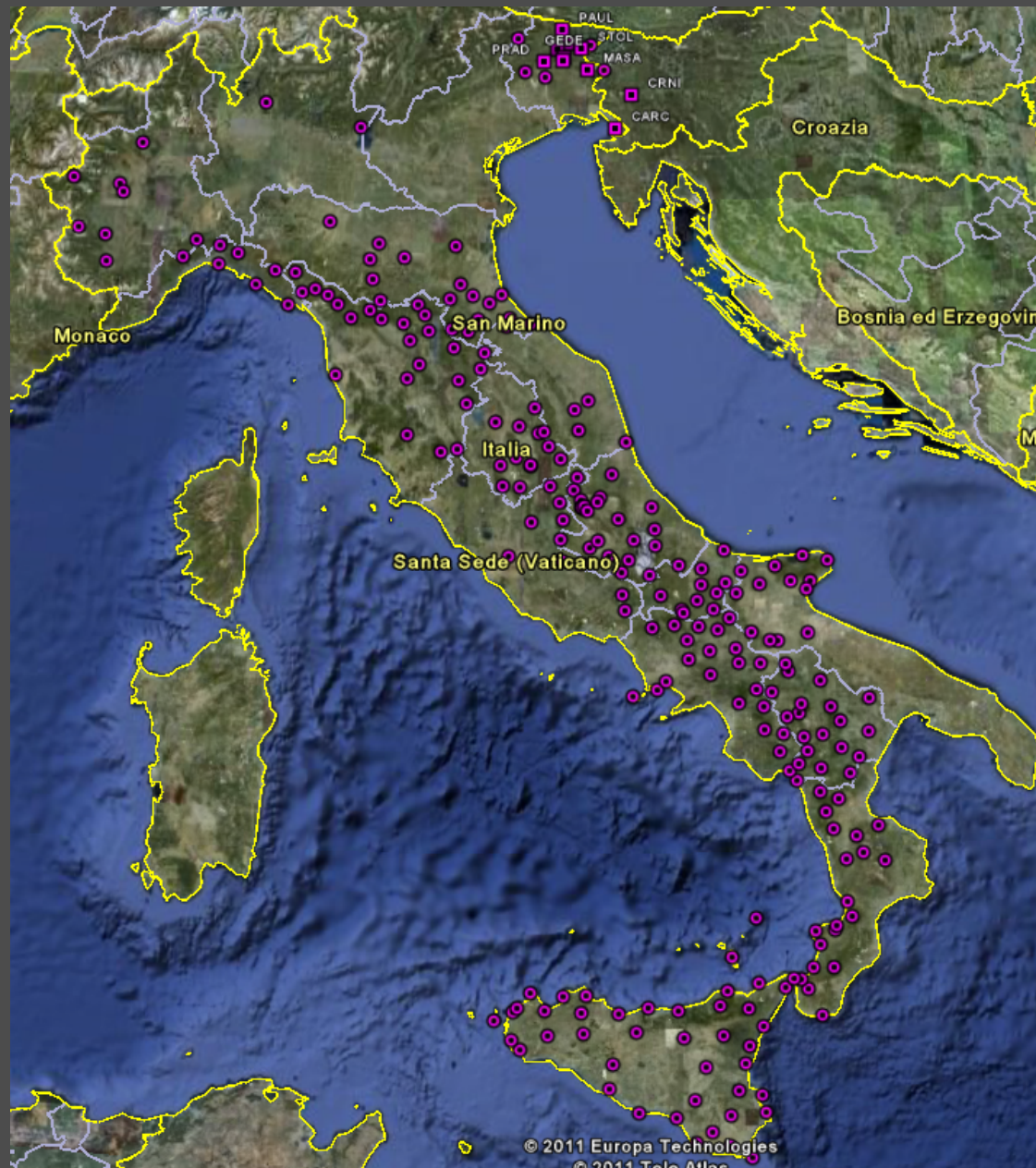
Datalogger	GSM	GPRS (triggered)	GPRS (continuous)
Etna	3	171	-
K2	-	6	-
Makalu	-	6	-
Everest	-	1	-
Basalt	-	-	51

- Makalu: 6
- Everest: 1
- Basalt: 51
- Others: 53





# RAN



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# RAN Remote Stations



# RAN Remote Stations



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KINEMATICS





# DPC Data Center



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# DPC Data Center

- ⦿ (2) Dell PowerEdge R720 servers as processing/ acquisition nodes with HA failover
- ⦿ Nexsan SATABeast RAID-5 storage
- ⦿ Cisco 3845 Integrated Service Router as gateway and modem server
- ⦿ (2) Cisco Catalyst 2960G redundant switches
- ⦿ (2) MultiTech CC1600 modem banks each with
  - (16) MT5600BR rackmount modems
  - (2) redundant power supplies
- ⦿ (4) Dell OptiPlex 7010 as user terminals
- ⦿ Dell Precision T3610 as video wall server with (6) 46" Samsung Commercial Grade LED displays



# System Customizations

- ⦿ Installed Antelope 5.4
- ⦿ Configuration of Red Hat High-Availability add-on for failover of acquisition or processing system
- ⦿ X-Win32/FastX
- ⦿ Implemented Zabbix based Monitoring System
  - Dashboard
  - Filesystem
  - Performance (CPU, RAM, LOAD, etc.)
  - Event triggers
  - Status details (e.g., UPS)
  - Network maps
  - Event history





# System Customizations - Dashboard

192.168.12.83/dashboard.php

DPC-DASHBOARD: Dashboard

**ZABBIX** Help Get support Print Profile Logout

Monitoring Inventory Reports Configuration Administration

DPC-DASHBOARD

Dashboard Overview Web Latest data Triggers Events Graphs Screens Maps Discovery IT services

History: Acknowledges » Dashboard » Acknowledges » Dashboard » Acknowledges

**PERSONAL DASHBOARD**

**Favorite graphs**

- ASPENSWITCH1: Interface GigabitEthernet0/3 Traffic
- ASPENSWITCH1: Interface GigabitEthernet0/4 Traffic
- ASPENSWITCH1: Interface GigabitEthernet0/13 Traffic
- ASPENSWITCH1: Interface GigabitEthernet0/15 Traffic
- ASPENDPC5: Network Interface bond0 Traffic
- ASPENDPC4: Utilization of Processor\_all
- ASPENDPC5: Disk Space Usage on /home

Graphs »

**Favorite screens**

- RAN Servers - Performance Overview
- RAN Servers - Hardware Sensors
- RAN Network Switches - Traffic
- RAN Servers - Disk Space
- RAN Servers - Filesystem States

Screens »

**Favorite maps**

- Local network
- RAN DMZ

Maps »

**Status of Zabbix**

Parameter	Value	Details
Zabbix server is running	Yes	localhost:10053
Number of hosts (monitored/not monitored/templates)	58	6 / 0 / 52
Number of items (monitored/disabled/not supported)	3610	2862 / 1 / 747
Number of triggers (enabled/disabled) [problem/ok]	1033	956 / 77 [7 / 949]
Number of users (online)	10	1
Required server performance, new values per second	43.18	-

Updated: 08:18:22 AM

**System status**

Host group	Disaster	High	Average	Warning	Information	Not classified
Power Supplies	0	0	0	0	0	0
RAN Desktops	0	0	0	0	0	0
RAN Network Switches	0	0	2	0	0	0
RAN Servers	0	1	4	0	0	0

Updated: 08:18:22 AM

**Host status**

Host group	Without problems	Time	User	Comments
Power Supplies	1	Jan 14th, 2015 08:17:35 AM	smr@kml.com (Stefan Radman)	this is only a temporary issue
RAN Desktops	1			
RAN Network Switches	0			
RAN Servers	0			

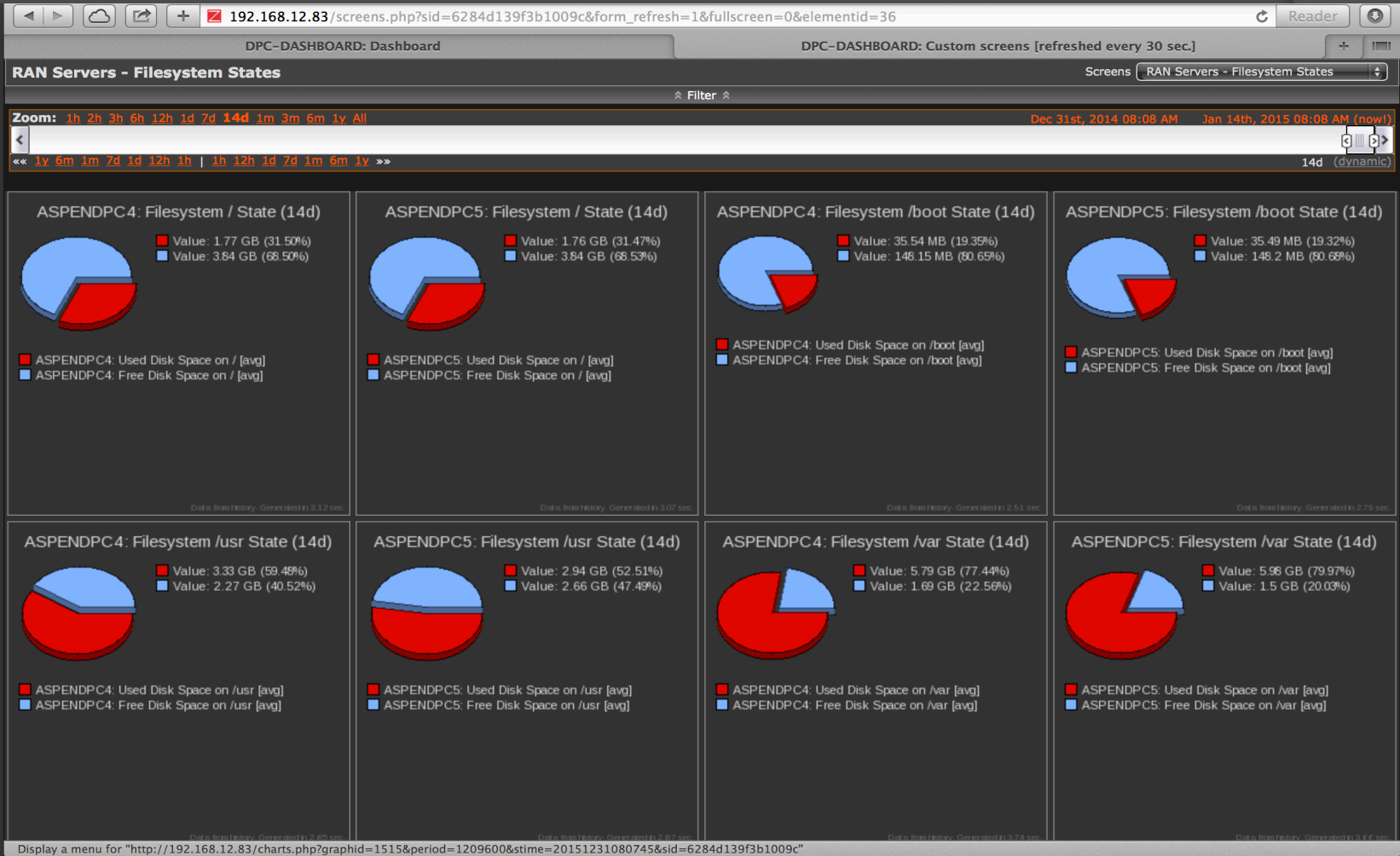
Host	Issue	Age	Info	Ack	Actions
ASPENDPC5	Filesystem ASPENDPC5:/micrate/aspencd1 is more than 90% full	19h 31m 54s		Yes (1)	Resolve

Close

Display a menu for "http://192.168.12.83/acknow.php?eventid=174111&triggerid=15388&backurl=dashboard.php&sid=6284d139f3b1009c"



# System Customizations – Filesystem



# System Customizations – Performance



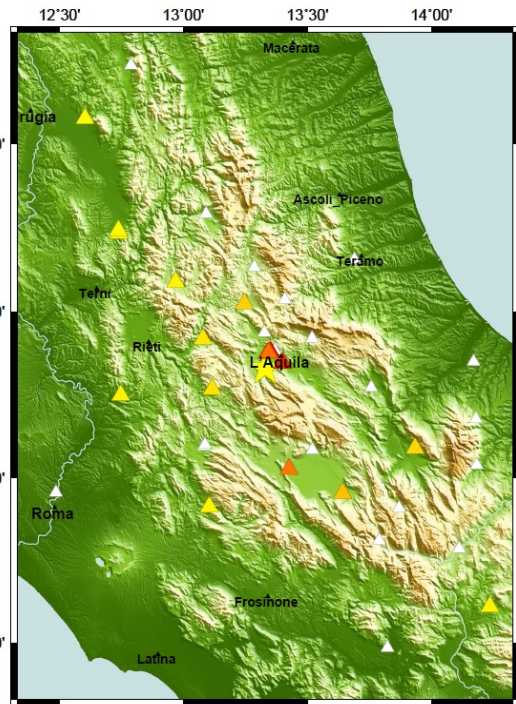
Display a menu for "<http://192.168.12.83/charts.php?graphid=1334&period=1209600&stime=20161230081903&sid=6284d139f3b1009c>"



# Client Customizations

## ● Civil Defense “fast-report”

06/04/09 01:32:41 MI:5.8 L'Aquila



phases

SeisRAM Region: LUSEVERA (I) Origin time: 2011/03/11 01:06:33.23 - INTERNAL USE ONLY

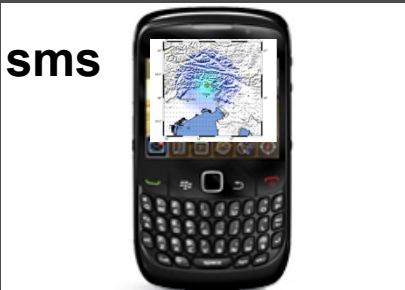
System: antestat MAC OSX - antelope ver.: 5.0  
Seismology Research and Monitoring Group  
Dipartimento di Geoscienze - University of Trieste

Region: LUSEVERA (I) EVID: 8753 ORIGID: 9044

Date	Time	Latitude	Longitude	Depth	MD	Ma	MI	Neta	RMS	Author
2011/03/11	01:06:33.23	46.2744	13.2867	0.0	0.00	0.60	2.16	47	0.78	orbassoco

ArrID	Sta	Diat	ByAs	Phase	Time	TTime	SNS	MD	Ma	MI
39874	CIND	0.58	273.9	P	01:06:43.338	-1.1	77.80	0.00	0.00	2.81
39817	PUGI	0.24	305.4	P	01:06:37.368	-0.5	193.0	0.00	0.00	2.40
39811	BALA	0.25	263.4	P	01:06:37.945	-0.1	148.3	0.00	0.00	2.47
39822	ACOM	0.32	29.7	P	01:06:38.398	0.1	51.36	0.00	0.00	2.50
39813	CADS	0.31	98.3	P	01:06:39.609	0.3	492.4	0.00	0.00	0.00
39814	ZODI	0.36	222.8	P	01:06:39.609	0.3	492.4	0.00	0.00	0.00
39815	MORF	0.42	287.2	P	01:06:39.609	0.3	492.4	0.00	0.00	1.64
39906	TIL	0.38	199.8	P	01:06:39.609	0.3	492.4	0.00	0.00	0.00
39818	SAMO	0.37	139.9	P	01:06:41.070	0.1	49.25	0.00	0.00	2.71
39834	MYKA	0.43	34.4	P	01:06:41.620	0.1	19.66	0.00	0.00	2.33
39825	VINO	0.02	192.1	P	01:06:33.882	0.3	246.5	0.00	0.00	-0.44
39819	SOSS	0.49	84.8	P	01:06:42.553	-0.2	405.9	0.00	0.00	0.00
39823	VOVS	0.48	120.0	P	01:06:42.628	0.2	628.1	0.00	0.00	0.00
39808	BDA	0.13	243.0	P	01:06:35.920	0.3	62.90	0.00	0.00	2.00
39809	BOSE	0.16	100.8	P	01:06:36.776	0.5	602.8	0.00	0.00	0.00
39821	POIC	0.60	245.8	P	01:06:44.728	0.0	8.632	0.00	0.00	2.59
39870	TRI	0.66	149.4	P	01:06:45.348	-0.5	20.83	0.00	0.00	2.00
39860	DETA	2.11	306.0	P	01:07:11.968	2.1	12.02	0.00	0.00	2.35
39828	JAVS	0.66	125.0	P	01:06:45.650	-0.2	117.1	0.00	0.00	0.00
39826	DETS	0.71	149.7	P	01:06:46.388	-0.3	11.43	0.00	0.00	2.38
39824	CHSE	0.70	105.7	P	01:06:46.393	-0.3	51.33	0.00	0.00	0.00
39835	ABTA	0.71	311.9	P	01:06:46.720	-0.2	26.29	0.00	0.00	1.68
39832	MOSS	0.80	88.2	P	01:06:48.734	0.2	56.72	0.00	0.00	0.00



Region: Origin time: - INTERNAL USE ONLY -

134 MI - 3.9 EVID: 7 ORID: 57 Agency: INGV

```

0 PSA03 Arias Housner
*# cm/*# cm/* cm
-----
+00 1.5e+01 2.1e+01 9.8e-01 Avezzano_Castello
+01 1.2e+01 1.3e+01 7.8e-01 Avezzano_Castello
+02 2.6e+01 3.4e+01 1.9e+01 Celano
+01 2.7e+02 4.2e+01 1.9e-01 Celano
+00 6.1e-01 1.5e+01 1.2e+00 Borgo_Ottomilia2
+00 1.9e-01 3.0e+00 7.1e-01 Borgo_Ottomilia2
+00 6.1e-01 2.0e+01 1.3e+00 Borgo_Ottomilia2
+01 3.1e-02 1.2e+00 1.9e-01 Poggio_Picenze
+01 5.6e-02 2.8e+00 3.6e-01 Poggio_Picenze
+01 3.4e+00 4.0e-01 Poggio_Picenze
+01 4.6e-02 1.0e+00 2.1e-01 L'Aquila_Colle_del_Grilli
+01 9.2e-02 8.4e-01 1.6e-01 L'Aquila_Colle_del_Grilli
+01 3.9e-02 2.2e-01 1.3e-01 L'Aquila_Colle_del_Grilli
+01 5.6e-02 9.4e-01 1.6e-01 L'Aquila_Valle_Aterno_Pi
+01 4.2e-02 1.1e+00 1.7e-01 L'Aquila_Valle_Aterno_Pi
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Seismological Research and Monitoring Group
Dip. di Geoscienze - Università degli Studi di Trieste
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+01
+01
+01

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tion parameters

Home SeisRAM Dip. Geoscienze University of Trieste

**Substations**

- Scientific background
- Project S4-Report
- IRIS
- Scenario
- Historical

**REAL TIME**

- Seismically Generated
- Recent seismicity
- ShakeMap

**Seismological Networks**

- Enabli Venezia Giulia Accelerometric Network EAF
- NE Italy Broadband Network

**Regional Networks**

- RAF
- ARSO
- ZAMG
- SOSS

**Real Time Shakemaps**

The Real Time Shakemaps at DIG are performed in the framework of the project **INTERREG IIIa Italia Austria 2000-2006: "Seismological Networks without frontiers in the southwestern Alps"** and of the International Agreement for "Real Time Seismological Data Exchange in the ALPE-ADRIA region".

Origin Time: 11/03/10 19:31:00 Lat: 46.23 Lon: 12.50 Mw: 3.5 S4: 3.2 CLAUT

PGA PGV Intensity

PSA03 PSA10 PSA30

# Network Maintenance

## Station Availability 2014

