

Centre de Recherche en Astronomie Astrophysique et Géophysique

CRAAG, Algeria



CRAAG

The New Algerian Digital Seismic Network

T.ALLILI, AK YELLES,
CRAAG, Algeria

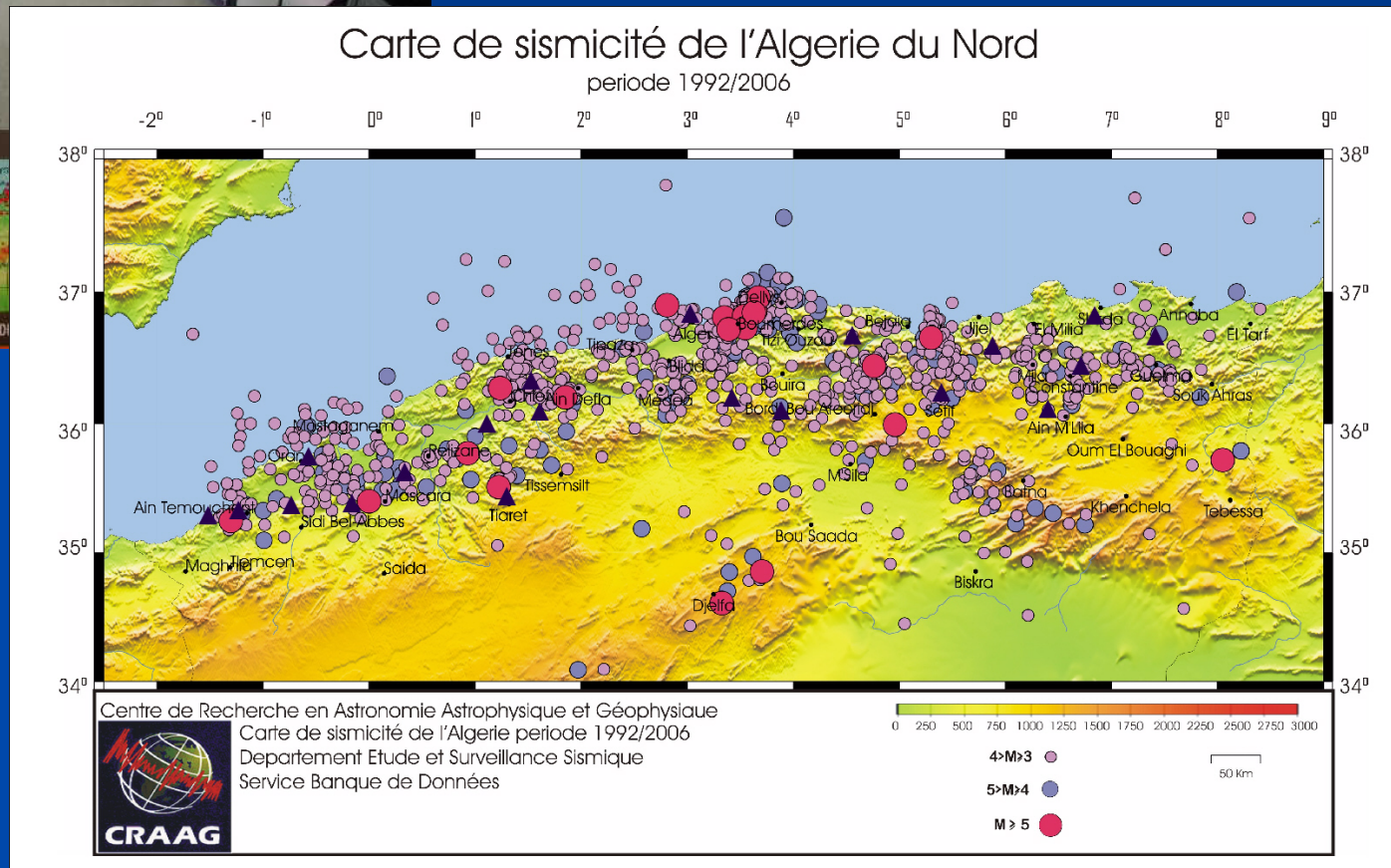
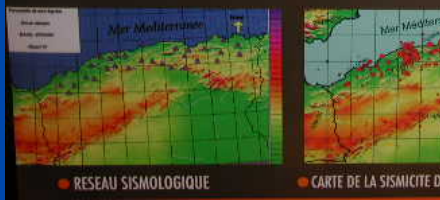
The New Algerian Digital Seismic Network

- ❑ State of the Algerian Seismic Network Before 2007
 - ❑ The New Digital Seismic Network
 - ❑ Data recorded
 - ❑ Antelope System (Acquisition, Automatic processing, Archiving Data and Monitoring, Data exchange)
 - ❑ Seismic Alert
 - ❑ Futur Actions
-

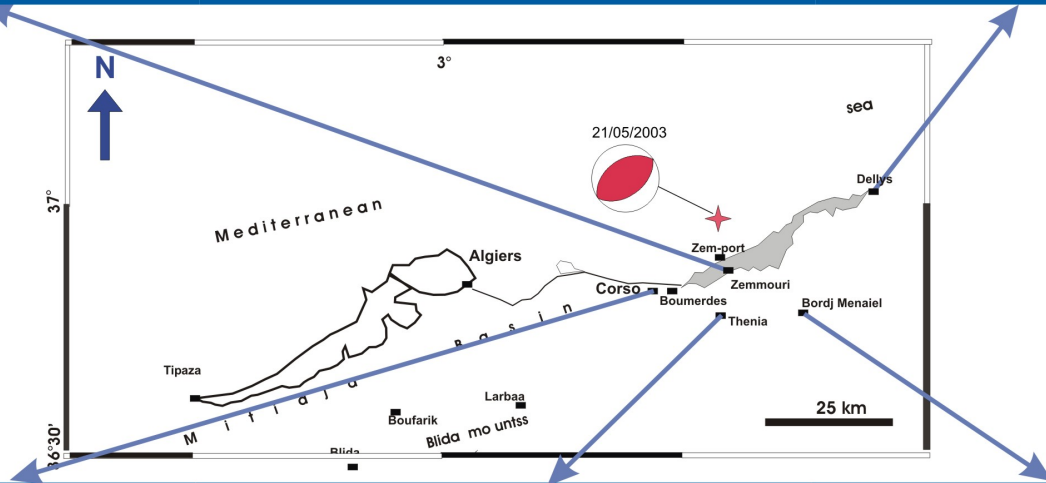
Seismicity recorded by Telemetry Network (1992 – 2006)



Several strong events during history
Algiers 1716, Blida 1825....



BOUMERDES EARTHQUAKE OF MAY 21st, 2003 M:6.8



New Digital Seismic Network

- **(08) BB stations and (02) VBB stations installed (2006 – 2007)**
 - Sensor BBVS-60 and BBVS-120
 - Digitizer EDAS-24IP 6 channels

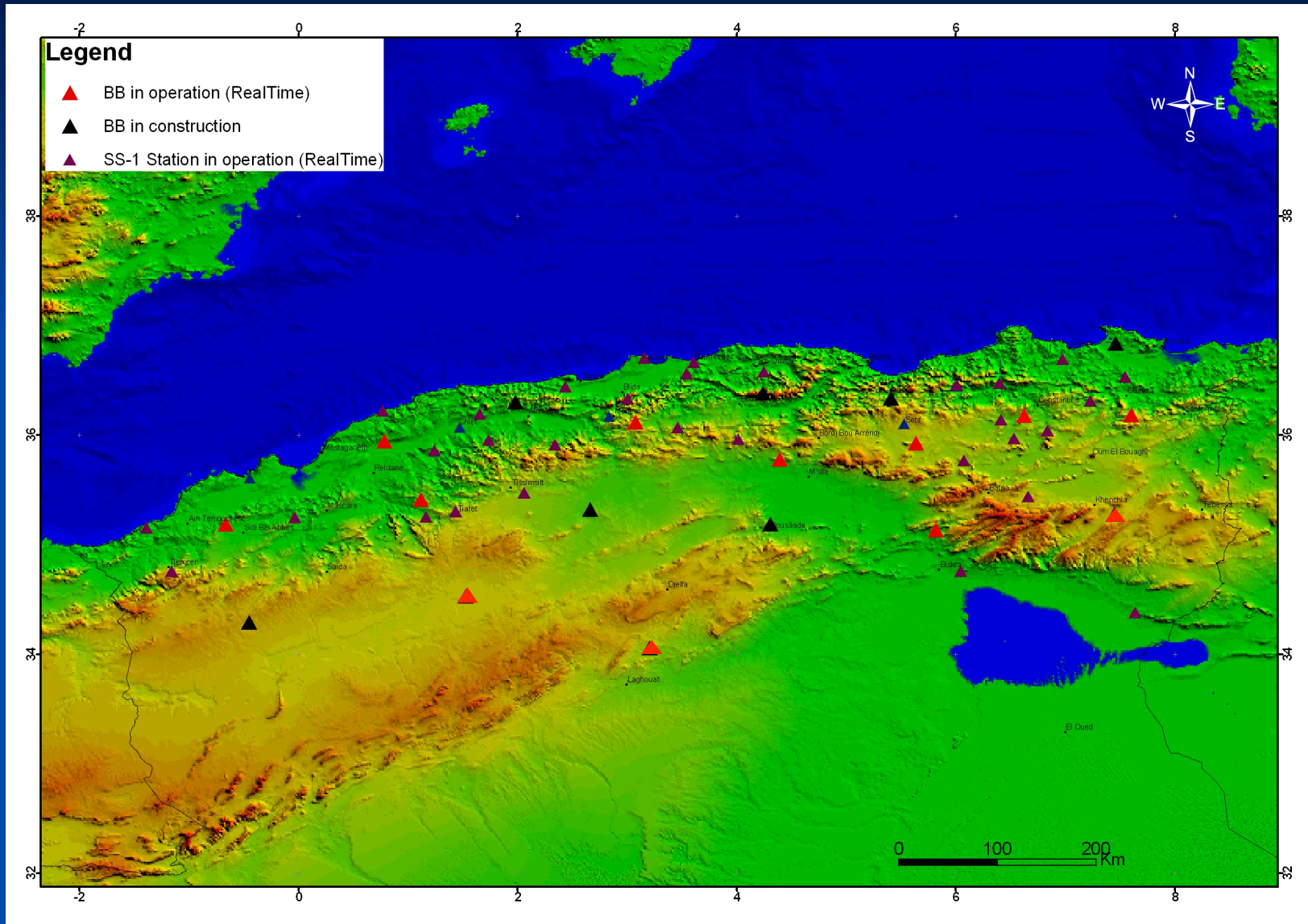
 - **50 new digital stations in 2007**
 - (10) new Broad Band Stations (03 installed Dec 08 – February 09)
 - Sensor STS-2
 - Digitizer Q-330 6 channels

 - (40) Short Period (30 installed July 08 – February 09)
 - Sensor SS-1
 - Digitizer Q-330 6 channels

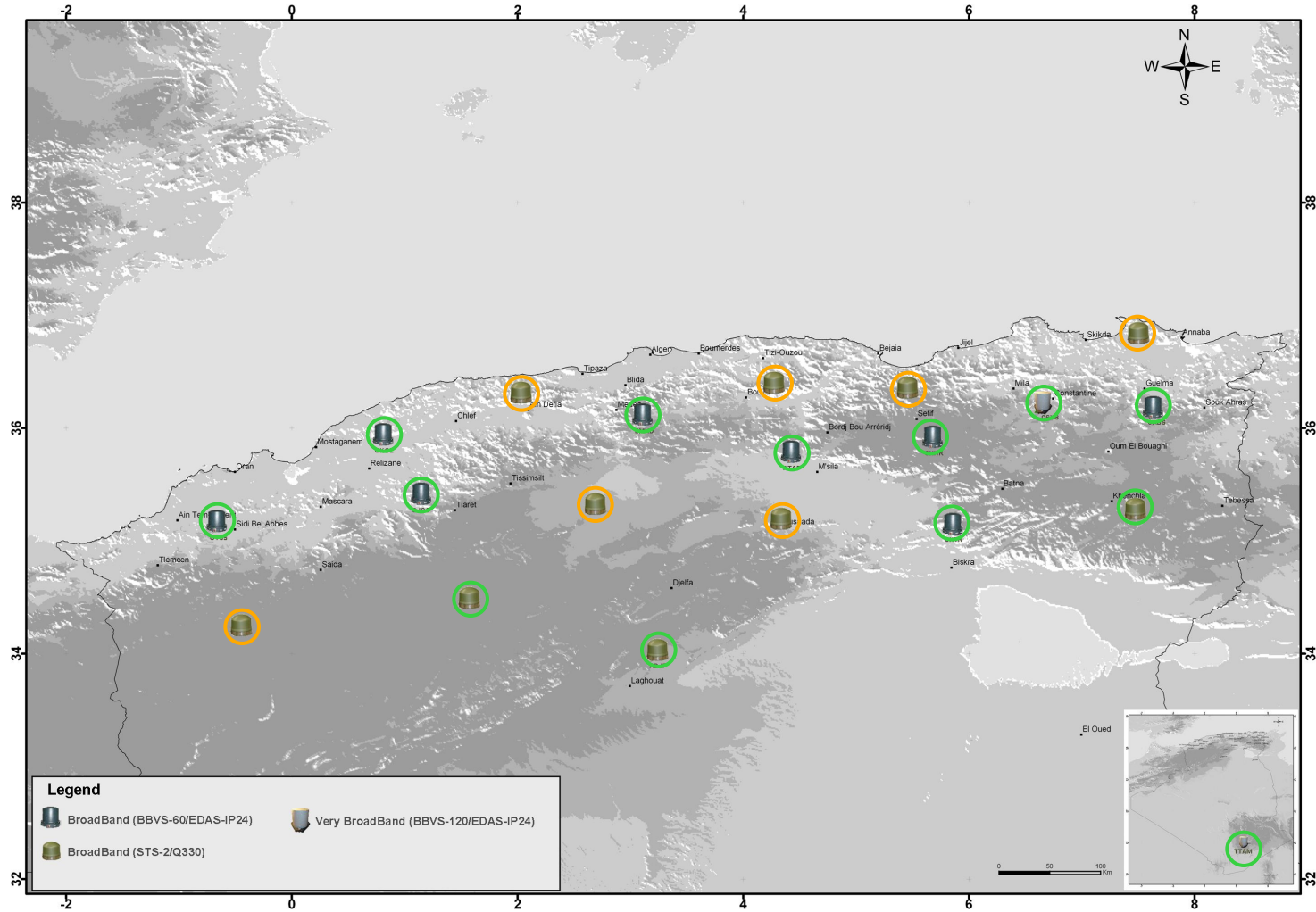
 - (22) Episensor (installed July 08 – February 09)
 - Sensor : (20) ES-T and (02) BBAS-2
 - Digitizer: (20) Q-330 6 channels and (02) EDAS-24IP

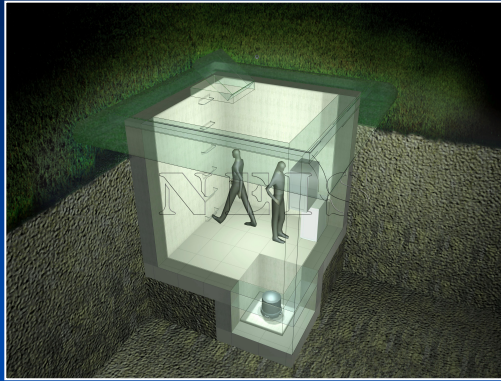
 - **Central of data Management with a near Real-Time processing (Antelope System 4.10) (installed 2007).**
-

Algerian Digital Seismic Network (ADSN, February 2009)

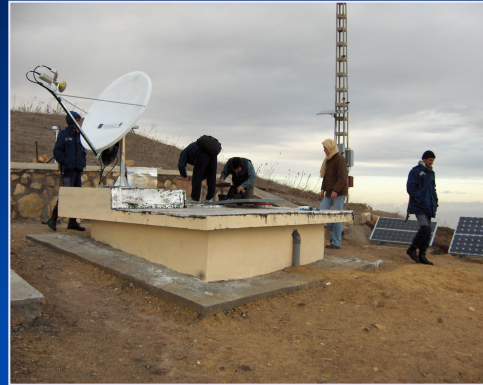


Algerian Digital Seismic Network (BB Stations, February 2009)





Site model



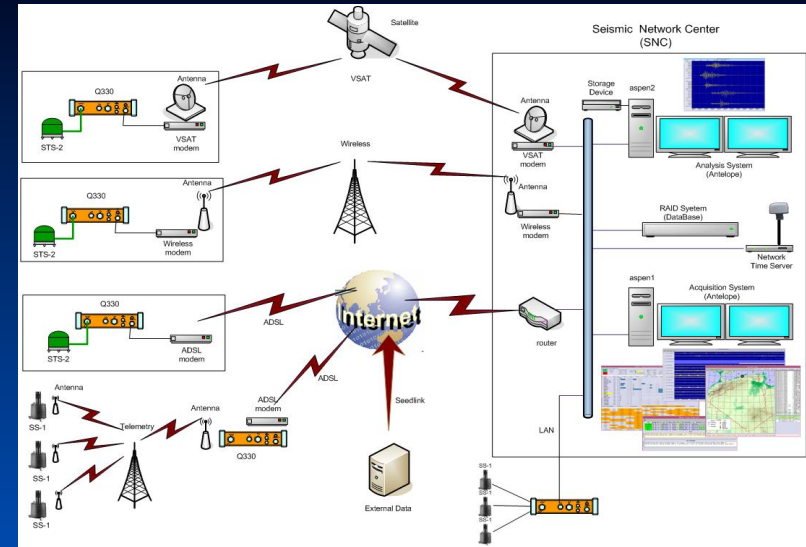
BB Stations in operation



VBB Stations in operation



SP Stations in operation

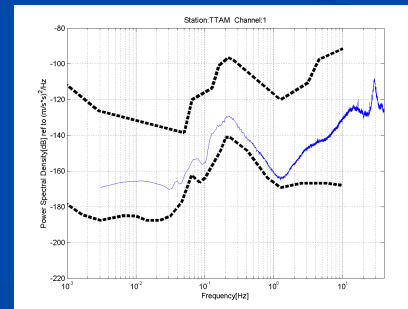
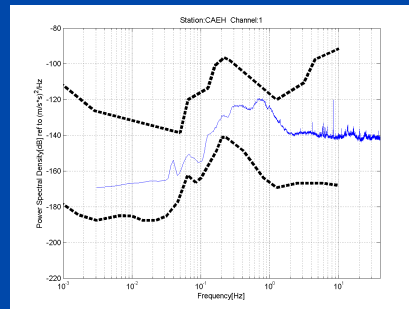
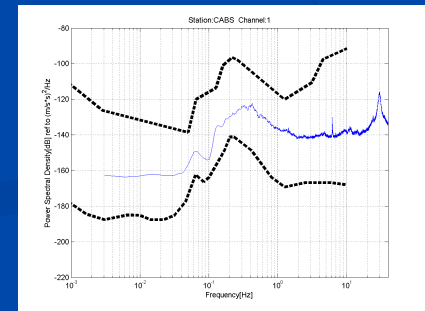
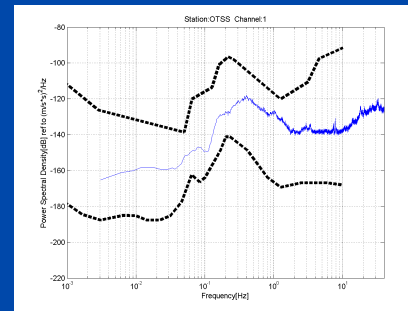
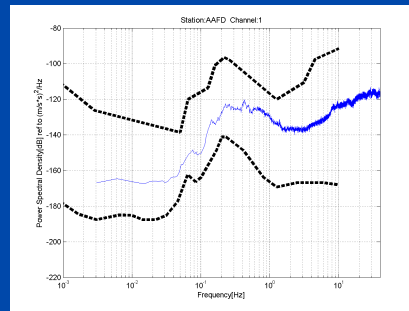
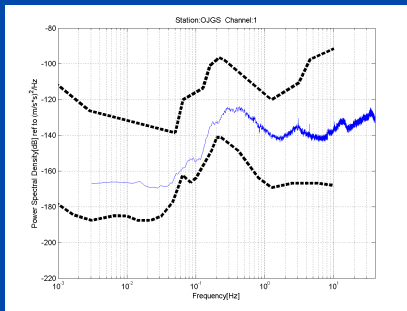
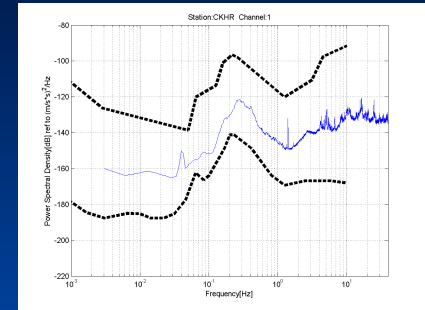
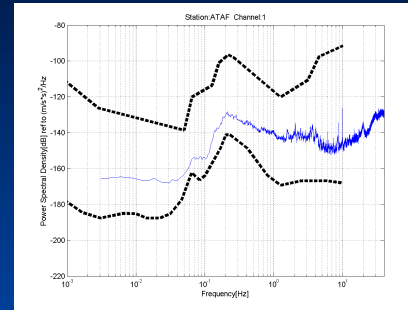
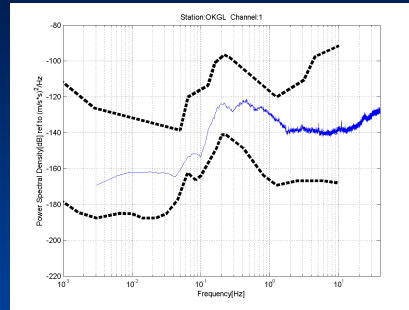
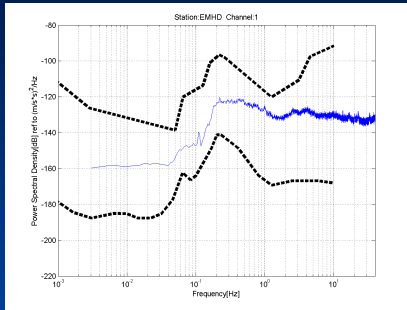


Near Real-time data acquisition and exchange



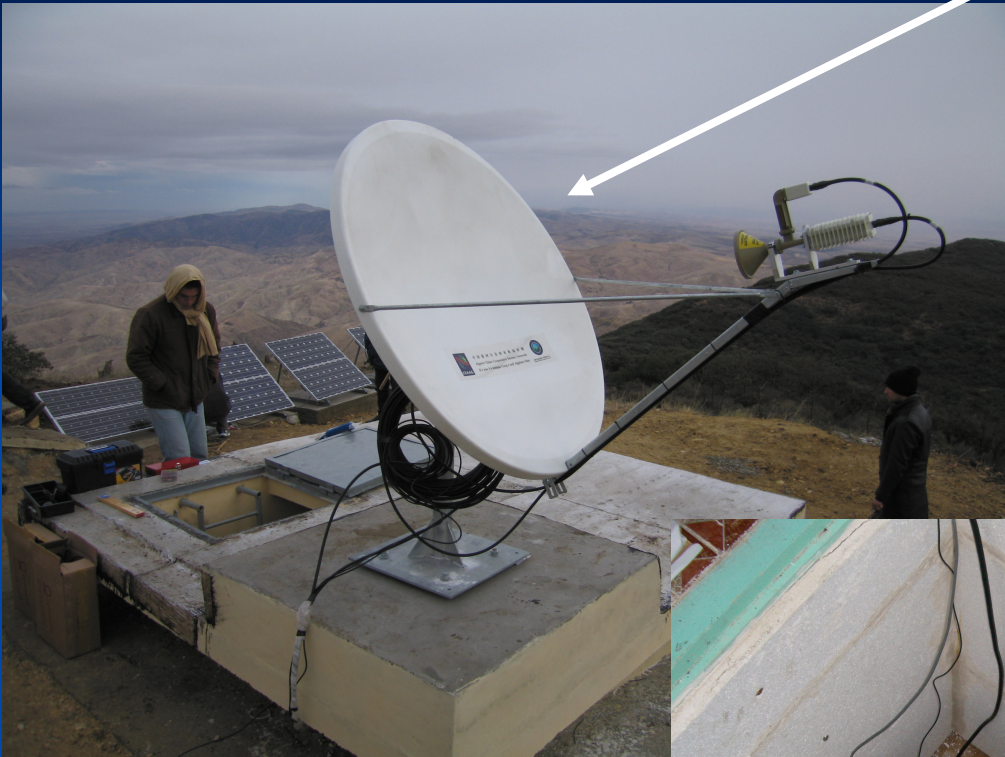
DC Power (Solar Panel)

Site Survey for 10 BB Stations before Installation (2006)



Example of BB station installed (OTSS, Jan 2007)

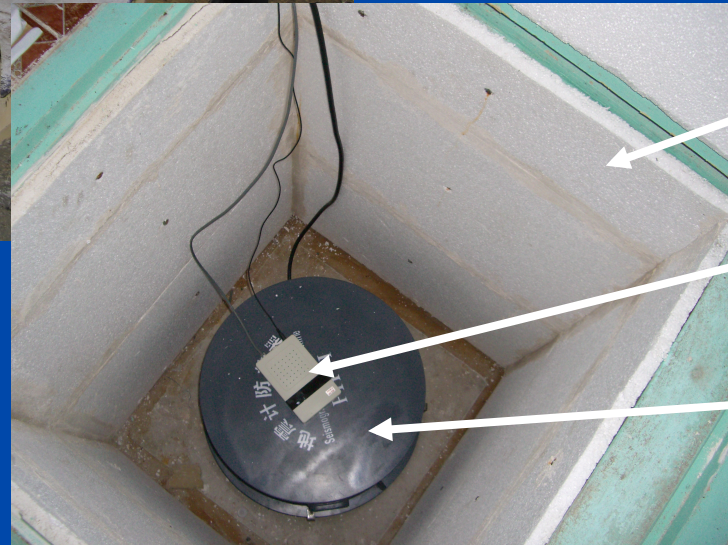
VSAT Antenna



Digitizer: EDAS-24IP



BBVS-60



Hole

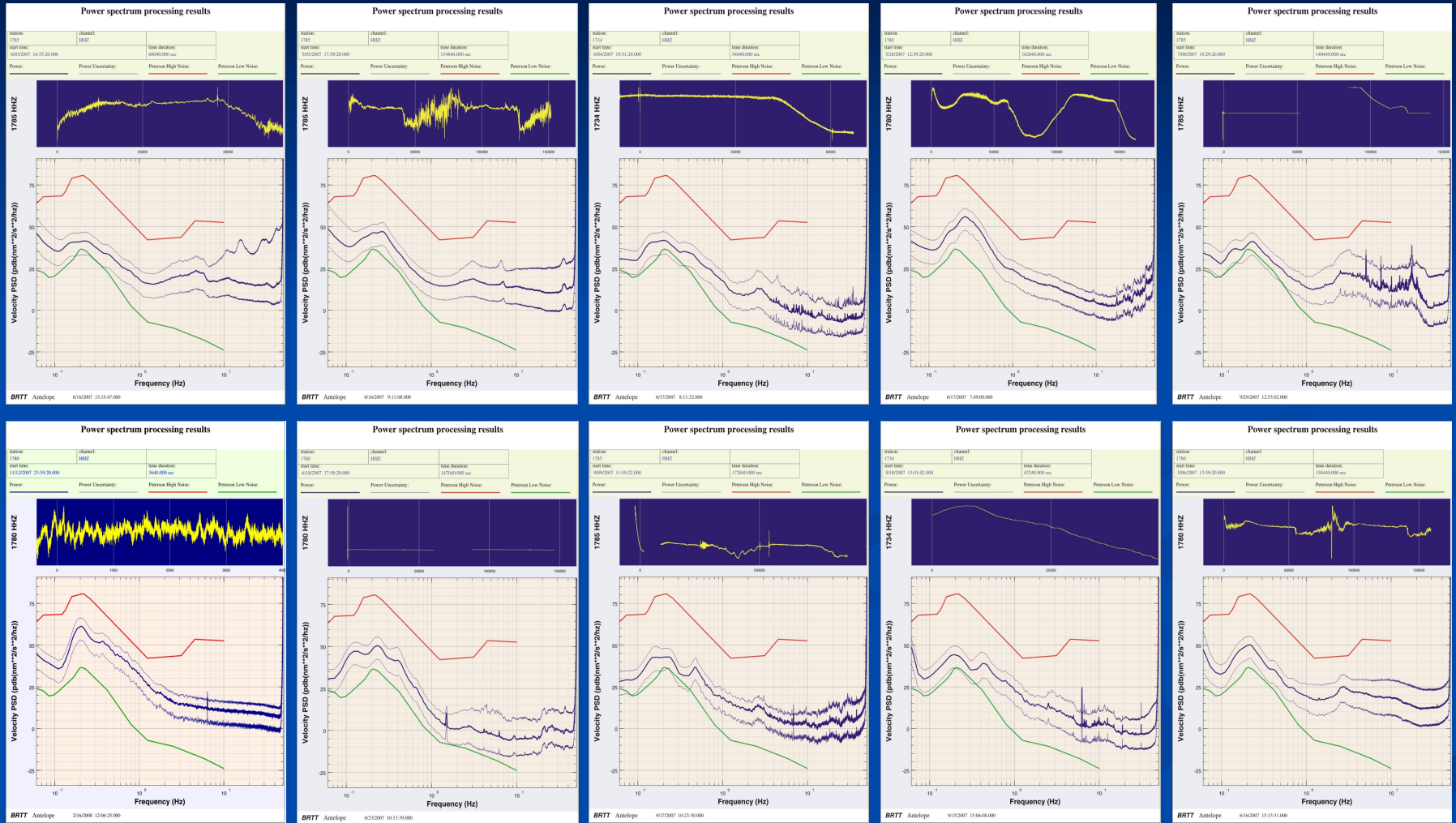
Environment Equipment

Cover

Site Survey for New BB Stations (Geological criteria)

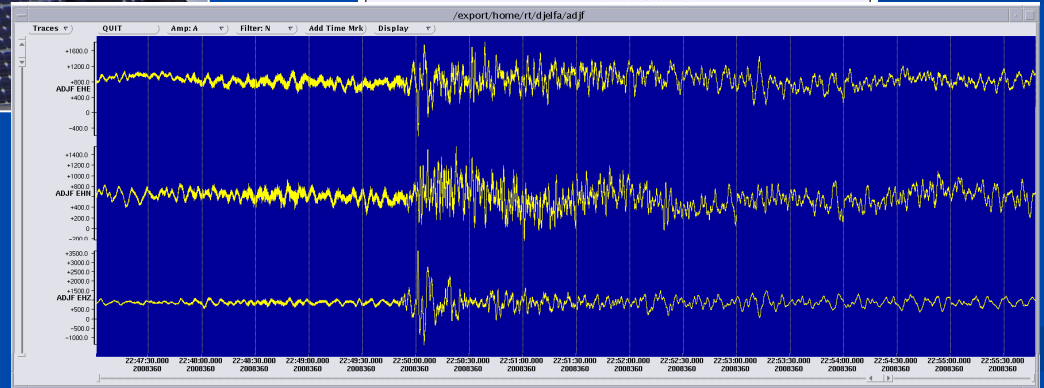
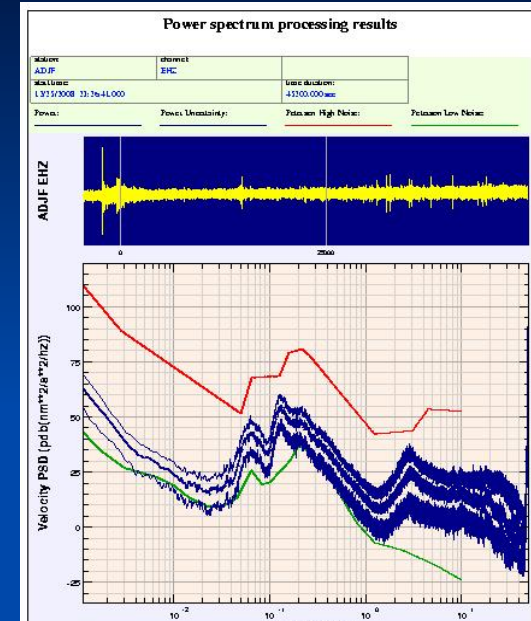


Site Survey for New BB Stations (PSD)



Example of New BB station installed (ADJF , Dec 2008)

VSAT Antenna
GPS Station



Digitizer: Q330



STS-2

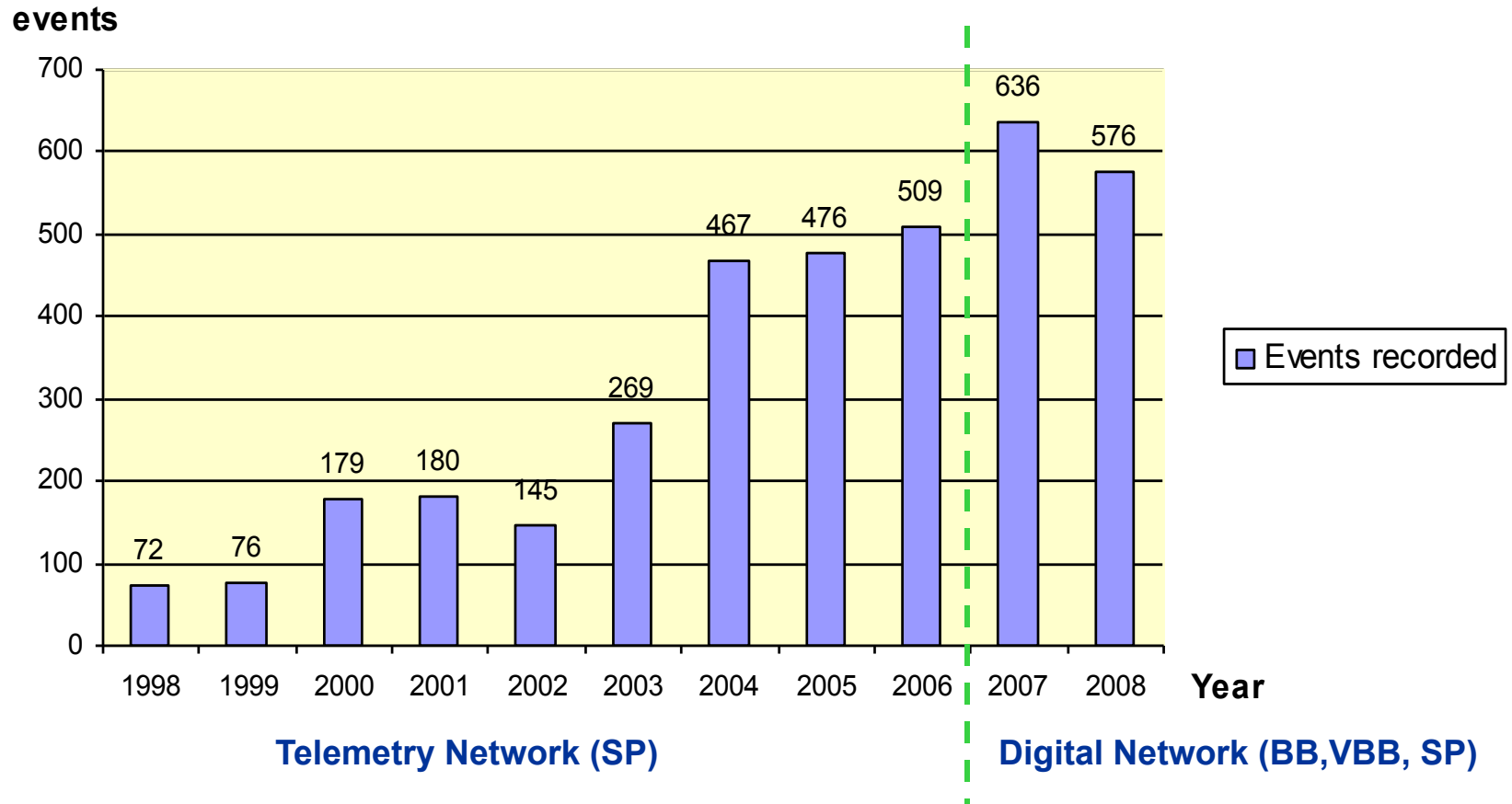
time=25.Dec 22:40:33, mb= 5.65 NEAR COAST OF PAKISTAN

Data Recorded



Event Recorded by Algerian Seismic Network

Number of events recorded



Continuous Data Recorded by Digital Network

BB stations

BBVS-60 / EDAS-24IP

Number : 08

Channels : 3 (BHZ, BHN, BHE)

Sampling rate : 100Hz

Started to record : December 2006

Continuous Data available : 2 years and 01 month

Acquisition mode : Real Time using VSAT Transmission

BBVS-120 / EDAS-24IP

Number : 02

Channels : 3 (BHZ, BHE, BHN / LHZ, LHE, LHN)

Sampling rate : 100Hz, 1Hz

Started to record : December 2006

Continuous Data available : 2 years and 1 month

Acquisition mode : Real Time using VSAT Transmission

STS-2 / Q330

Number : 03

Channels : 3 (HHZ, HHE, HHN / BHZ, BHE, BHN / LHZ, LHE, LHN)

Sampling rate : 100Hz, 20Hz, 1Hz

Started to record : January 2009

Continuous Data available : Less than 1 month

Acquisition mode : Real Time using VSAT Transmission

Short Period stations

DS-A / Q330

Number : 01

Channels : 3 (EHZ, EHN, EHE)

Sampling rate : 100Hz

Started to record : April 2007

Continous Data available : 1 year and 10 months

Acquisition mode : Cable Transmission

SS-1 / Q330

Number : 30

Channels : 1 (EHZ)

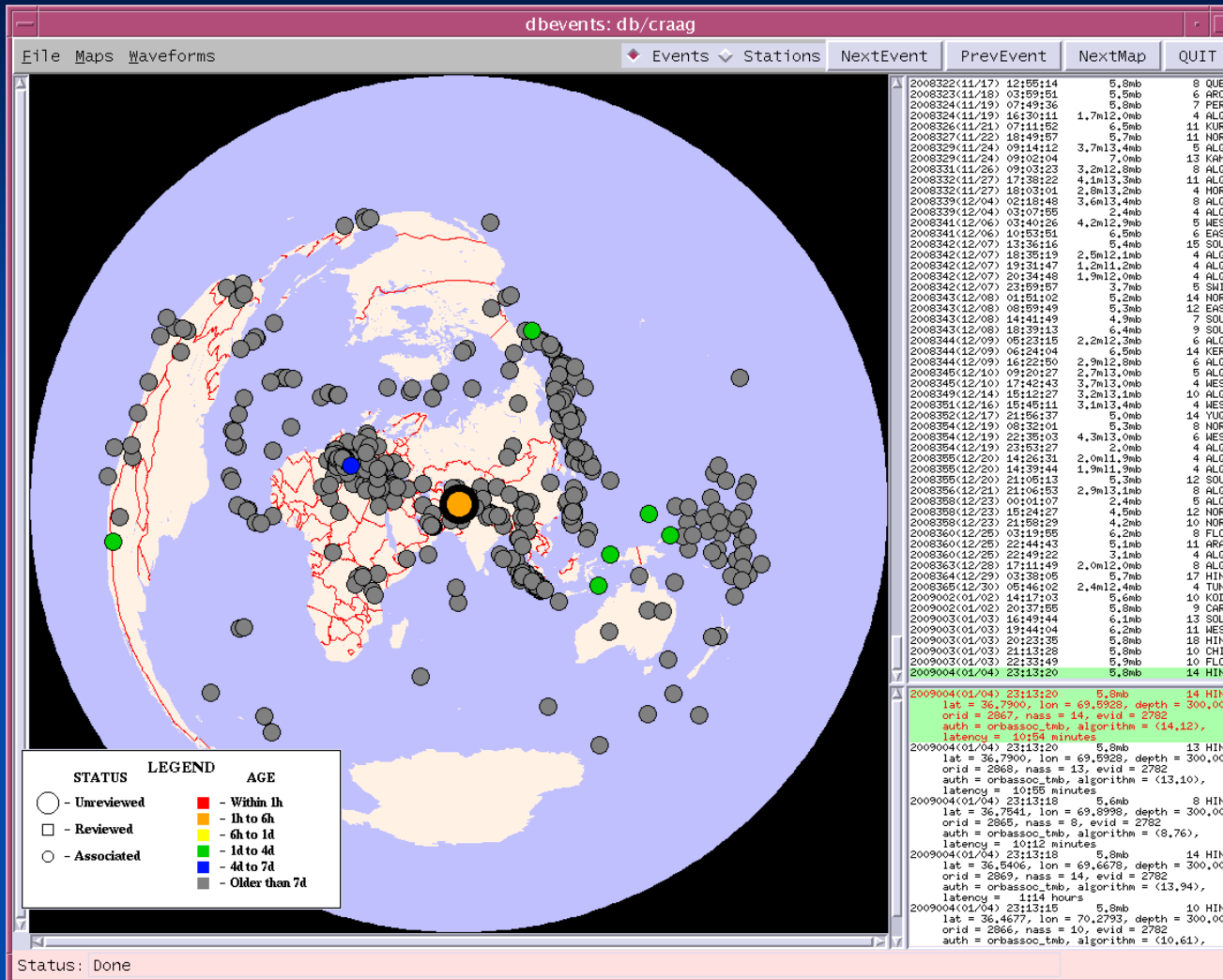
Sampling rate : 100Hz

Started to record : November 2008

Continous Data available : 03 Months

Acquisition mode : Wireless Transmission

Event Recorded by Digital Network

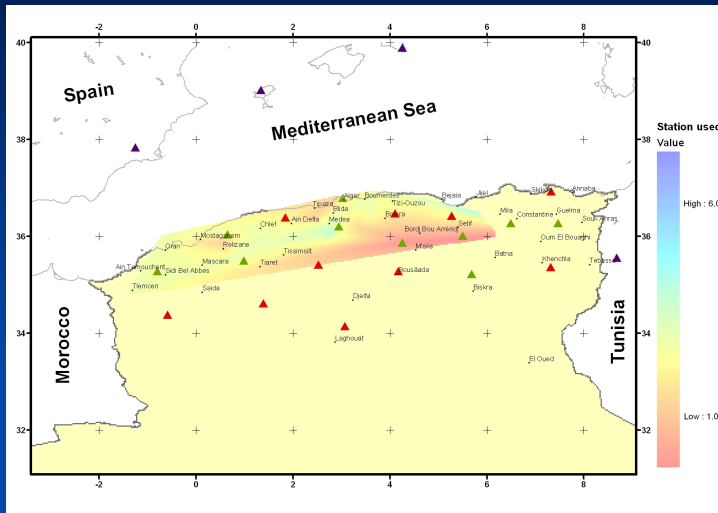


Automatic location :

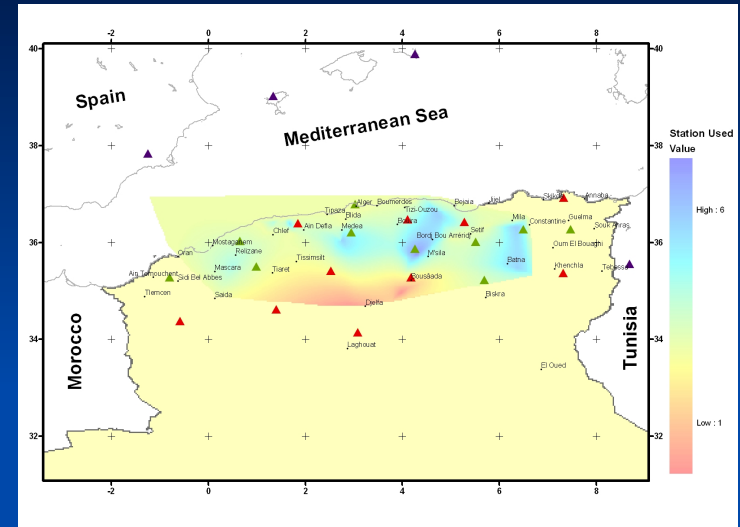
- Local event : 506
- Regional event : 43
- Teleseismic event : 279

Digital Network (BB,VBB, SP)

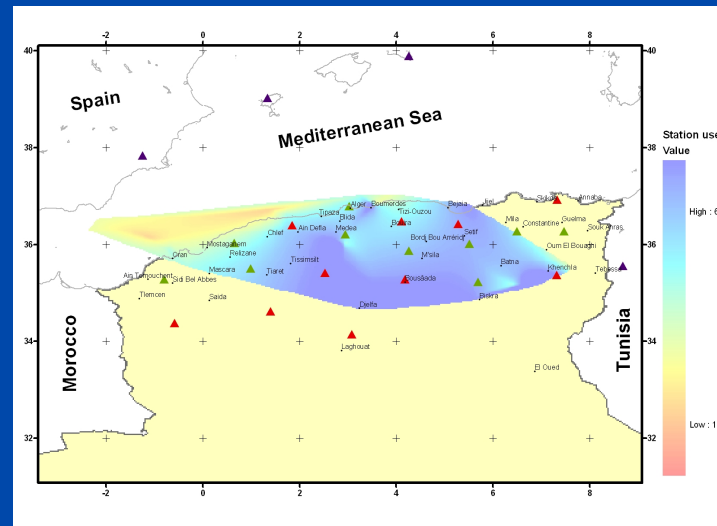
Area covered by the Network (Only Data recorded by BB station since December 2006)



Magnitude ~ 2



Magnitude ~ 3



Magnitude ~ 4

Antelope System 4.10

Data Acquisition

Data Analysis (Automatic processing)

Monitoring

Archiving Data

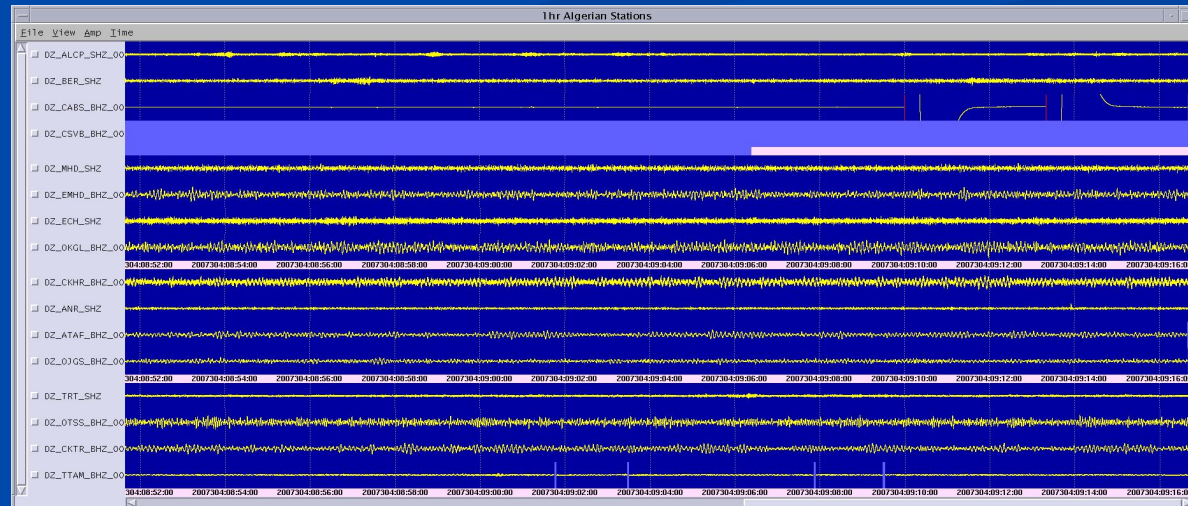
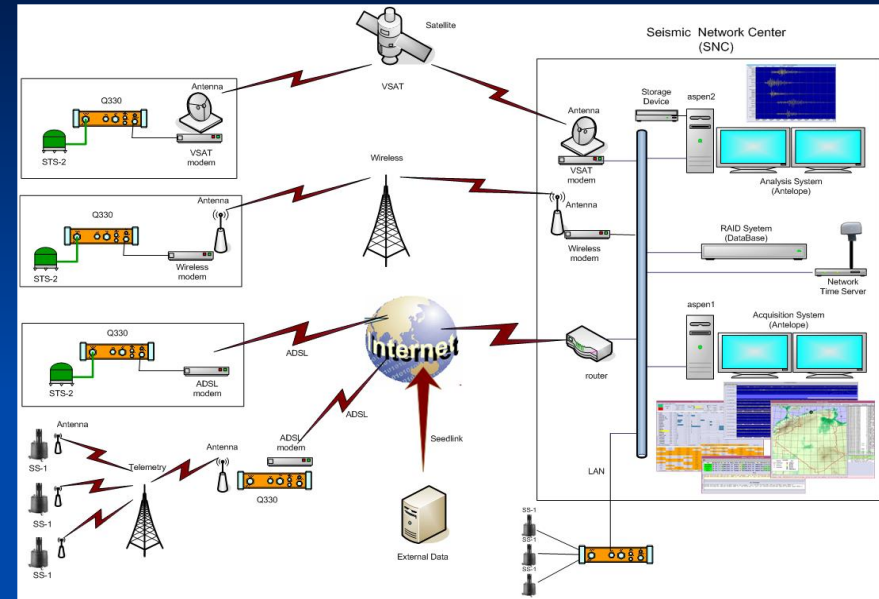
Data Exchange

Seismic Alert

Data Acquisition

Number of Stations Connected :

- (13) BB Stations
(RealTime / VSAT)
- (30) SP Stations
(RealTime / GSM, ADSL)
- (22) Episensor
(RealTime / GSM, ADSL)
- (09) External Stations
(Seedlink, orb2orb, Liss)



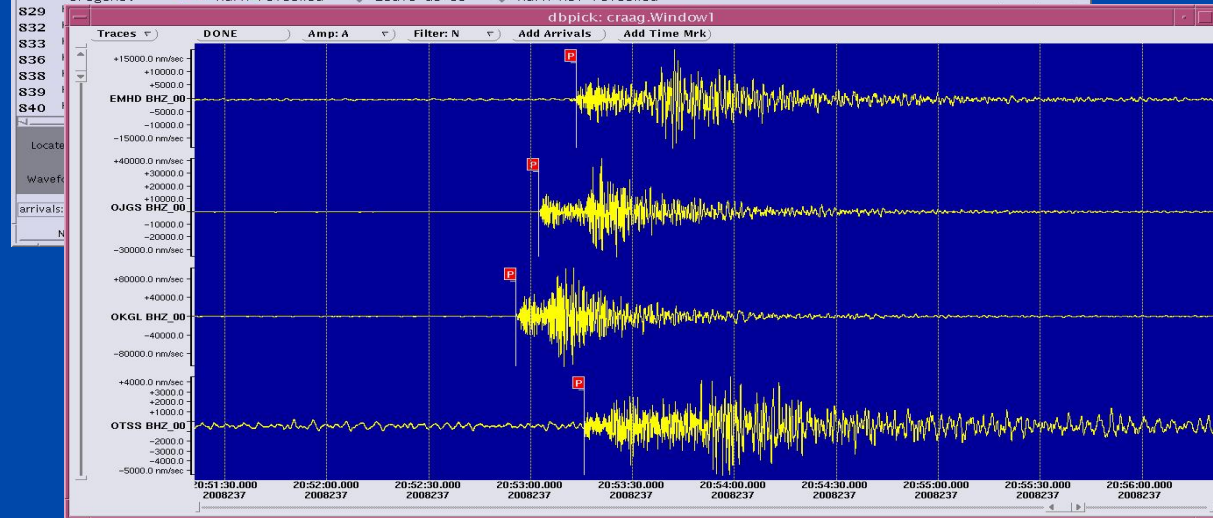
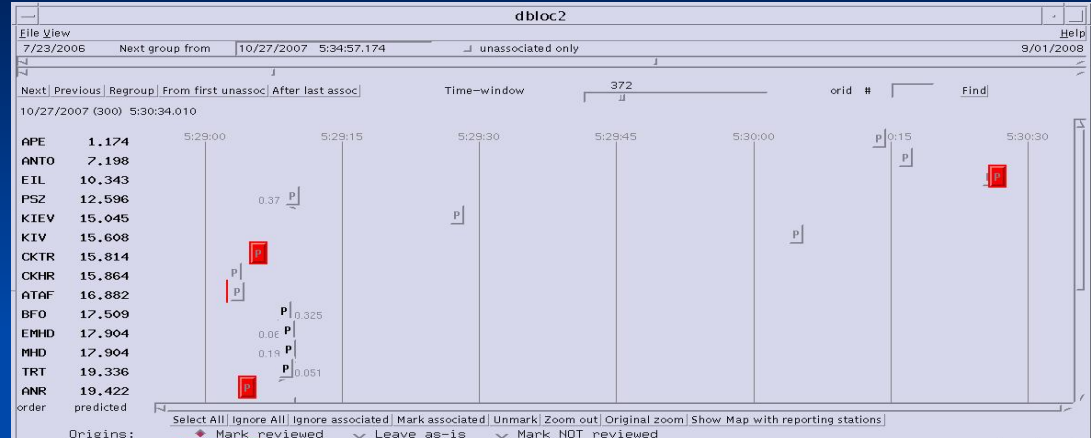
Data Analysis

Automatic processing

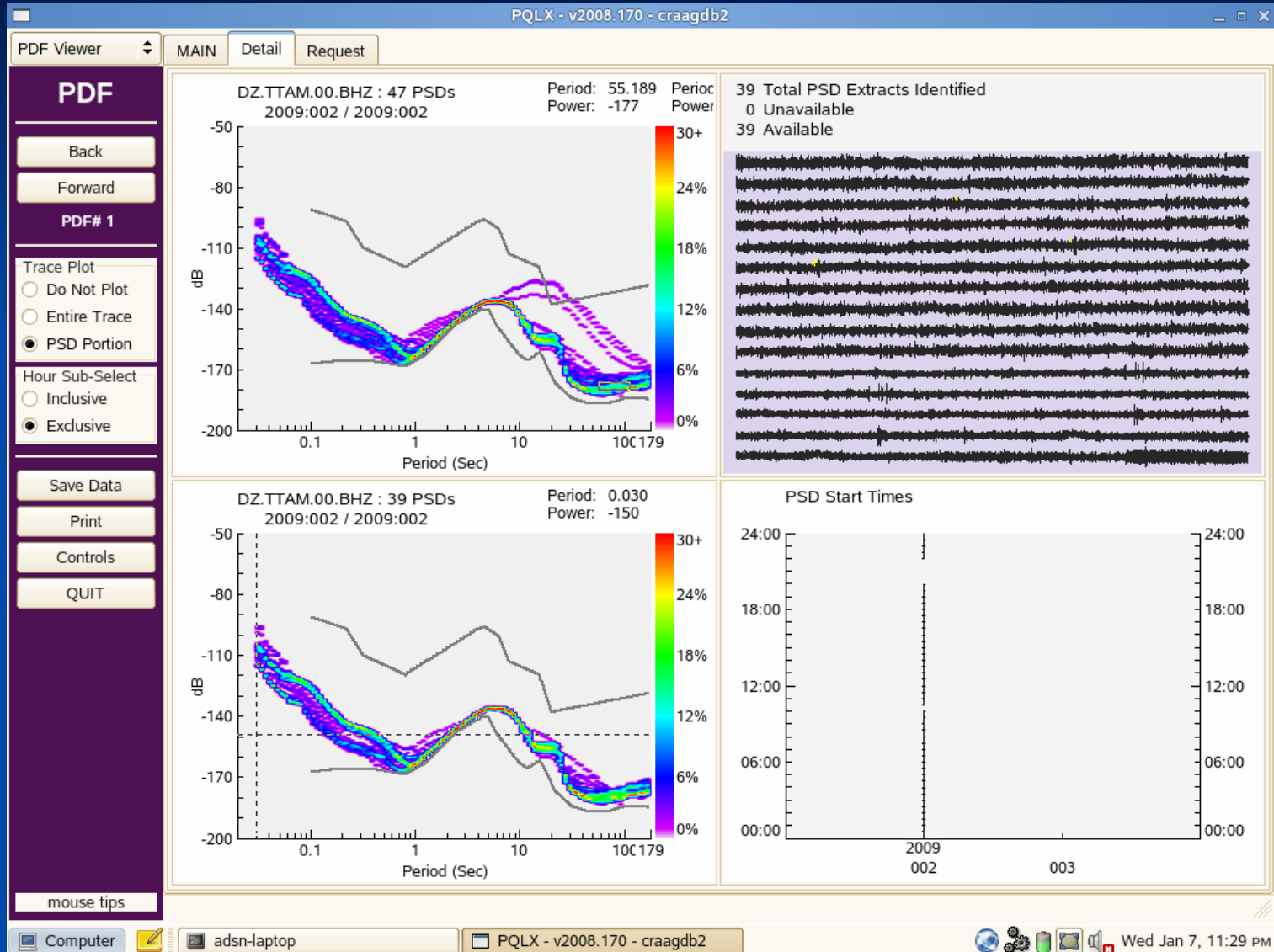
- P-wave picking
- event association
- event localization
- computation of MI or Mb
- creation of www page
- distribution of e-mail/
SMS alerts (<5min)

Manual processing

- phase picking
- event association
- event localization
- computation of MI, Mb
- creation of database
- distribution of reports/
bulletins



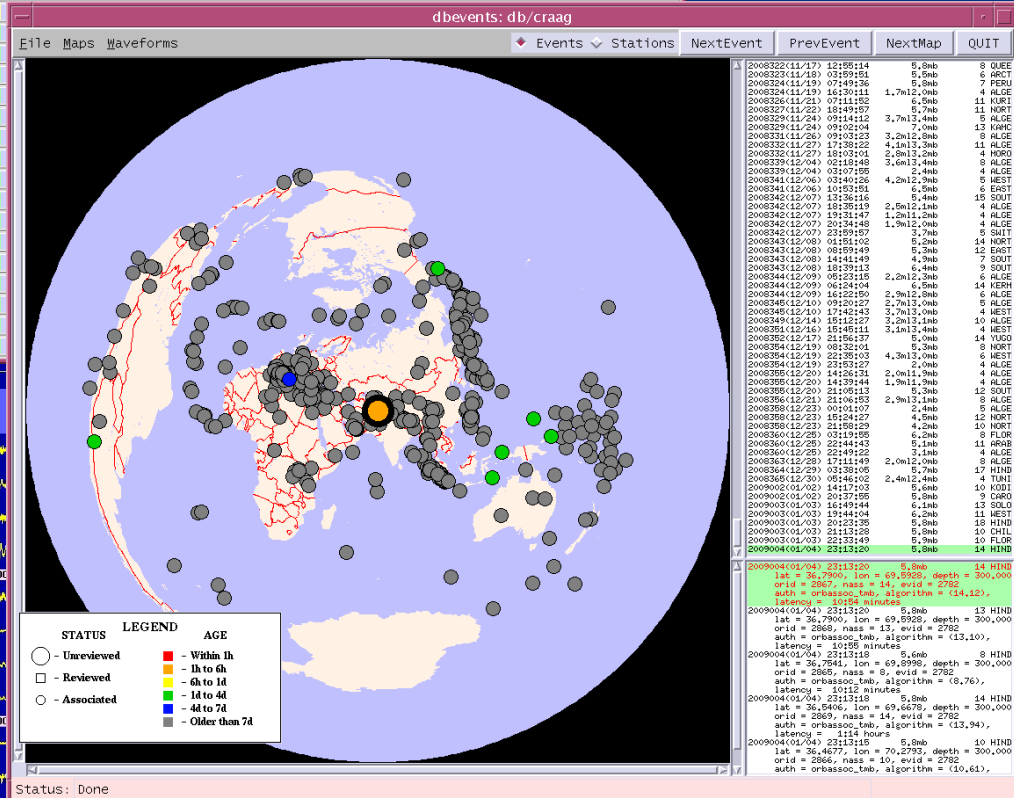
Data Analysis : PQLX



Monitoring

State of health

dname	comt	comp	gp24	gp1	nr24	pmp	SLT	dltacy	runtm	tp	cme	bufr	nr24	np24	nr24	dr	br24	bu24	mems	ade	cats	cltacy	lcq	cldr	m0-2	m3-5	temp	volt	amp	gps	gps	pll	lat	lon	elev			
DZ_ABKD	0s	0s	0	0	0	0	00s	2002b46m14s	2002b47m50s	0.00	100%	0.0%	0	24	0k	299k	0	0	0	0	00s	97%	-25ms	20	20	16C	12.8V	61mA	ona	3D	T	36.535	2.310	218m				
DZ_AKET	22h	0s	0	0	0	0	00s	16h15m49s	05h09m13s	0.00	100%	0.0%	12	24	276k	340k	0	0	0	0	01h07m00s	53%	0us	20	20	6C	12.4V	68mA	offp	If	H	36.054	3.891	1259m				
DZ_CAEH	0s	0s	0	0	0	0	00s	9d12h56m20s	9d11h51m01s	0.00	100%	43%	0	24	0k	304k	0	0	0	0	01h05m00s	54%	1us	20	21	15C	10.8V	71mA	offp	If	H	36.786	6.850	443m				
DZ_COAT	0s	0s	0	0	0	0	00s	16d10h04m32s	16d10h04m09s	0.00	100%	0.0%	0	24	0k	303k	0	0	0	0	02h07m00s	47%	0us	20	20	11C	11.1V	71mA	offp	If	H	36.235	6.285	859m				
DZ_OMFR	0s	0s	0	0	0	0	00s	14d11h21m46s	14d09h37m48s	0.00	16%	0.0%	0	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
DZ_ARMS	2d	0s	2	0	0	0	00s	03s	20m15s	1.00	100%	0.0%	4	7.1k	0	0	0	0	0	0	03s	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
DZ_ABZH	0s	0s	0	0	0	0	00s	03s	37m38s	1.00	100%	0.0%	25	5.4k	0	0	0	0	0	0	03s	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
DZ_ADJF	6d	0s	4	0	0	0	00s	08s	37m00s	1.06	100%	0.0%	19	8.1k	0	0	0	0	0	0	08s	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
DZ_AECH	3h	57m	0	0	0	0	00s	01h25m18s	30m27s	0.51	70%	100%	26	7.3k	0	0	0	0	0	0	03s	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
DZ_AKED	0s	0s	0	0	0	0	00s	03s	36m19s	1.00	100%	0.0%	28	6.3k	0	0	0	0	0	0	03s	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
DZ_CBST	0s	0s	0	0	0	0	00s	03s	37m11s	1.00	100%	0.0%	27	2.3k	0	0	0	0	0	0	03s	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
DZ_CDPR	0s	0s	0	0	0	0	00s	03s	47m40s	0.98	96%	0.0%	27	6.8k	0	0	0	0	0	0	03s	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
DZ_CMAH	0s	0s	0	0	0	0	00s	11s	48m12s	0.97	96%	0.0%	29	6.9k	0	0	0	0	0	0	03s	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
DZ_CTEI	0s	0s	0	0	0	0	00s	03s	48m10s	1.00	100%	0.0%	29	2.0k	0	0	0	0	0	0	03s	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
DZ_CTOG	0s	0s	0	0	0	0	00s	03s	19m34s	1.00	95%	0.0%	30	2.1k	0	0	0	0	0	0	03s	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
DZ_EANR	0s	0s	0	0	0	0	00s	03s	35m47s	1.00	99%	0.0%	27	7.4k	0	0	0	0	0	0	03s	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
DZ_EBER	0s	0s	0	0	0	0	00s	03s	20m00s	1.00	99%	0.0%	28	2.2k	0	0	0	0	0	0	03s	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DZ_FODD	0s	0s	0	0	0	0	00s	03s	20m47s	1.00	98%	0.0%	28	2.0k	0	0	0	0	0	0	03s	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DZ_ETRT	12h	0s	1	0	0	0	00s	03s	37m09s	1.01	100%	0.0%	14	9.0k	0	0	0	0	0	0	03s	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DZ_ODJA	0s	0s	0	0	0	0	00s	03s	36m12s	1.00	99%	0.0%	28	6.8k	0	0	0	0	0	0	03s	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DZ_OIHC	0s	0s	0	0	0	0	00s	03s	37m12s	1.00	100%	0.0%	26	9.3k	0	0	0	0	0	0	03s	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



Stream monitoring

Events monitoring

Archiving Data

- Separate archiving of waveforms and parametric data
- Waveforms: disk array and DVD
- Readings, localizations and station parameters: css 3.0 schema

dbhelp:css3.0

Schema: css3.0
Path: ../dbmaster/{craag}
Center for Seismic Studies Schema Version 3.0

digitizer.samprate

sampling rate in samples/sec
This attribute is the sample_rate in samples/second. In the instrument relation this is specifically the nominal sample rate, not accounting for clock drift. In wfdisc, the value may vary slightly from the nominal to reflect clock drift.

Some special channels, like log channels, have this set to zero.

Field type: REAL
characters: 11
First character: 110
printf format: %11.7f
Null value: -1.0000000
Range: samprate >= 0.0
Units: 1/seconds

Used in tables:
calibration calresult digitizer dmcwf instrument nominalresp seismometer stage wfdisc wftape wftar

digitizer

digitizer/calibrator parameters
This relation holds basic digitizer and calibrator parameters.

Primary key: net sta chan time endtime model manu ssidnt samprate phchan lddate
Foreign keys: ssidnt
Record Size (bytes): 144

arrival_tshift	assoc	b051	b059
chanperfl	comm	deployment	detection
fkgrid	fplane	gap	gps
netmag	netperf	network	nominalresp
qgrid	ratechange	remark	retransmit
snetsta	speedisc	sregion	stage
wfdisc_tshift	wfedit	wfmeas	wfmgme

Dismiss

Table of station parameters:

origerr	origin	predarr	predmech	q330comm	q730b	qgrid	ratechange	remark	retransmit
schanloc	seismometer	sensor	site	sitechan	sitephotos	snetsta	speedisc	sregion	stage
stamag	stanotes	stassoc	strgrid	trigger	wfdisc	wfdisc_tshift	wfedit	wfmeas	wfmgme
wfoffset	wfrms	wftag	wftape	wftar					

Search for.. About dbhelp

File Options

affiliation arrival assoc calibration changed detection emodel event gap instrument lastid net

craag site

0	sta	ondate	offdate	lat	lon	elev	staname	statype
	AECH	2007290		36.1602	1.3451	0.2200	Accelerometre de Chlef	
	ALCP	2006335		36.7971	3.0321	0.3910	Alger, Data Centre	
	ANR	2007001		35.9200	1.1000	0.7270	Ain Nsour, Chlef, Algeria	
	ATAF	2006335		35.8718	4.2657	1.0400	Msila	
	BIA	2007001		36.2900	1.5300	0.6360	Beni Rached, Chlef, Algeria	
	CABS	2006335		36.2766	7.4733	1.0720	Guelma	
	CKHR	2006335		36.0171	5.5113	1.3310	Setif	
	CKTR	2006335		35.2267	5.6902	0.6460	Biskra	
	CSVB	2006335		36.2716	6.4964	0.7200	Constantine	
	ECH	2007001		36.1600	1.1345	0.2201	Chlef, Algeria	
	EMHD	2006335		36.2052	2.5503	1.2800	Medea	
	HND	2007001		35.2100	2.3500	1.2800	Mehouada , Medea, Algeria	
	OGCS	2006335		35.5054	0.9900	0.9900	Tiaret	
	OKGL	2006335		36.0370	0.6561	0.5940	Mostaganem	
		35.2819		-0.7937	1.1200	1.1200	Sidi Belabbes	
		35.3800		1.3000	1.2210	1.2210	Tiaret, Tiaret, Algeria	
		22.7917		5.5284	1.4130	1.4130	Tananasrasset	
		37.0689		25.5306	0.6200	0.6200	GEOfON/NOA Station Apirathos, Naxos, Greece	ss
		29.6699		34.9312	0.2100	0.2100	GEOfON Station Eilat, Israel	ss
		38.3134		38.4273	1.1200	1.1200	GEOfON/medNet Station Malatya, Turkey	ss
		47.9184		19.8944	0.9400	0.9400	GGK/GEOfON Station Piszkes, Hungary	ss
		44.4581		28.4128	0.0770	0.0770	GEOfON Station Tirgusor, Romania	ss
		49.6646		6.1526	0.2950	0.2950	GEOfON Station Walferdange, Luxembourg	ss
		42.6390		74.4940	1.6450	1.6450	Ala Archa, Kyrgyzstan	ss
		51.8937		-176.6844	0.1160	0.1160	Adak, Aleutian Islands, Alaska	ss

Dismiss

Help

cdisc stage stamag wfdisc wftar

Quit

craag site

File Edit View Options Help

Add ok x

1

ALCP	2006335	offdate	36.7971	3.0321	0.3910
sta	ondate	offdate	lat	lon	elev

Alger, Data Centre
staname

10/22/2007 (295) 13:42:17.39513
lddate

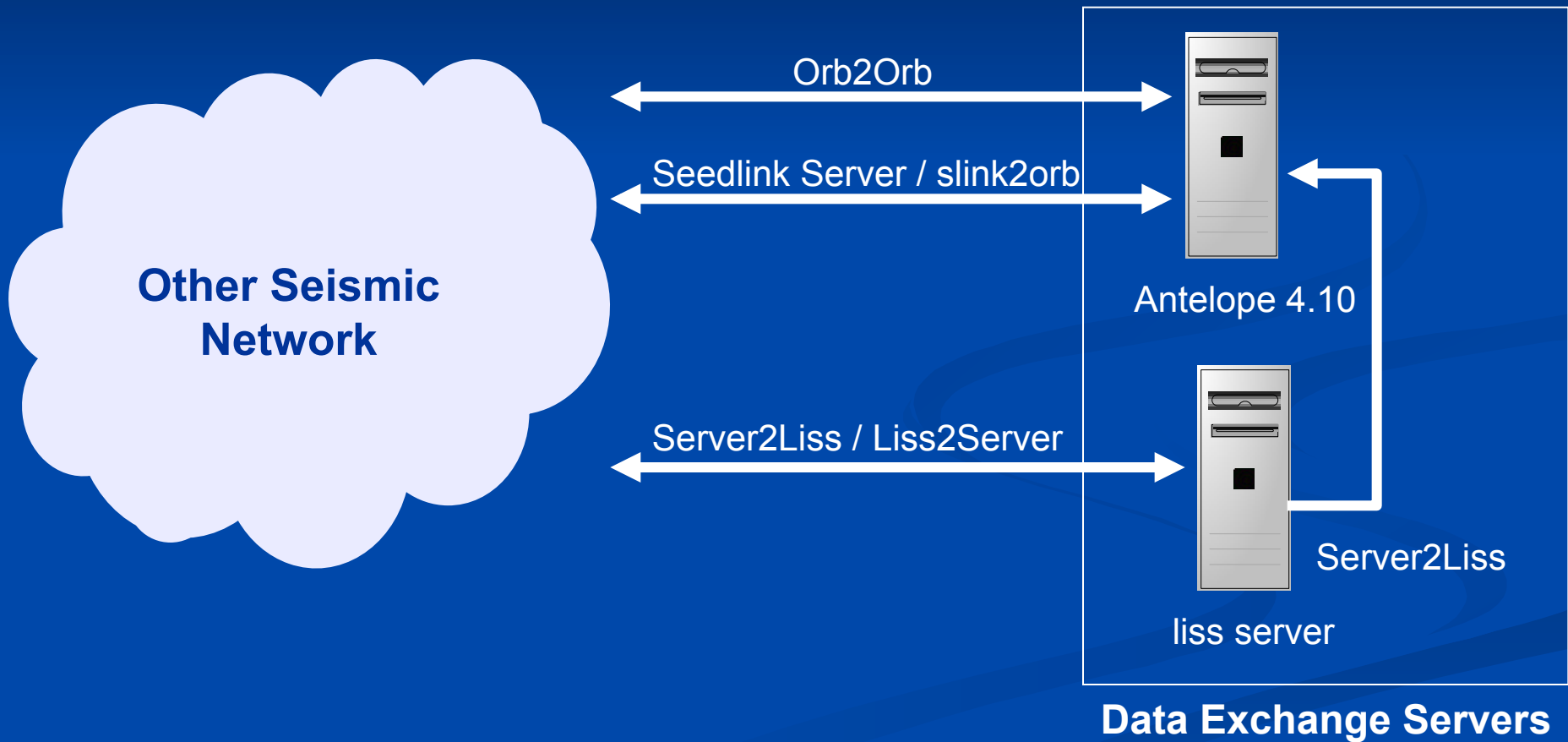
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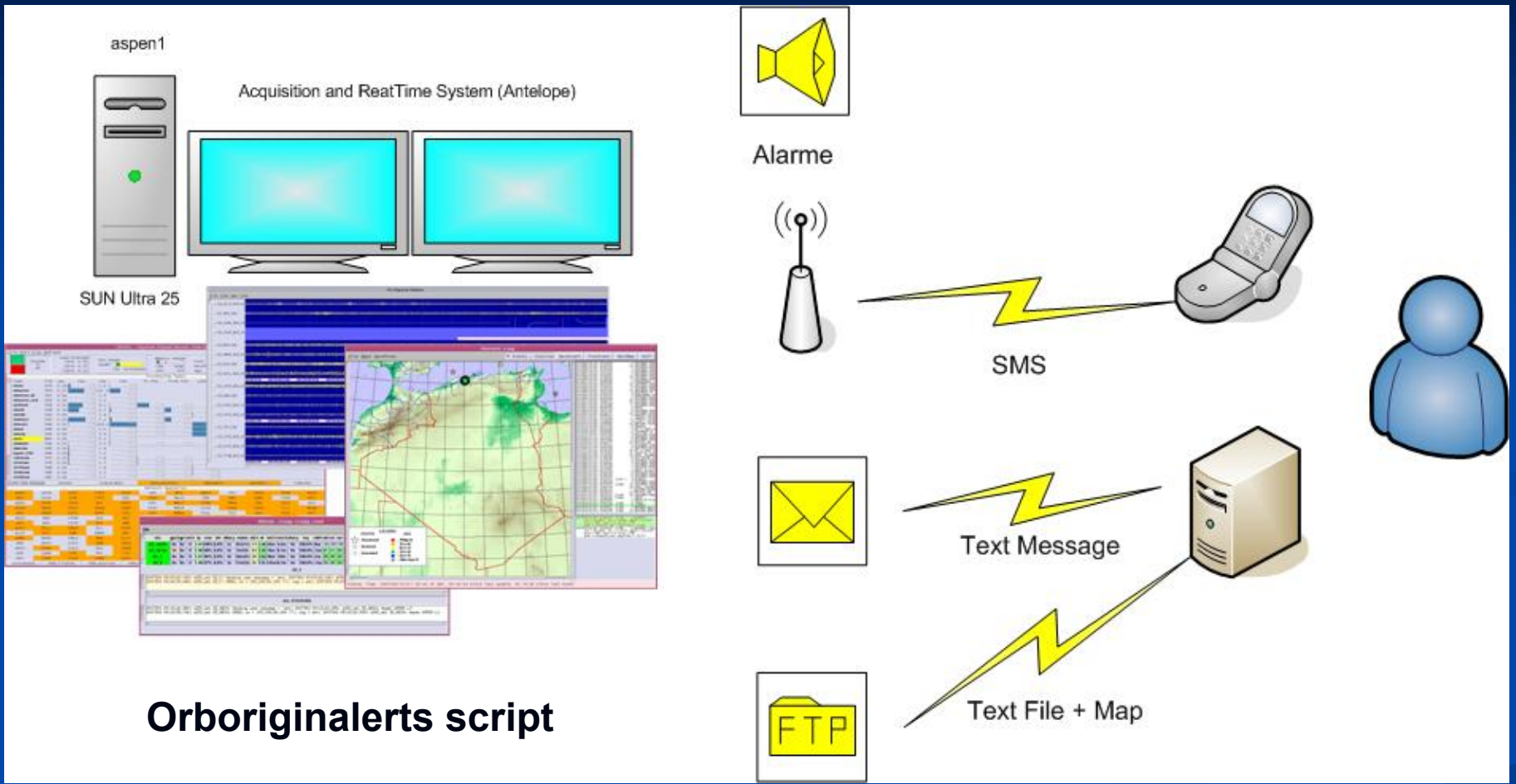
Data Exchange

1

Available protocol to exchange data :



Seismic Alert



Automatic location and sending Alert less than 5 min

Futur Actions



Futur Actions

- Installation : (07) BB stations (STS-2 / Q330)
- Acquisition in 2009 of 30 new BB , 75 SP and 75 episensor
- Web Site Monitor using BSC method (Balanced ScoreCards) and Web Services.
- Data Exchange : Autodrm Server
- Contribution to the Alert system for the tsunami in the Mediterranean region (IOC-EERWEM projects)

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THANK YOU

