

THE HELLENIC BROADBAND SEISMIC NETWORK (HL) AS IT IS OPERATED AT THE INSTITUTE OF GEODYNAMICS OF THE NATIONAL OBSERVATORY OF ATHENS

“Progress report for FDSN group”

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Summary

Since 1997 a new effort has been put to upgrade the Seismic Network operated in Greece by the Institute of Geodynamics of the National Observatory of Athens (NOA-IG). In the first stage, an upgrade from analogue to digital was implemented, taking into consideration the possibility for the Network to link outstations to Athens via dedicated telephone leased lines and transfer not only the digital seismic signals, but also to take advantage of the available connection, and transfer also other signals up to the available baud rate (in most cases 64Kb). The second stage involved upgrade of the seismic network monitoring and attenuation system by implementing SeisComP freeware software. This made also possible to include in the autolocation procedure other stations available in the Eastern Mediterranean Region (i.e. GEOFON and MEDNET VeryBroadBand stations) and improve locations especially around the Hellenic Trench. The resulted Hellenic Broadband Network (HL) currently operates with a dedicated web page <http://bbnet.gein.noa.gr> and gives information on automatic locations for earthquakes with local magnitude greater than 3 that occur in Greece and adjacent region. The trial period of operation for the last six months showed sufficiently good results of the automatic procedure and further dissemination with e-mails and sms messages is also planned. Other advantages such as data exchange in near real time with Orfeus ODC, GEOFON, MEDNET and other neighboring networks demonstrate that this application can be attractive for other implementations in Europe.

Current State

Today 22 stations have been upgraded to digital broadband (Fig. 1 – Table 1) and their signal is transferred in real-time via telephone dedicated leased lines to Athens HL

central basis. There the initial recording system (ICP of Geotech Instruments) has been replaced by a multi serial port to Ethernet output (Moxa server) connecting all serial ports received at Athens to a Seedlink/SeisComP server Linux PC, which performs acquisition – monitoring. Several other Linux and Unix workstations connected into a private LAN take care of other normal base station tasks, i.e. data storing (DDS-4 DAT media as an end storing product) both for all continuous recorded streams as well as older ICP produced event triggered files as well as 15 min continuous data files. Further more, autolocation and presentation of resulted products, such as Qplots (Fig.2), Alerts (Fig.3), e-mail/sms alerts etc are handled by in house implemented perl scripts within the local private LAN and presented in the newly developed webpage dedicated for this purpose (<http://bbnet.gen.noa.gr>).

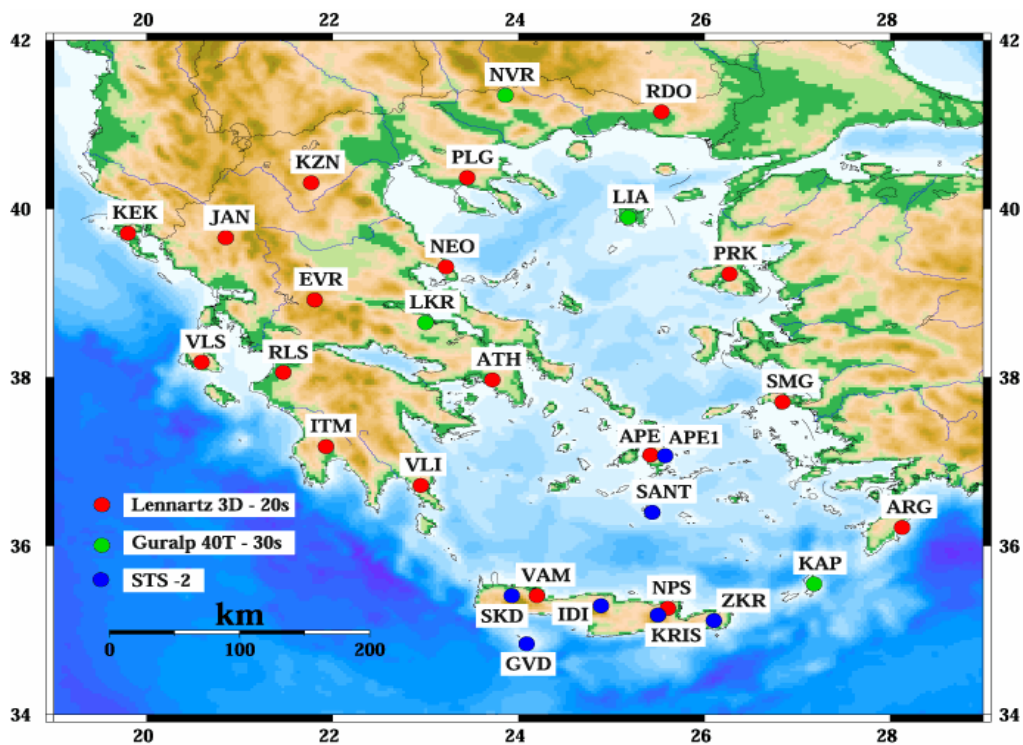


Figure 1. NOA-IG (HL) Station Map. Stations with blue bullets are GEOFON stations, except for IDI station, which is MEDNET station and operates also as auxiliary CTBT station.

Table 1. Station List for HL Broadband Seismic Network.

Code	Lat (N)	Lon (E)	Elev	Site	Start Time	Instrument
APE	37.0690	25.5310	620	Apeiranthos Naxos	1998-10-23	Le3D/20
ARG	36.2160	28.1260	170	Archangelos Rhodes	1997-10-14	Le3D/20
ATH	37.9720	23.7170	95	Athina	1997-04-17	Le3D/20
EVR	38.9200	21.8100	1050	Evrítania	2000-02-09	Le3D/20
ITM	37.1786	21.9252	400	Ithomi Messinia	1997-06-05	Le3D/20
JAN	39.6570	20.8510	540	Janena	1998-07-15	Le3D/20
KARP	35.5500	27.1600	530	Karpathos	2003-01-22	CMG40T/30
KEK	39.7100	19.8000	280	Kerkira	2000-03-01	Le3D/20
KZN	40.3070	21.7710	900	Kozani	1997-11-18	Le3D/20
LIA	39.9000	25.1800	60	Limnos	2001-11-09	CMG40T/30
LKR	38.6500	23.0000	180	Atalanti Lokrida	2002-03-26	CMG40T/30
NEO	39.3100	23.2200	500	Neochori Volos	2000-04-07	Le3D/20
NPS	35.2630	25.6130	370	Neapolis Crete	1997-08-05	Le3D/20
NVR	41.3500	23.8600	595	Nevrokopi	2001-11-23	CMG40T/30
PLG	40.3740	23.4460	580	Poligiros Chalkidiki	1997-05-23	Le3D/20
PRK	39.2460	26.2720	100	Agia Paraskevi Lesvos	1998-03-05	Le3D/20
RDO	41.1460	25.5380	100	Gratini Rodopi	1998-12-15	Le3D/20
RLS	38.0600	21.4700	100	Riolos Achaia	2001-07-23	Le3D/20
SMG	37.7100	26.8400	340	Samos	2000-05-18	Le3D/20
VAM	35.4070	24.2000	225	Vamos Crete	1997-06-08	Le3D/20
VLI	36.7200	22.9500	220	Velies Lakonia	2000-01-24	Le3D/20
VLS	38.1750	20.5900	375	Valsamata Kefalonia	1997-05-07	Le3D/20

More Network Information - Developments

All stations listed in Table 1 are recorded using Geotech Instruments DR-24 digitizers operating at 50HZ digitization rate and continuous digital samples are transferred to Athens central base via leased telephone lines. There, all signals via serial multiplexing are monitored by a Seedlink/SeisComP Server run on a Linux PC. SeisComP software has been implemented and adapted at NOA with the collaboration of the GEOFON group and all products have been organized with in house developed perl scripts – html software.

Currently four stations (ARG, ITM, KEK, RDO) are made available to Orfeus ODC and GEOFON group, while KEK to MEDNET. Stations IDI_MN, SANT_GE and APE_GE are also handled by the HL acquisition system and are made available to MEDNET (MN) and GEOFON (GE) respectively via internet. Stations AQU, WDD, VTS are also recorded at NOA made available via MEDNET server while the rest of GEOFON stations in Greece as well as ISP, MALT, EIL, CSS, KSDI are made available via GEOFON server. All above stations in addition to HL stations are used in the automatic location procedure developed by the GEOFON group and applied at NOA - HL Network. Detected events produce alerts which are sent to EMSC and also reported via perl script to the HL dedicated webpage. Maps and info for the alerts are organized in monthly basis and updated every time more delayed phase picks are made available. SMS messages are also sent to declared mobile phone numbers for events satisfying certain criteria. A newly developed – upgraded station site is shown in Figure 4.

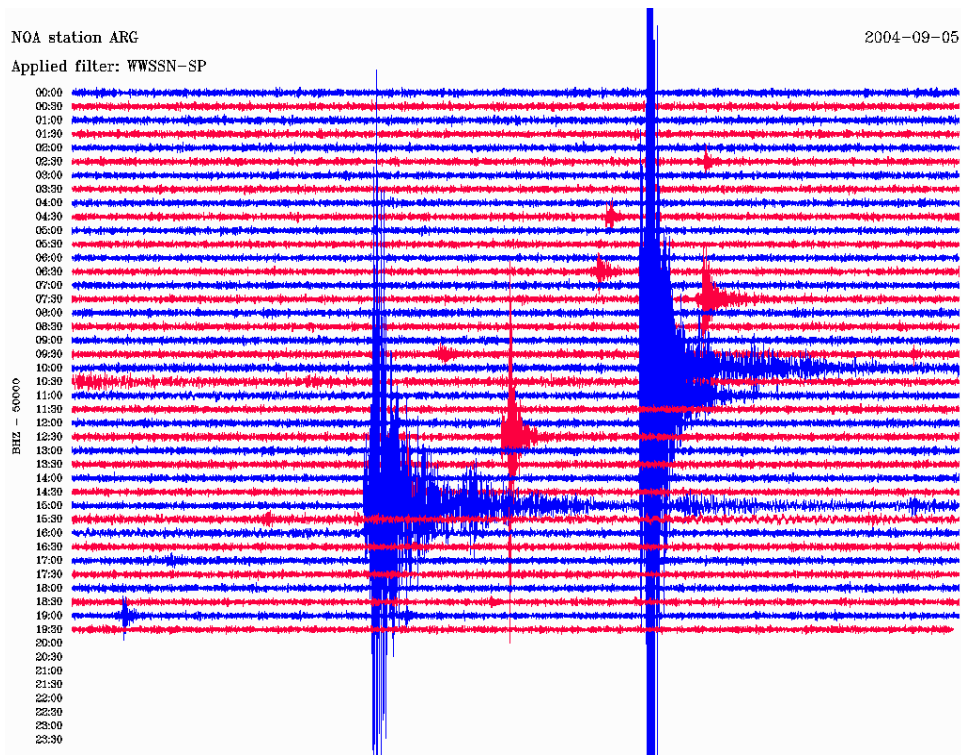


Figure 2. An example of a QPLOT generated by HL and presented on the webpage.

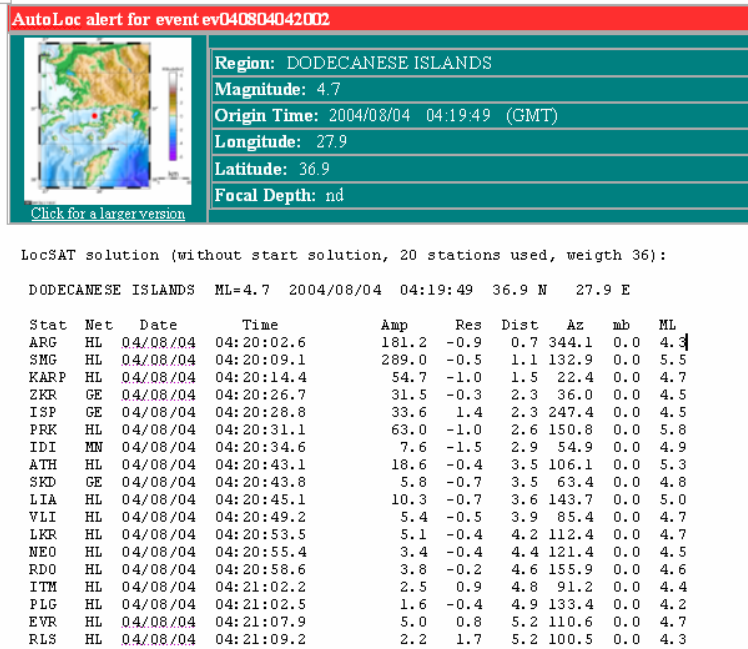


Figure 3. An example of an alert produced and presented on the HL webpage.



Figure 4. A typical HL outstation. In the present case LIA site.