GEOFON Program

GEOFON Status Report for the FDSN Meeting Potsdam September 2004

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Network Operations

Not much has changed within the permanent GEOFON network. It still consists of 48 stations (table 1). Three stations became moved to new locations: MLR (Romania), co-located with an IMS station, was moved to Eastern Romania and is now called TIRR. FODE (Crete) was closed because the nearby MedNet station IDI is now available in real-time and moved to the eastern coast of Crete instead (became ZKR now). Another station on Crete, KRIS, was moved a few km for logistical reasons (now LAST). The installation of two new GEOFON stations is planned for later this year in Ceuta (N.Africa/Spain) and Kabul (Afghanistan).

At the joint IRIS/GEOFON stations PMG, KMBO and LVC, IMS CGI satellite links have been established by IRIS for real-time communication instead of previously used Internet connections (KMBO and LVC only). GEOFON gets the data by LISS from ASL. The greek station SANT has obtained real-time communication through a leased high speed data line provided by NOA (Athens).

The hardware upgrade by exchanging Quanterra data loggers with Earth Data digitizers has been continued (namely in SNAA, Antarctica, and BOA, Nicaragua).

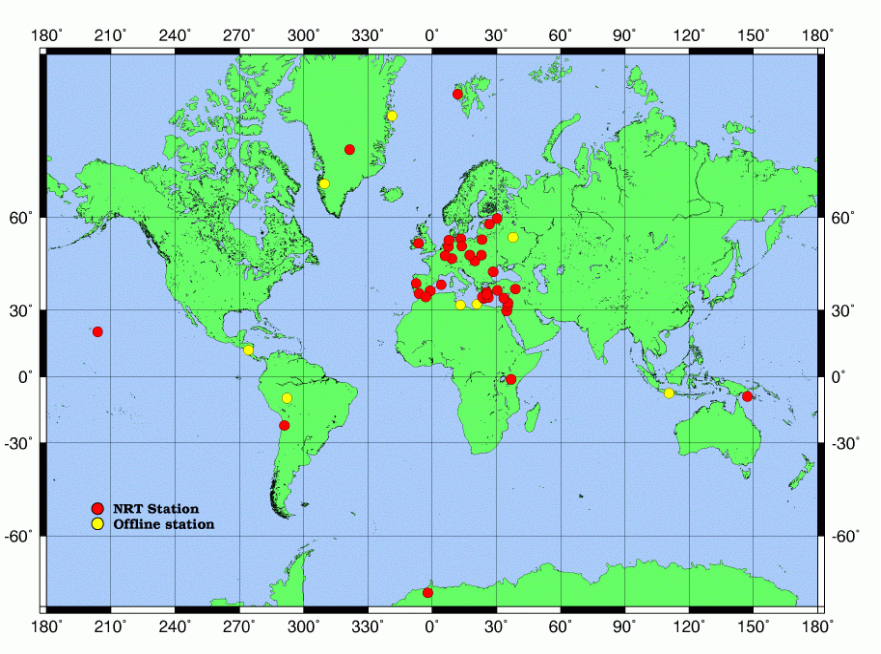

Fig. 1: GEOFON Station map September 2004

GEOFON Station Summary Permanent Network (Status September 2004)

Existing Permanent Stations

	Code	Coordinates		Inst.Date	Cooper. with	Communication
Port Moresby, PNG	PMG	9.409S	147.154E	Sep 93	IRIS/PACIFIC21	CGI/Int./LISS
Moravsky Beroun, CR	MORC	49.776N	17.547E	Nov 93		Internet/SLK
Dublin, Ireland	DSB	53.245N	6.376W	Dec 93		phone/SLK
Walferdange, Luxembourg	WLF	49.665N	6.152E	Mar 94		Internet/SLK
Bar Giora, Israel	BGIO	31.722N	35.088E	May 94	GII	+++ May 96
Muntele Rosu, Romania	MLR	45.492N	25.946E	Oct 94		+++ Oct 04
Ny Alesund, Spitsbergen	KBS	78.915N	11.938E	Nov 94	IRIS/AWI	CGI/Int./LISS
Kilimambogo, Kenya(rep.NAI)	KMBO	1.274S	36.804E	Jan 95	IRIS	Internet/SLK
Michnevo, Russia	MHV	54.958N	37.767E	May 95		no
Rügen, Germany (rep. LID)	RGN	54.546N	13.364E	May 95	GRSN	ISDN/SLK
Suwalki, Poland	SUW	54.013N	23.181E	Nov 95		phone/SLK
Rüdersdorf, Germany (temp)	RUE	52.480N	13.780E	Nov 95		+++ Jan 00
Soend. Stroemfjord, Greenl.	SFJ	66.997N	50.615W	May 96	IRIS	phone
Piszkes, Hungary	PSZ	47.919N	19.894E	Jun 96	IG Budapest	Internet/SLK
San Fernando, Spain	SFUC	36.637N	6.175W	Jun 96	UCM/ROA	+++ Oct 01
Tartu, Estonia	TRTE	58.379N	24.721E	Jun 96		+++ Apr 03
Eilath, Israel	EIL	29.670N	34.951E	Jul 96	GII	Internet/SLK
Wanagama, Indonesia	UGM	7.913S	110.523E	Aug 96		Inmarsat
Isparta, Turkey	ISP	37.843N	30.509E	Oct 96	MEDNET	Internet/SLK
Limon Verde, Chile	LVC	22.618S	68.911W	Nov 96	IRIS	CGI/Int./LISS
Sanae, Antarctica	SNAA	71.671S	2.838W	Mar 97	AWI	Internet/SLK
Manteigas, Portugal	MTE	40.403N	7.537W	Oct 97		ISDN/SLK
Cartagena, Spain	CART	37.587N	1.001W	Dec 97	UCM/ROA	phone/SLK
St. Petersburg, Russia	PUL	59.767N	30.316E	May 98		Internet/SLK*
Danmarkshavn, Greenl.	DAG	76.772N	18.654W	Aug 98	AWI	Inmarsat
Ibbenbüren, Germany	IBBN	52.307N	7.757E	Sep 98	U. Bochum	ISDN/SLK
Mathiatis, Cyprus	CSS	34.962N	33.331E	Dec 98	GII	phone/SLK
Boaco, Nicaragua	BOA	12.48 N	85.72 W	Jan 99		no
Rio Branco, Brasil	RIOB	10.150S	67.747W	Jan 99		Inmarsat
Mahon, Menorca, Spain	MAHO	39.896N	4.267E	Jun 99	UCM/ROA	phone/SLK
Kalwaria Paclawska, Poland	KWP	49.631N	22.708E	Jun 99		phone/SLK
Maui, Hawaii, USA	MAUI	20.768N	156.245W	Jun 99		phone/SLK
Melilla, Spain	MELI	35.290N	2.938W	Dec 99	UCM/ROA	phone/SLk
Rüdersdorf, Germany	RUE	52.480N	13.780E	Jan 00	GRSN	ISDN/SLK
Malatya, Turkey	MALT	38.313N	38.427E	May 00	MedNed	Internet/SLK
Gharyan, Libya	GHAR	31.122N	13.089E	Dec 00	ETH	no
San Fernando, Spain	SFS	36.466N	6.206W	Oct 01	UCM/ROA	Internet/SLK
Al Marj, Libya	MARJ	32.553N	20.878E	Dec 01	ETH	no
Helgoland, Germany	HLG	54.185N	7.884E	Dec 01	U. Kiel	ISDN/SLK
Summit Camp, Greenland	SUMG	72.576N	38.454W	Jun 02		Internet/SLK
Vasula, Estonia	VSU	58.462N	26.735E	Apr 02		Internet/SLK
Tirgusor, Romania	TIRR	44.458N	28.413E	Oct 03		Internet/SLK

Greek Sub Network (longterm)

Skordalos, Crete	SKD or SKOR	35.412N	23.928E	Aug 96		ISDN/SLK
Kristallenia, Crete	KRIS	35.178N	25.503E	Aug 96		ISDN/SLK
Santorini, Greece	SANT	36.371N	25.459E	Aug 96		Internet/SLK
Gavdos Island, Greece	GVD	34.839N	24.087E	Nov 99		ISDN/SLK
Moni Apezanon, Crete	APEZ	34.977N	24.886E	Apr 00		GSM
Fodele, Crete	FODE	35.380N	24.958E	Apr 00		+++ Jul 03
Apirathos, Naxos, Greece	APE	37.07 N	25.53 E	Aug 00		Internet/SLK
Zakros, Crete, Greece	ZKR	35.115N	26.217E	Jul 03		ISDN/SLK
Lasithi, Crete, Greece	LAST	35.162N	25.478E	Jun 04		ISDN/SLK

Loosely Associated Stations (Data Distribution only)

Stuttgart, Germany	STU	48.770N	9.193E	Apr 94	IG Stuttgart	Internet/SLK
Jerusalem, Israel	JER	31.772N	35.197E	May 96	GII	Internet/SLK
Mount Meron, Israel	MRNI	33.011N	35.400E	Mar 98	GII	+++ Jan 02
Sierra Elvira, Spain	SELV	37.238N	3.728W	Nov 01	IAG Granada	+++ Sep 03
Kfar Sold, Israel	KSDI	35.659N	33.192E	Feb 02	GII	Internet/SLK

SLK SeedLink (near) real-time data transfer
* Access for GEOFON denied by Russian authorities
+++ Station closed

Data Center Operations

Real-time data processing (http://www.gfz-potsdam.de/geofon/new/eq_inf..html)

The GEOFON earthquake alert system, which is based on the real-time data from the GEOFON and EuroNet networks and from various IRIS stations, became a rather important and popular issue. Originally only developed for internal use, it is now a major source of quick information about EuroMed and worldwide earthquakes in Europe. Features like the Global and EuroMed Seismic Monitors, email and SMS alerts for three different alarm levels and the automatic earthquake bulletin are meanwhile widely used by many scientific and governmental institutions, seismologists, news media and other interested people.

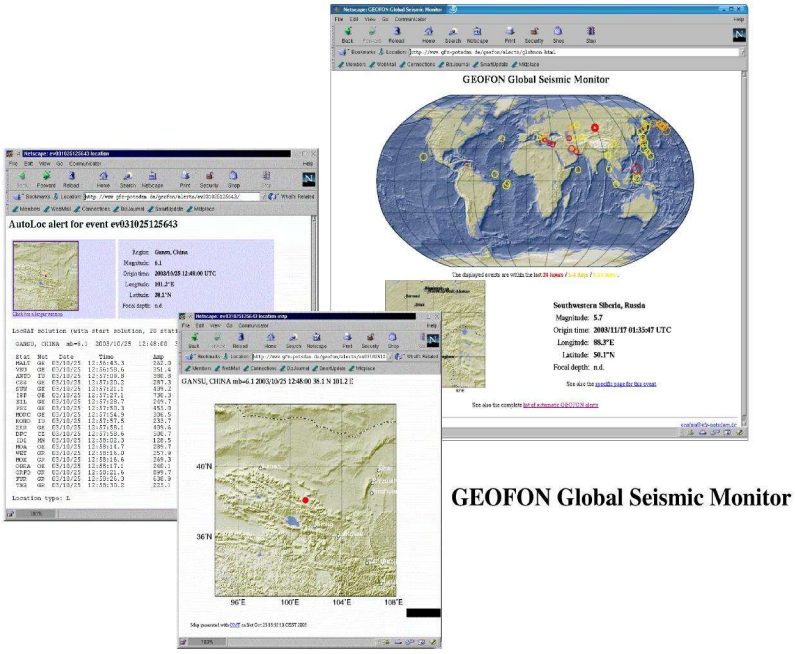

Fig.2: The GEOFON Global Seismic Monitor (http://www.gfz-potsdam.de/geofon/seismon/globmon.jpg).

GFZ Seismological Data Archive (http://www.gfz-potsdam.de/geofon/new/arc_inf.html)

The GEOFON Data Archive has experienced substantial improvements. It became responsible for the archiving and distribution of all passive seismological data generated by the GFZ instrument pool (the largest seismic pool in Europe) and the German Task Force Earthquakes. A new position (of a data center manager) was funded in this context. Presently the data sets from already 45 temporary experiments (many including also large quantities of non-GFZ stations) have been collected and many of them have been made available. In addition, also the data from 9 European permanent partner networks ("EuroNet") are now collected in real-time and archived as backup for their national facilities. All these data is jointly distributed through the available user interfaces in a unified way. It is not only composed of broadband data, but also short period, strong motion and OBS data. Because of these extended data holdings and services, the GEOFON Data Archive it is now more generally called "GFZ Seismological Data Archive". For the future it is also planned to host magneto-telluric data as well as data from the permanent global gravimeter network.

The WebDC project (http://www.gfz-potsdam.de/geofon/new/web_dc.html)

WebDC is an initiative of GEOFON and SZGRF to design tools for a distributed seismological waveform archive structure in Germany and Europe, to implement this structure in cooperation with all interested institutions and to provide a comfortable user interface to this structure. WebDC is designed as a straight continuation of IRIS' NetDC concept. In practice, the basic NetDC ideas are just combined with the basic SeedLink ideas to overcome present shortcomings by involking a direct TCP/IP based protocol instead of email and ftp.

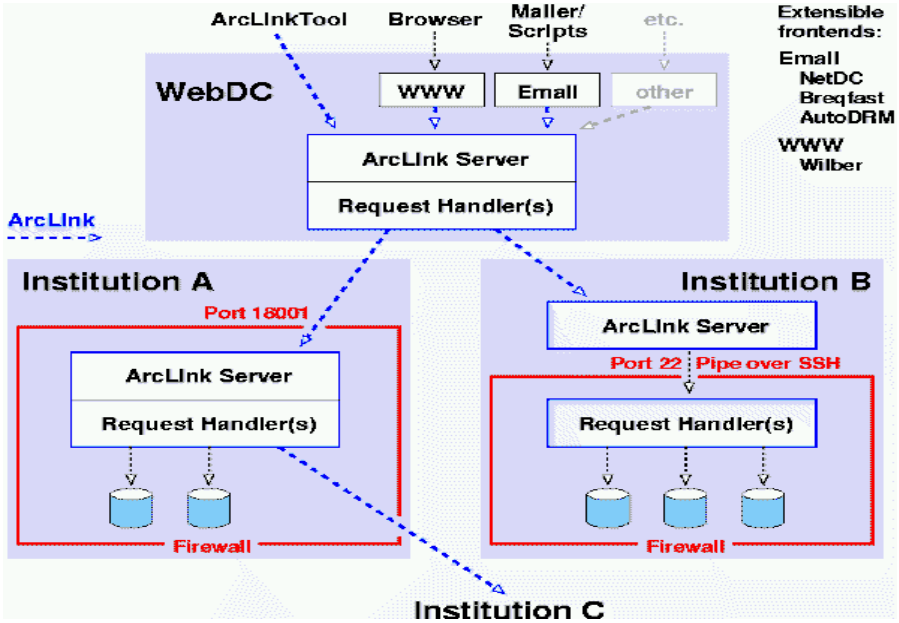

Fig. 3: Principle design scheme of the WebDC distributed archive system.

A first prototype ArcLink (the TCP/IP based DC-DC data communication protocol of WebDC) version is developed and available for testing. But the present requesthandler just supports SDS (Seiscomp Data Structure) archives. Other archive types can and will be added by writing individual plugins for each archive type (as in SeedLink for the different data acquisition systems).

Also a protoype user interface is available for the access to the joint GFZ Data Archive data sets. This web interface is a first approach to allow more sophisticated user access to waveform data and meta data information for the networks archived in the GFZ Seismological Data Archive and witin the future distributed WebDC archive. The basic purpose of this tool is to help the user to formulate data requests to the data archive by allowing on one side wildcarding of networks, namely combining permanent station data with data from temporary networks as well as from the near real-time data pool with archived data sets. On the other side the wildcarding should still lead to senseful requests not flodding the data center with unnecessarily huge data requests and the user with a lot of unwanted data.

When ArcLink access will be available to other data archives in a distributed structure in Germany and across Europe, the user access will be routed through an anonymous .org Internet portal to reflect the flat hierachy of the system.