Centre Sismologique Euro-Méditerranéen
European-Mediterranean Seismological Centre

Newsletter

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EDITORIAL

As we go to press with this issue we are making final preparations for the 1998 EMSC Assembly in Tel Aviv on 24 August. The staff from Bruyères-le-Châtel (Florence Riviere and Emmanuel Papillon) and myself will be joined by most of the Executive Committee to welcome members, observers and all interested scientists, engineers and planners. We will, of course, be seeking more members to join the present 39 from 25 countries and we anticipate formally endorsing the applications of 2 new institutions, NORSAR and Universidad Politecnica de Madrid. On the first day of the ESC conference, EMSC has convened a workshop based on its EU-sponsored project "A Rapid Warning System for Earthquakes in the European-Mediterranean Region", which is near completion after 2 years of considerable effort by 7 of our members. Its principal aims have been to extend, geographically, the network of stations able to transmit alerts and data to EMSC within 1 hour and to enhance the rapid acquisition of broad-band data for moment-tensor inversion, conducted for EMSC at GFZ, Potsdam. A major goal is to reduce the threshold at which alerts are triggered and information is disseminated to members, from magnitude 5.5 to 5.0, for the European-Mediterranean area.

This issue of the newsletter includes an illuminating history of AutoDRM by Urs Kradolfer, from its genesis through its evolution to the tool which is so widely used today for transferring parameter and waveform data, worldwide. It is, of course, central to present-day EMSC operations including the Rapid Warning project, above. The Broad-Band community and the ORFEUS data centre are, similarly, exploiting the AutoDRM, and their contribution on the subject in this newsletter also seeks information from readers on details of AutoDRMs not widely known at this time. Please respond to the authors who will publicise your facility.

Chris Browitt
President

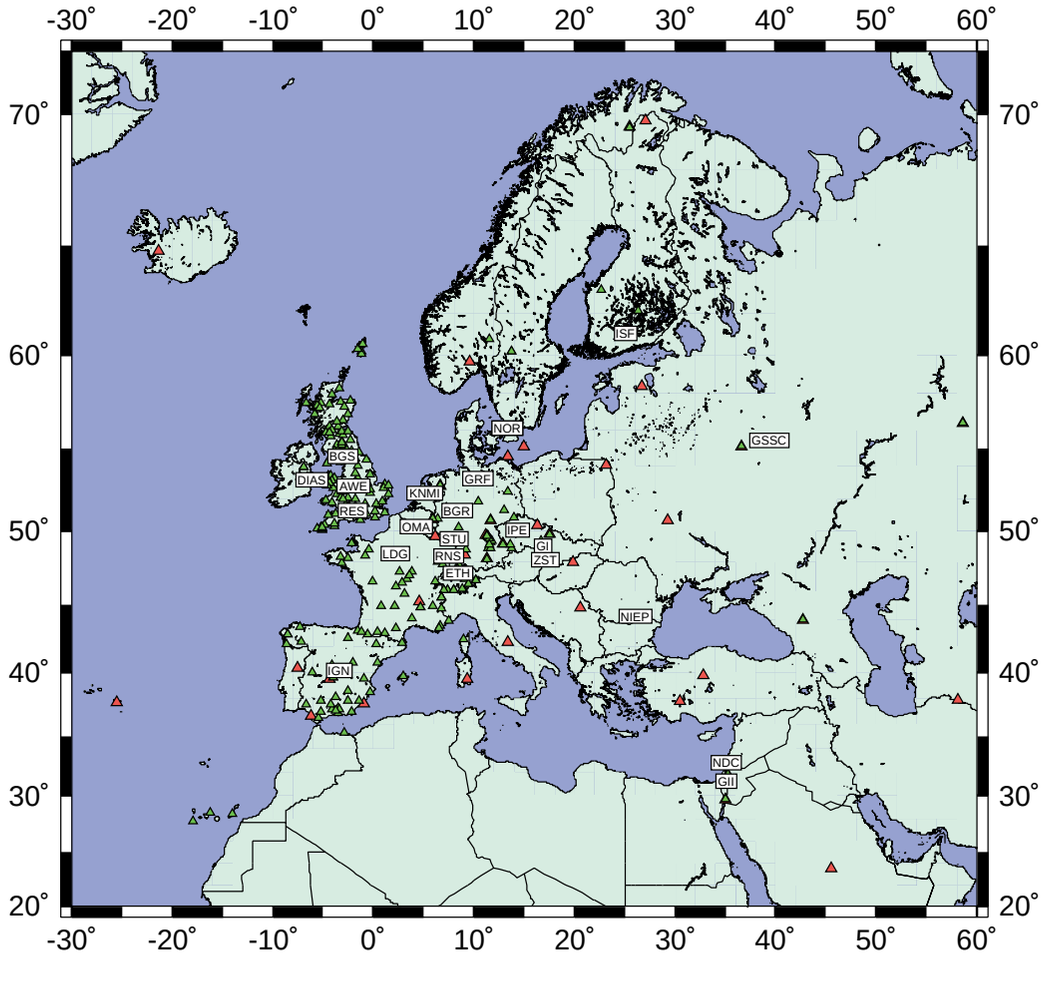

Figure 1 : ***European AutoDRMs***
green triangle : station available through autodrm ; red triangle : european orpheus station ; label : installed autoDRM

AUTODRM - THE FIRST SEVEN YEARS

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Introduction and Background

Looking out through the huge windows in a cafeteria at the United Nations buildings in Geneva, gazing on high Alpine mountains, sipping an orange juice and talking with a seismologist friend - this was the initial step to the AutoDRM concept. With Manfred Henger, the German delegate in the Group of Scientific Experts (GSE) at the Conference on Disarmament I was enjoying a break in the meetings and we were discussing how seismologists might easily access data from other seismological observatories. At that time, March, 1989, the Group of Scientific Experts (GSE) had on its agenda the preparations for the second international data exchange experiment GSETT-2. The German delegation was once again proposing an 'Open Station Concept', where one could easily access any observatory's computer and interactively log in and view all data available there. The program that allowed such a browsing of the data was called 'Data Request Manager (DRM)' and had already been installed for quite a while at the German National Data Center (NDC).

After many fruitful discussions Manfred Henger and I came to the conclusion that, in the future, it would be nice if one could send electronic mail to an observatory and subsequently get a response in the form of an e-mail message with the requested data.

It took about two years (there is a persistent saying in Switzerland that people originating from Berne are mentally slow) for me to digest this discussion and start to code a new program, called 'Automatic Data Request Manager (AutoDRM)'. During this work I was strongly influenced by two other experiences as well. First, several people used to ask the Swiss Seismological Service for digital waveform data. Negotiating the format and the media for transmission, as well as finally packing the media into a parcel and filling out the customs form made me increasingly sick and tired, especially if I soon got another request for the same time span but different channels. Second, during the GSETT-2 experiment I experienced the tedious undertaking of properly formatting every message to the prototype International Data Center. It essentially took a computer program to submit a request for data in the proper format. These frustrations motivated the initial version of an AutoDRM. The underlying philosophy is to let any user submit a request for data to an observatory using a very simple command language that is, from a syntactical point of view, simple enough so that no program is needed to request data.

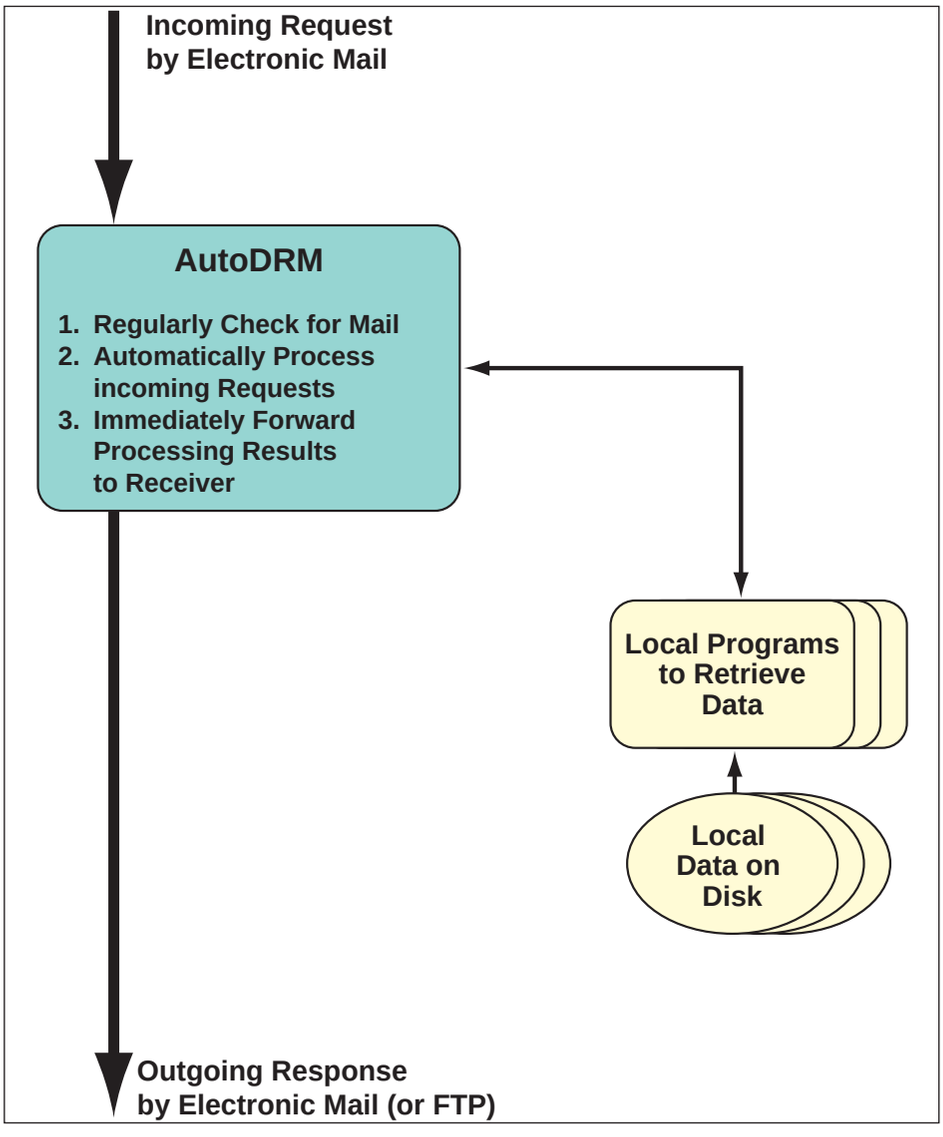

Figure 1: The basic principle of AutoDRM: receive request, process it by retrieving local data, and send response to requester.

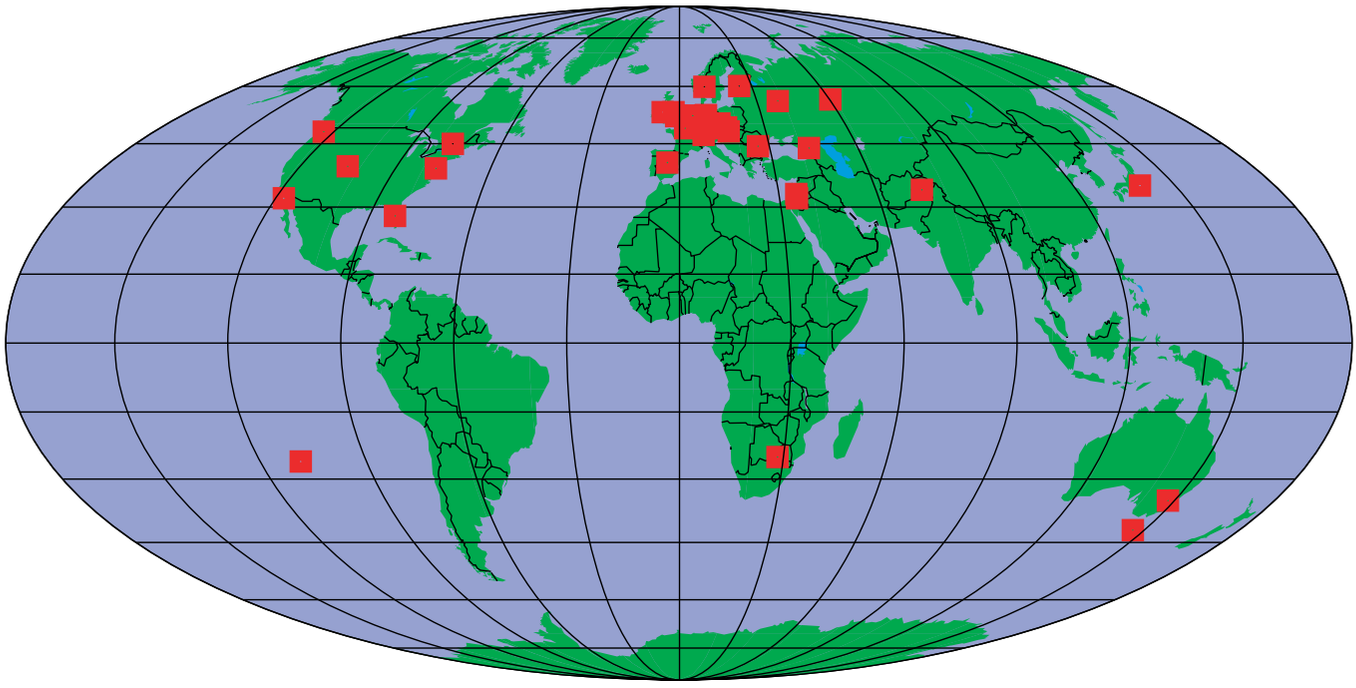

Figure 2: Maps with the sites where AutoDRMs are installed.

Already with the first version of the AutoDRM (presented to the GSE in August 1991) simple requests for waveforms were possible. For example, to request waveform data from two stations with the codes APL and DIX for the interval from 21 June 1991 00:12 to 00:13 UTC one simply sends an e-mail message to autodrm@seismo.ifg.ethz.ch with the following text:

```
begin
date1 199106210012
date2 199106210013
wavef apl
wavef dix
email user@host.domain
stop
```

With this simple syntax it is rather easy to set up and send request messages either by hand or with a computer program. Upon the arrival of such messages our AutoDRM reads and processes the request within one minute and produces a response message by scheduling locally already existing programs to retrieve the desired data. This message is then sent to the requester's e-mail address given in the request. The reason for choosing e-mail as the main communications method was the fact that, at least in those days (early 90s), many European and Asian observatories did have e-mail access but had no direct link to the 'real' Internet. The concept of how an AutoDRM works has remained unchanged since then, although other features (e.g. transfer of the requested data via FTP) have been added during the years (Figure 1).

Developments

During the first few months of operation in 1991, the Swiss AutoDRM typically received about 30 requests per month. They were mostly from European colleagues who requested locations for earthquakes at local, regional and teleseismic distances. Fewer users requested waveform data, calibration information or P-phase arrival data. I felt that having written a program that was, on average, used once every day by external users was already a success. I did not imagine that this access rate would increase by two orders of magnitude.

After a presentation of the AutoDRM concept at the XXXIII General Assembly of the European Seismological Commission in 1992 in Prague, Czech Republic, other seismological observatories asked for the AutoDRM code and installed this software on their computers. Compared with today's code, I must apologize to those early recipients for the badly structured code they got. The early versions did not separate the more general parts of the code from the site-specific parts and, so local adaptation was difficult. It is proof of the computer talent of people like Reinoud Sleeman and Ray Buland that they have very successfully adapted the old AutoDRM code to their local environment. It was during this period (1993-1994) that many colleagues around the world made valuable suggestions for improving and extending the AutoDRM. Bernard Dost and Tim Ahern encouraged me to add the feature that a response may be automatically ftp'ed to the requester's machine. The status of the AutoDRM at that time is described in Kradolfer [1993].

Probably the most important year for the further development and the rapid propagation of AutoDRM to many different places was 1994. During the

January, 1994 IASPEI meeting in Wellington, New Zealand, the Federation of Digital Seismograph Networks (FDSN) acknowledged that AutoDRM had become a de facto standard for seismological data exchange, and members were encouraged to install AutoDRMs.
Shortly afterwards, the GSE, preparing the Third Technical Test (GSETT-3), another large-scale experiment on international seismic data exchange, agreed that AutoDRM would be one of the allowed interfaces for those stations, where the prototype International Data Center (pIDC) would retrieve waveform data segments (today such stations are called auxiliary stations, while primary stations are transmitting a continuous data stream to the pIDC) in order to improve both location and characterization of the events detected and preliminarily located using data from the primary stations. However, due to the anticipated large amount of requests to be sent by the plDC to individual stations (or the National Data Centers operating them) it was necessary to develop an extended and more formal AutoDRM command language.
A dedicated format working group was established. Within only a couple of months - partly due to the guidance and great efforts of Jerry Carter at the Center for Monitoring Research (CMR) in Arlington, VA - the new protocols and formats for the data exchange were formalized. These are now referred to as GSE2.0 format [Group of Scientific Experts, 1995]. An important extension is the possibility that the new message formats allow the exchange - in addition, e.g., to waveform data in the GSE format - of seismic data in other established formats, such as CSS or SEED. Also, the new formats include message identifications in order to enable message tracking, which is an important feature especially for agencies such as the IDC, where lots of messages are transmitted and received daily.

In the new GSE2.0 format, the sample request message given above would appear as follows:

```
begin gse2.0
msg_type request
msg_id any_ID GSE_IDC
time 1991/06/21 00:12:0.0 to 1991/6/21 00:13
sta_list apl, dix
chan_list *Z
waveform gse2.0
e-mail user@host.domain
stop
```

This example demonstrates that the new format has more flexibility in terms of possible details (e.g. specification of a channel list) and includes better tracking of requests.

Current Status and Documentation

Currently there are more than 30 known AutoDRMs in operation world-wide that are providing data and supporting the GSE2.0 format (Figure 2). Some of these AutoDRMs also support the old version-1 format. A user may send a request to any of these AutoDRMs with the command HELP and will then automatically receive more information about this specific AutoDRM. A corresponding list and maps are updated regularly and can be accessed on the World-Wide-Web (WWW) under 'http://seismo.ethz.ch/autodrm.html'. It is likely that there are more AutoDRMs already installed and actually providing seismic data. If you wish that your AutoDRM be included in this list, please contact the author of this article (urs@seismo.ifg.ethz.ch). It must be emphasized here that, although each of these AutoDRMs follows the agreed formats, not each of them is based on the Swiss AutoDRM source code. Many people have either written their own code or have heavily modified the Swiss code, and I think they have done a wonderful job. For those who would like to install an AutoDRM, the code of the newest version of the Swiss AutoDRM is available via anonymous FTP at seismo.ethz.ch (user=ftp, password=ftp) in the directory pub/gse. This version runs on most common UNIX platforms, and a first installation of the software package is only a matter of minutes, since the system-dependent configuration is now done fully automatically.

Information about the AutoDRM and the complete and official GSE2.0 formats may also be obtained through WWW at http://seismo.ethz.ch/autodrm.html, where the documentation may also be directly retrieved in the form of a PostScript-file. This documentation also contains a chapter about the minimum requirements for an AutoDRM. I must also clarify, that the 'GSE2.0 format' not only applies to digital waveform formats but also includes the details of many other formats including the request syntax to AutoDRMs.

During an AutoDRM seminar in 1995 at the ETH in Zurich, where 18 people from 12 countries participated, it was agreed that AutoDRMs should have an e-mail address starting with 'autodrm@...' and should be able to receive and transmit messages in GSE2.0 format. As an absolute minimum, they should understand the command HELP and then return information about the commands understood by this AutoDRM. Today, some AutoDRMs, at least those based on the Swiss code, are backward-compatible so that the original commands such as 'date1' and 'wavef' are still supported. However, I think users should prepare themselves to switch to the GSE2.0 request format now in order to be sure that their request is understood by all AutoDRMs installed today.

Outlook

Where will the AutoDRM concept go? These days there are still many observatories that are installing new data distribution techniques. The AutoDRM concept still is the only e-mail based one that is very wide-spread and relatively well documented. In particular, it is very well suited for a fully automatic data exchange. People often tell me that one of the most enjoyable features of the AutoDRM is the fact that they quickly can submit a request for data and that they then may forget about it, because they know, that within a very reasonable amount of time they will obtain the requested data. Retrieving data by direct access often takes more of an individual's time and may be tedious or completely unsuccessful in case of heavily overloaded or interrupted

Internet links. See, for example, the article by Malone [1996] about his experience with the bottleneck in the jump across the Atlantic. An e-mail based system is much more reliable in such circumstances, because e-mails are spooled in case of traffic jam until the link is up again.
Some people have told me that they would never allow someone to access their computers directly because of security considerations. AutoDRM is a comparatively very secure tool because the remote user never directly accesses the computer. Unknown or unauthorized commands are not executed by the program so the only likely security problems are because the UNIX-program sendmail is running.

New developments regarding the future of the AutoDRM concept have been discussed during the last two years by the GSE format working group led by Jerry Carter and John Coyne. While the concept remains the same, some extensions in the format were made in order to meet the needs for the CTBT monitoring system (see the special article in this Newsletter).

There was a very promising development at the European-Mediterranean Seismological Center (EMSC) near Paris, France, where Bruno Feignier and Frederic Ramon have implemented an AutoDRM that is capable of sending requests to other AutoDRMs in case the requested data is not available at this center. This facilitates the work of seismologists, because they could then send a single request to one AutoDRM asking for data stored at different observatories.

Given the increasing number of AutoDRMs, one might ask whether their presence, or rather their usage, might affect the Internet or not. Surely, the number of requests (and each request usually results in one response) to AutoDRMs have significantly increased during the past five years. The pIDC sends several 10,000 requests per month distributed to 14 distinct AutoDRMs, which give them access to 60 stations. Our AutoDRM in Zurich receives more than 3,000 requests per month, and the US National Seismograph Network operated by the NEIC in Golden, Colorado, receives about 10,000 requests each month. However, I do share the opinion of Steve Malone [1996], that the seismological users will become a smaller and smaller fraction of the total Internet bandwidth compared with other users.

To conclude, I have positive thoughts and would guess that there are many more years of AutoDRM usage ahead of us. While some of the details may evolve and change, the basic concept is sound and will continue to be the basis for the exchange of many seismograms.

References

Group of Scientific Experts, GSETT-3 Documentation, Conference Room Paper/243, Conference on Disarmament, United Nations, Geneva, Switzerland, 1995.

Kradolfer, U.: Automating the Exchange of Earthquake Information.
Eos Trans. AGU, 74, 442, 444-445, 1993.

Malone, S.: The International Internet - Global Connectivity. Seism.
Res. Let., 67, 1, 1996.

PARAMETRIC DATA ACCESS THROUGH AUTODRM : EUROPEAN-MEDITERRANEAN AREA

Emmanuel Papillon, Florence Rivière

AutoDRM is an easy procedure to retrieve parametric or waveform data from various seismological institutes. A list of European AutoDRM which provide waveform data is available on the ORFEUS web site (http://www.orfeus.nl). More recently, we added to the EMSC web site (http://www-csem.bruyeres.cea.fr) a list of European AutoDRMs which provide parametric data (see table 1). Most of them are now using the standardized GSE2.0 format and parametric data can easily be retrieved with the requests bulletin, event, origin or arrival.

In 1996, the EMSC developed an AutoDRM based on a decentralized database scheme. EMSC AutoDRM is not only requesting data from its own databases but also from a network of European database. It analyzes the mail received to determine whether it is a new request, or data coming back from another AutoDRM as an answer to a request. After checking its format and the requester's identity, a message is sent back to inform that the request is being processed. Then, a new request is broadcasted to all participating AutoDRMs. Answers from various AutoDRMs are identified, stored, grouped together and sent back to the requester. A first answer is mailed 15 minutes after the request registration time, including all data already available. If additionnal data are coming after this short time, a second answer is mailed two hours later (see EMSC Newsletter n°7 for more details).

In the coming weeks, an interactive interface will be developped on the EMSC web site to help users to use this European AutoDRM. Through this interface, it will be possible to request either one European AutoDRM, or all European AutoDRMs using EMSC AutoDRM, for parametric data.

The list shown in table 1 is probably not complete, but we are counting on you to contact us in case information is inaccurate or missing.

Table 1 : AutoDRM within the European-Mediterranean area

Institute	Country, city	AutoDRM address	Type	Help	Bull	Event	Orig	Arriv	Detec	Wave	Stat	Chan	Resp
OMA	Belgium, Brussels	autodrm@oma.be	ETH	x						1-20 d	x	x	
IPE	Czech Republic, Brno	autodrm@ipe.muni.cz	GSE	x				1 mo		10 mn	x	x	x
GI	Czech Republic, Prague	autodrm@ig.cas.cz	ETH	x						1 d			
IS	Finland, Helsinki	autodrm@seismo.helsinki.fi	GSE	x						x	x	x	x
EMSC	France, Bruyeres-le-chatel	csemauto@ldg.bruyeres.cea.fr	GSE	x									
LDG	France, Bruyeres-le-chatel	autodrm@ldg.bruyeres.cea.fr	GSE	x	wly	wly	wly	wly	wly	wly	x	x	x
ReNaSS	France, Strasbourg	autodrm@ctds3.u-strasbg.fr	GSE	x	dly	dly	dly	dly	r.t.	r.t.	x	x	
SZGRF	Germany, Erlangen	autodrm@szgrf.uni-erlangen.de	GSE	x						x	x	x	x
BGR	Germany, Hannover	autodrm@sdac.hannover.bgr.de	GSE	x	x					x (1)	x	x	
Uni-STU	Gernamy, Stuttgart	autodrm@geophys.uni-stuttgart.de	GSE	x						x	x	x	x
DIAS	Ireland, Dublin	autodrm@cp.dias.ie	GSE	x						x	x	x	
GII	Israel, Holon	autodrm@iprg.energy.gov.il	GSE	x	x	x	x	x	x		x	x	
NDC	Israel, Yavne	autodrm@ndc.soreq.gov.il	GSE	x	3 d	1 h	1 h	1 h	20 mn	x	x	x	x
KNMI	Netherlands, De Bilt	autodrm@knmi.nl	GSE	x				1-3 d	r.t.	r.t.	x	x	x
NORSAR	Norway, Kjeller	autodrm@norsar.no	GSE	x						5 mn			
NIEP	Romania, Bucharest	autodrm@infp.ifa	GSE	x									
ARU	Russia	autodrm@aru.gssc.rssi.ru	GSE	x						x	x	x	
KIV	Russia	autodrm@kiv.gssc.rssi.ru	GSE	x						x	x	x	
OBN	Russia	autodrm@obn.gssc.rssi.ru	GSE	x						x	x	x	
ZST	Slovak Republic	autodrm@seis.savba.sk								x	x		
IGN	Spain, Madrid	drmgse@ign.es	GSE		10 mn	10 mn	10 mn	3 mn	3 mn	15 mn	x	x	
ETHZ	Switzerland, Zurich	autodrm@seismo.ifg.ethz.ch	GSE	x	10 mn	10 mn	10 mn	10 mn		10 mn	x	x	x
RES	UK	autodrm@ekads.ekaseis.co.uk	GSE	x						x	x	x	x
AWE	UK, Blacknest	autodrm@blacknest.gov.uk	GSE	x						x	x	x	x
BGS	UK, Edinburg	autodrm@mail.nmh.ac.uk	GSE	x			dly	dly		dly	x	x	x

legend : **mo :** *month ;* **wly** *: weekly ;* **dly** *: daily ;* **d** *: day ;* **h** *: hour ;* **mn** *: minute ;* **r.t.** *: real time*

The ORFEUS page

WAVEFORM DATA ACCESS THROUGH AUTODRM : EUROPEAN-MEDITERRANEAN AREA

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AutoDRM, a standardized e-mail data request mechanism, is an interesting alternative to WWW and telephone data access with regard to waveform data. The procedure is fairly easy to implement at a data center, it is standardized, suitable for automatic request procedures and, last but not least, it is a cheap alternative to telephone/modem data requests. Installation at a data center may be hampered by implementing the connection between the AutoDRM software and the waveform data base. ORFEUS participants may get help from ORFEUS on this issue.

At the ORFEUS web-site (http://orfeus.knmi.nl - seismo-data -) we maintain an overview of AutoDRMs, which provide waveform data (Table 1). Waveform data is available either as event data or continuously. In the case of continuous data any time selection can be made within the time period of available data. This may result in large amounts of data. Therefore, file restrictions apply. Waveform data requests that results in files larger than 500 kiloBytes (newly recommended value; old value was 100 kiloBytes) will not be sent by e-mail, but are either stored temporarily at the data-providers site or sent (optionally) through ftp to the client. In the first case the client receives an e-mail telling the data is ready and where (ftp site and directory) it can be obtained. This is the pull mechanism. In the second case the client receives an e-mail telling the data has been sent by ftp to the directory as specified in the request. This is the push mechanism and has so far, to our knowledge, only be implemented at those AutoDRM

installations, which are based on the original Swiss AutoDRM (versions later than July 1993).

The waveform data obtained by AutoDRM is generally in GSE2.0 format and does not include station information other than station code, component, time and sampling information. Other station information, like the response information, has to be requested separately. Unfortunately, we notice that response information may not always be up-to-date. If this is the case, please, report this to the provider. GSE format can be easily converted to other formats (SAC, etc.) using gsesac.f or codeco.f, both available in ORFEUS software library.

The number of stations from which waveform data through AutoDRM can be requested is rapidly increasing. One major development can be seen at GEOFON, where currently many individual stations are equiped with AutoDRM. ORFEUS is specifically interested in access to broad-band stations, as well as AutDRMs supporting SEED format. Orfeus will implement this last option in the near future in its own AutoDRM.

Table 1 : Waveform data available through AutoDRM within the European-Mediterranean area

Country	e-mail	Stations	dataset type	last	delay	comments
Czech Republic (IPE)	autodrm@ipe.muni.cz	VRAC, MORC	c:	?	n.r.t.	
Czech Republic (GI)	autodrm@seis.ig.cas.cz	PRU, KHC	e: e:	90 d 90 d	1-2 weeks 1-2 days	
Finland	autodrm@smo.helsinki.fi	KAF(SP) VAF (SP)	e: e:	180 days 32 days	n.r.t. n.r.t.	
France (LDG)	autodrm@ldg.bruyeres.cea.fr	all LDG stations	e: c:	1996 10 days	7 days n.r.t	continuous for LOR station only
France (ReNaSS)	autodrm@renass.u-strasbg.fr	CFF MLS RENF DOU	e: e: e: e:	95/09 95/09 96/03 97/04	1 month 1 month 1 month 1 month	web access
Germany (SDAC/GRSN)	autodrm@sdac.hannover.bgr.de	GERESS(SP), GEC2, BFO, BRNL, BSEG, BUG, CLZ, FUR, GSH, GRFO, IBB, MOX, TNS, WET	e:	?	1 day	
Germany (STU)	autodrm@geophys.uni-stuttgart.de	STU	c:	98/04	1 day	
Germany (SZGRF)	autodrm@szgrf.uni-erlangen.de	GRA1-4, GRB1-4, GRC1-4 GEC2, BFO, BRG, BRNL, BSEG, BUG, CLL, CLZ, FUR, GRF0, IBBN, MOX, RGN, STU, TNS, WET	c: c:	1980 91/07	n.r.t 1 day	
Ireland (DIAS)	autodrm@cp.dias.ie	DLF(SP), DMU(SP), DCN(SP)	e:	1995	1 day	
Israel (NDC)	autodrm@ndc.soreq.gov.il	JER, EIL, PARD(LP)	c:	7 days	n.r.t.	max 30 min
Netherlands (KNMI)	autodrm@knmi.nl	HGN, WIT	c:	94/01	n.r.t.	max 6 hours
Netherlands (ORFEUS)	autodrm@knmi.nl	all SPYDER® data	e:	93/01	n.r.t.	only M>5.5, push and pull, web access
Norway (Norsar)	autodrm@norsar.no	NORSAR (6 BB, SP) ARCES (1LP,SP) NORES (SP) HFS(1BBZ, SP) SPITS(1BB,SP)	c: c: c: c: c:	7 days 6 days 6 days 5 days 4 days	n.r.t. n.r.t. n.r.t. n.r.t. n.r.t.	max 30 min
Russia (ARU)	autodrm@aru.gssc.rssi.ru	ARU	c:	7 days	n.r.t.	
Russia (KIV)	autodrm@kiv.gssc.rssi.ru	KIV	c:	7 days	n.r.t.	
Russia (OBN)	autodrm@obn.gssc.rssi.ru	OBN	c:	7 days	n.r.t.	
Slovak Republic	autodrm@seis.savba.sk	ZST	e:	97/10	n.r.t.	
Spain (IGN)	drmgse@ign.es	Spanish SP network, Sonseca array (SP) PAB	c: e:	6 days ?	n.r.t. n.r.t.	
Switzerland	autodrm@seismo.ifg.ethz.ch	Swiss SP network	c: e:	14 days 1984	n.r.t. n.r.t.	
United Kingdom	autodrm@blacknest.gov.uk (Blacknest)	EKR(SP), EKB(SP)	c:	?	n.r.t.	
United Kingdom (BGS)	autodrm@mail.nmh.ac.uk	UK SP network, EDI	e:	?	n.r.t.?	

Note :

This table provide the status as presently (June 1998) known to the authors. If any of the information is erroneously, we would appreciate to receive your correction (e-mail: vaneck@knmi.nl).

Explanation of table notations :

Stations - Station codes are given, in parenthesis the type of instrumentation (SP - Short Period; LP - Long Period; BB - Broad Band; BBZ - Broad Band only Z-component). If not specified it concerns BB stations.

Dataset - type is either event files (e:) or continuous (c:); last refers to how far in time data are available, either a specific date or year or alternatively x days back from present time; delay refers to how fast the data are available, either within x days, weeks or months or in near real time (n.r.t.).

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Bulletins and other matters			csem@ldg.bruyeres.cea.fr

ORFEUS workshop

"Installation and operation of broad-band seismograph stations"

November 9-12, 1998, Geophysical Institute ASCR, Prague, Czech Republic

"First European Quanterra Users Group (QUG) Meeting"

November 12-13, 1998, Geophysical Institute ASCR, Prague, Czech Republic

Registration before August26, 1998

Details on the program and registration can be obtained from the ORFEUS web site (http://orfeus.knmi.nl) or directly from ORFEUS (e-mail: vaneck@knmi.nl).

--- ORFEUS; P.O.Box 201; 3730 AE; De Bilt; The Netherlands ---

EMSC calls for papers

The next newsletter will be dedicated to magnitudes. Please, send papers relevant to the following topics: magnitude calculation, relationship between different magnitudes, magnitude corrections to the EMSC regional editors or directly to the EMSC.

Your opinion about the EMSC Web site

In order to provide you with the best service, the EMSC would like to receive your comments about its Web site (e.g. what features of the site are you accessing ?, what information currently not available would you like to see on the Web site ?).

Council of Europe

The EMSC is a Specialized European Centre for the Open partial Agreement

Synop6 - Nancy