FINAL REPORT OF CERGOP2 WORK PACKAGE 1
A DATABASE FOR EU PROJECT CERGOP2/ENVIRONMENT

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1. Introduction

At the very beginning of the project CERGOP in 1994 a data centre was developed and made available where one could retrieve GPS campaign data. However, the data were placed at ftp servers in Graz without any comfort of retrieval and no web presentation at all. Everyone who did know the ftp address could retrieve data, but with no assistance. With the expansion of the project and the implementation of the EU project it was felt to develop more sophisticated structures for finding and retrieving data. The minimum requirement was a set of web pages which should explain the data structure and should help to find the desired data, an ftp server, where one retrieve the bulk of observations and results and a database where to store and to retrieve the data. A work package was created (Work Package 1) to design, create and run those services. The lead was given to the AAS (Austrian Academy of Sciences) because the CERGOP data centre was already located there and synergetic effects would appear by overtaking a part of the old structure.

2. Concept, Design and Realization

The concept of data holding as a proposal of the AAS (Pesec, Stangl 2003) is seen in Figure 1. The data and products should be stored in a public server with ftp- and web-access, secured by an internal server. Links to related data and products, already available or yet to be produced by connected national or scientific institutions, should lead to further information. In the concept a small portal should provide information and metadata for individual users' requests. For the most interested users within the projects a questionnaire was sent to look for their needs. It turned out that a much simpler design was wanted. People wanted to have a storage for observation data which can be accessed by ftp. A separation between public area and restricted area has to be foreseen. The web pages should contain further information in relation to the data (e.g. equipment used for the CEGRN campaigns) and an overview of the availability of data. There was no much demand for diachronic information for one station but more for synchronous data for one day, week or year.

The design of the ftp- and web-server was made after considering the requests (Stangl et al. 2004). The contents of the data centre were transferred to a dedicated server (Pentium IV processor, SCSI-disks RAID 1). The order was done simply by making directories for each CEGRN campaign, adding a yearly directory with daily subdirectories for the foreseen permanent stations. It was decided that all CEGRN campaigns performed during the years of the EU-Project should be private until the end and all permanent stations should be public. However most of the station managers wanted also to keep the permanent stations private. The public area is therefore very small containing old data. Additionally the web server is running at the same machine with address cergops2.iwf.oeaw.ac.at . Apart from the homepage which was prescribed by EU regulations the web pages (Haslinger et al. 2005) of the overview and the project results have been constructed in a detailed way. The web page of links is only fragmentary due to the disinterest of most of the institutions to provide access to their databases. An important link leads to the web page of the CEGRN Consortium which will take over totally the responsibility after the EU project. The project results in the meaning of the web pages consist mainly of the CEGRN observations and their meta-information as well as of the coordinates, velocities and zenith delays of the troposphere which are deliverables of the analysis centres and should finally be combined to one CERGOP solution for each campaign. Apart from the simple upload and restructuring of the data the following components were developed:

- a meta-database consisting of tables of ftp-links for RINEX data, observation sheets and other info (MySQL),
- scripts for retrieval of campaign data accessing the meta-database (PHP),
- log sheets for each station, permanent and epoch (text files),
- an overview of the occupied stations, the equipment and corrections made by the DC for each CEGRN campaign (static HTML),
- a map with the stations occupied for each CEGRN campaign (static HTML).

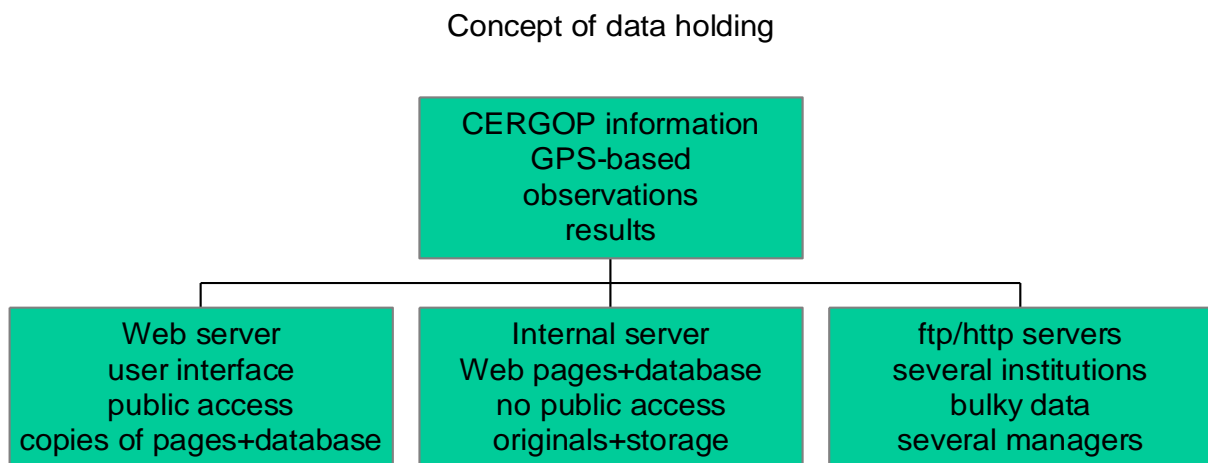Some examples of web pages are given in figures 2-5.

Concept of data holding

Figure 1. Concept of the data services for CERGOP

CERGOP-2 project

Historical and new Results

CERGOP1 results (1994-1998)		SOLUTION			
CEGRN94	MAP	Stations	Equipment	
CEGRN95	MAP	Stations	Equipment	
CEGRN96	MAP	Stations	Equipment	
CEGRN97	MAP	Stations	Equipment	

Intermediate Results (1998-2003)		SOLUTION			
CEGRN99	MAP	Stations	Equipment	
CEGRN01	MAP	Stations	Equipment	

CERGOP2 results (2003-)		SOLUTION			
CEGRN03	MAP	Stations	Equipment	Corrections
CEGRN05	MAP	Stations	Equipment	Corrections

Accepted sites	Logfiles

Special data retrieval - example only	QUESTION	
Special data retrieval - example only	ANSWER	
Special campaign info - example only	QUESTION	

Special campaign	complete RINEX data	observation protocols

Figure 2. Web page project results

CERGOP-2 project

Rinex Data - CEGRN03

CODE	DOY	TYPE	LINK
AT01 11027M002	1670	D	ftp://cergop2@cergops2.iwf.oeaw.ac.at/CEGRN03/RINEX
AT01 11027M002	1670	S	ftp://cergop2@cergops2.iwf.oeaw.ac.at/CEGRN03/RINEX
AT01 11027M002	1680	D	ftp://cergop2@cergops2.iwf.oeaw.ac.at/CEGRN03/RINEX
AT01 11027M002	1680	S	ftp://cergop2@cergops2.iwf.oeaw.ac.at/CEGRN03/RINEX
AT01 11027M002	1690	D	ftp://cergop2@cergops2.iwf.oeaw.ac.at/CEGRN03/RINEX
AT01 11027M002	1690	S	ftp://cergop2@cergops2.iwf.oeaw.ac.at/CEGRN03/RINEX
AT01 11027M002	1700	D	ftp://cergop2@cergops2.iwf.oeaw.ac.at/CEGRN03/RINEX
AT01 11027M002	1700	S	ftp://cergop2@cergops2.iwf.oeaw.ac.at/CEGRN03/RINEX
AT01 11027M002	1710	D	ftp://cergop2@cergops2.iwf.oeaw.ac.at/CEGRN03/RINEX
AT01 11027M002	1710	S	ftp://cergop2@cergops2.iwf.oeaw.ac.at/CEGRN03/RINEX
AT01 11027M002	1720	D	ftp://cergop2@cergops2.iwf.oeaw.ac.at/CEGRN03/RINEX
AT01 11027M002	1720	S	ftp://cergop2@cergops2.iwf.oeaw.ac.at/CEGRN03/RINEX
BOR1 12205M002	1670	D	ftp://cergop2@cergops2.iwf.oeaw.ac.at/CEGRN03/RINEX
BOR1 12205M002	1670	S	ftp://cergop2@cergops2.iwf.oeaw.ac.at/CEGRN03/RINEX

Figure 3 Web page after requesting data access to CEGRN03

CERGOP-2 project

CERGOP Data Centre - CEGRN03 equipment

List of Equipment (.txt)

Site	Receiver	Antenna	Antenna eccentricities		
			ΔH	ΔE	ΔN
AT01 11027M002	LEICA SR530	LEIAT503	0.1110	0.0000	0.0000
BOR1 12205M002	ROGUE SNR-8000	AOAD/M_T NONE	0.0624	0.0000	0.0000
BOZI	TRIMBLE 4000SSI	TRM22020.00+GP	0.3107	0.0000	0.0000
BRAI	LEICA SR530	LEIAT504 LEIS	0.0000	0.0000	0.0000
BRSK	TRIMBLE 4000SSI	TRM22020.00+GP	0.9940	0.0000	0.0000
BUCA	LEICA SR520	LEIAT502	0.2380	0.0000	0.0000
BUCU 11401M001	ASHTECH Z-XII3	ASH700936D_M SNOW	0.0815	0.0000	0.0000
BZRG 12751M001	LEICA CSR1000	LEIAT504 LEIS	0.2120	0.0000	0.0000
CAME 12754M001	TRIMBLE 4000SSI	TRM29659.00 NONE	0.0000	0.0000	0.0000
CAOP	TRIMBLE 4000SSI	TRM29659.00 NONE	0.0260	0.0000	0.0000
CLUJ	LEICA SR530	LEIAT504 LEIS	0.0000	0.0000	0.0000
CSAN	TRIMBLE 4000SSE	TRM14532.00	0.3050	0.0000	0.0000
CSAR	TRIMBLE 4000SSE	TRM14532.00	0.3050	0.0000	0.0000
DISZ	TRIMBLE 4000SSE	TRM22020.00+GP	0.3050	0.0000	0.0000
DRES 14108M001	TRIMBLE 4000SSI	TRM29659.00 NONE	0.5943	0.0000	0.0000
DUBR 11901M001	ASHTECH Z-XII3	ASH700936D_M SNOW	0.0810	0.0000	0.0000
FUN3	LEICA SR520	LEIAT502	0.3110	0.0000	0.0000
GABR	TRIMBLE 5700	TRM41249.00	1.1406	0.0000	0.0000
GOPE 11502M002	ASHTECH Z18	ASH701946.3 SNOW	0.0464	0.0000	0.0000
GRAZ 11001M002	ASHTECH UZ-12	ASH701945C_M NONE	1.9640	0.0000	0.0000
GRMS 11028S001	TRIMBLE 4000SSI	TRM29659.00	0.0000	0.0000	0.0000
GRMT 11028M001	ASHTECH UZ-12	TRM22020.00+GP	0.3300	0.0000	0.0000
GPYR	TRIMBLE 4700	TRM14532.00	0.8328	0.0000	0.0000

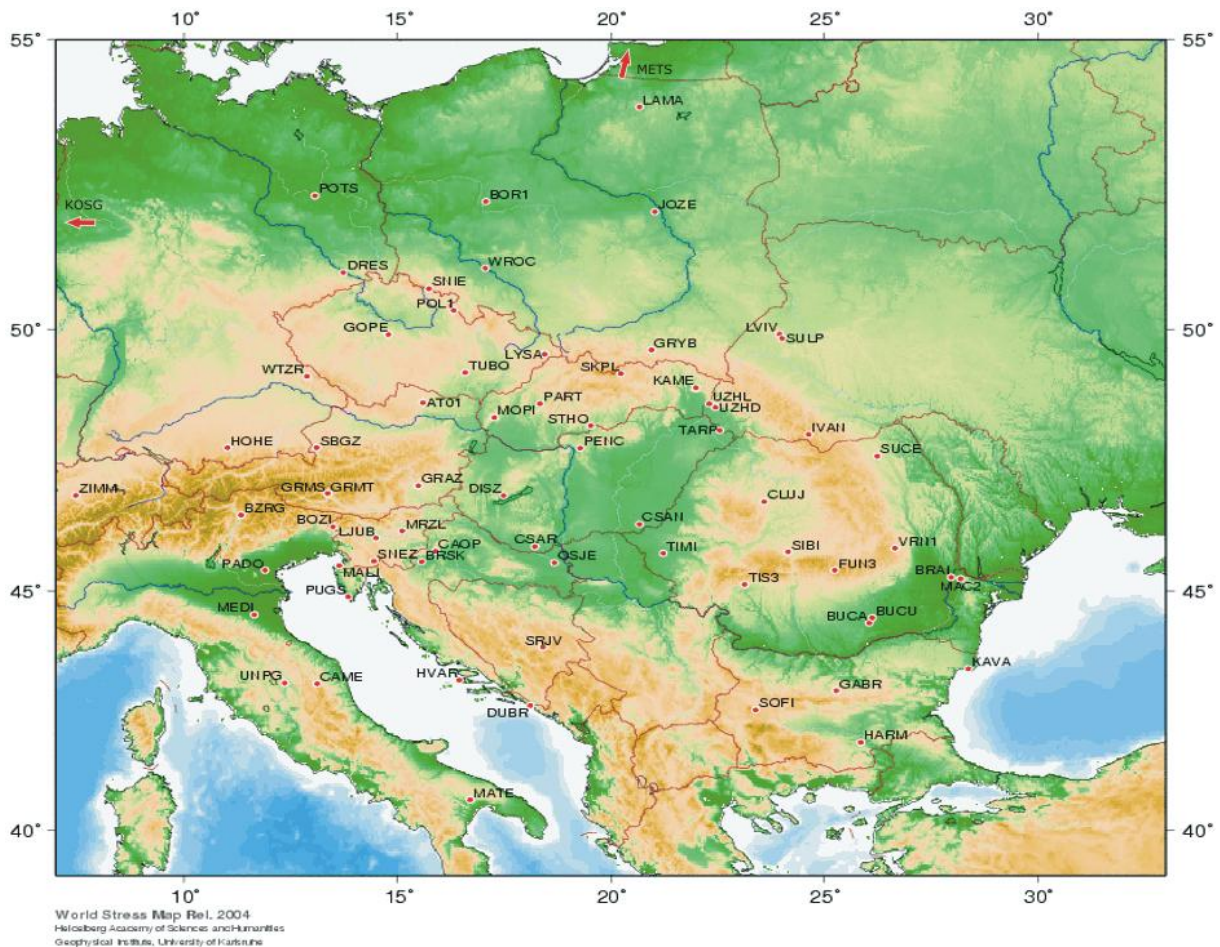**Figure 4 Web page of equipment used in CEGRN03**

Figure 5. CEGN03 map (included in the web page)

3. Socio-Economic Impact

There are no sophisticated statistics about the server access. The daily uploads of the permanent stations amount up to 500, the downloads are much less. During campaign times the number of uploads may increase to 3000 totally and the downloads to about 20000. Averaging it out for 730 days (one campaign every second year) the number of additional traffic may not reach 50 accesses/day. Beginning reprocessing in autumn 2006 for all campaigns may increase the traffic by the same amount. The number of web accesses naturally is much higher but there is no user statistics (interested users, robots, crackers, users by chance). The effort to construct an information about observations and results which are designed to study crustal movements does not pay immediately therefore. An empty server naturally is not as interesting as one which will be filled in time. The value is increasing in time and the accesses will do also in this way. A huge advantage should be pointed out, several documents are digitised for the first time related to the observations. Best observations decrease in value when the documentation is lost. A second disadvantage was already mentioned, the newest and most interesting data and results are not yet public and therefore not available for a larger set of users. Considering that monitoring crustal movements within one plate is a matter of decades for measuring, analysis and modelling the information should be stored in a way which is not too dependent on the memory of people which did the jobs in the past.

4. Implementation

As already mentioned the CEGRN Consortium will overtake full control about the CERGOP project. That means that the admittance of stations, permanent and epoch, will be a responsible task for it. The substructure of national efforts in crustal dynamics of Central Europe will remain in the responsibility of the national institutions and also the decision to which extent data and results will be linked to CERGOP. Concerning the infrastructure AAS is willing to maintain and upgrade the ftp- and web-server for CERGOP as well as the DC. That means the collection of data and offering them in a comfortable for users will be continued. At the end of 2006 some changes must be done. A transfer to another server makes the maintenance more comfortable and improves the data holdings for CERGOP and other international data using the same stations. The ftp area will be merged to a common ftp server whereas the web access should go to the CERGOP web pages using an own web address. A major change will be done considering the public and private area. After a decision of the CEGRN Consortium the major part of data should get public access. Only a minor part should be private on demand of the partners of the consortium. It is also suggested to publish fresh campaign data with a certain delay to give the CERGOP analysis centres a sort of advantage for publications.

5. Literature

Pešec, P., Stangl, G. (2003), Structuring CERGOP information, Approaches to a database, Reports on Geodesy No. 1 (64), 2003, Proceedings of the EGS-AGU-EUG G17 Symposium "Geodetic and Geodynamic Programmes of the CEI (Central European Initiative)" Nice, France 6 – 11 April 2003, 23-28.

Stangl, G., Pešec, P., Haslinger, C., Cristea, E. (2004), Development of the CERGOP-2 Database (WP.1), Reports on Geodesy No. 2 (69), 2004, Proceedings of the EGU Symposium G11 "Geodetic and Geodynamic Programmes of the CEI (Central European Initiative)" Nice, France 25 – 30 April 2004, 11-14.

Haslinger, C., Krauss, S., Pešec, P., Stangl G. (2005), Development of the CERGOP2 Database – Web Design, Reports on Geodesy No. 4 (75), 2005, Proceedings of the CERGOP2/ENVIRONMENT Semi-annual Conference Sarajevo, Bosnia and Herzegovina November 11 – 12 2005, 9-14.

ftp server ftp://cergops2.iwf.oeaw.ac.at

web server http://cergops2.iwf.oeaw.ac.at