NEWSLETTER #19A

Supplement to Newsletter 19
for Station Managers

22 May 2009

Prepared by Jacques Hinderer and David Crossley.

Circulation

This Supplement to Newsletter #19 is being distributed to the following list.

GGP Station Managers May 2009

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5.2 Station Questionnaire on parameters for sites (GFZ)

This is to update certain station parameters at the request of the ISDC at GFZ Potsdam. Because of the nature of the document, it is being included as an attachment.

➔ *ALL Station Managers – return to C. Kroner.*

5.3 Seismic Noise Test for Site + Instrument

This should be done (or re-done) to establish noise levels at all sites for the combination of instrument performance and site noise level –

Essentially the test requires a procedure to choose the quietest 5 single days of raw data within the past 1 year of recording (or shorter period if the instrument has been installed less than 1 year). Then the user will construct a spectrum and a numerical index (the seismic noise magnitude, or SNM) that represents the station noise.

The algorithm for doing this is given in detail on the GGP website
http://www.eas.slu.edu/GGP/snm.html
which includes all the necessary programs. Note that absolutely no processing of the data should be done prior to the implementation of the procedure. Sample values of the SNM are given in the above link, and a full description can be found in Rosat et al. (2004)

Rosat, S., J. Hinderer, D. Crossley, and J.-P. Boy, 2004. Performance of superconducting gravimeters from long-period seismology to tides, *J. Geodyn*. **38,** 461–476.

➔ We request that this test be re-done for every station, so that we may provide a complete list that includes all the new stations. This can be done either by the station personnel (preferred) or by sending raw data to D. Crossley. In the latter case, I need to download 1 year of your raw data, so provisions must be made to gain access to the data by ftp. Please contact me if you have questions. *ALL Station Managers – return to D. Crossley*

5.4 New Station Parameters and Data Authorization

As you know, we keep track of what are the essential station parameters on the GGP Home Page: http://www.eas.slu.edu/GGP/ggpstations.html
Each station has a page of parameters that may, or may not, be complete, e.g. for BH:
http://www.eas.slu.edu/GGP/stations/ggpqu_bh.html

A separate file is attached with tables of most stations. We ask you to check if the data is correct, or fill in a new table if necessary. Please return to crossleydj@gmail.com

We have simplified the data authorization form and ask all of you to return a copy of the second page if you have not already done so. This was last done in about 1999, so there are a lot of forms missing; fill in a new one if something is changed. This is necessary to establish the willingness of each SG site to provide data and to authorize GGP to release your data (it will also be useful for GGOS activities). It is easiest to print the form (datauth09.pdf) to a new Acrobat file to save your input. Again, return to crossleydj@gmail.com

5.5 GGP File Format, Final Changes

After extended discussion between B. Ducarme, J.-P. Barriot, and B. Ritschel, it has been decided to re-standardize the GGP data headers. Most changes were circulated October 2008, but some final tweaking was done early in 2009. Unfortunately this was not circulated at that time, but has to be done now. No further modifications are anticipated. Changes should be implemented immediately before the next data upload. Existing headers will be changed by ICET retroactively. *ALL Station Managers.*

Update on GGP File Format. 2008-12-10. Changes in red.

GGP file formats were discussed in Newsletters 5, 6, 6a, and 7. Unfortunately the format was not precise enough, and many slight variations have been developed by the station operators, each of

which has required a different format for reading the data at ICET. Here we establish a more precise specification of the original format, so that in future ICET will have only 1 format to read.

This document applies only to the user-uploaded 1 minute *.ggp files that are stored at ICET. It is intended for files coded "00", "01", or "02" as specified in the Data Repair Codes. The Corrected Minute files and other files produced by ICET are different in that the gravity data are calibrated in nm s^{-2} so they may be used directly for tidal analysis (e.g. ETERNA).

REQUEST
SG groups should modify their data preparation programs (if necessary) to conform to the following specifications, starting with data uploaded at the end of September 2008.

A GGP 1-minute file is made up of 2 sections, and each section is subdivided into 3 parts:

1. The header
    - 1.1 - first 10 required lines
    - 1.2 – optional text lines inserted by SG group
    - 1.3 – two required text lines
2. The data
    - 2.1 – one required introductory line
    - 2.2 – lines of gravity and pressure data
    - 2.3 – last required termination line

1. HEADER

1.1 – First 10 required lines

Each line permits one or more text strings or numerical values to be read by a program
Line 1: text string "Filename :" (a21) + filename (a30)
Line 2: text string "Station :" (a21) + station (a30)
Line 3: text string "Instrument :" (a21) + instrument (a30)
Line 4: text string "Time Delay (sec) :" (a21) + phase lag (f10.4) + error (f10.4) + *method**
Line 5: text string "N. Latitude :" (a21)+ latitude (f10.4) + error (f10.4) + *method**
Line 6: text string "E. Longitude :" (a21) + longitude (f10.4) + error (f10.4) + *method**
Line 7: text string "Elevation MSL (m) :" (a21) + sensor height (f10.4) + error (f10.4) + *method**
Line 8: text string "Gravity Cal (ugal/V):" (a21) + g calibration (f10.4) + error (f10.4), *method**
Line 9: text string "Pressure Cal (hPa/V):" (a21) + p calibration (f10.4) + error (f10.4), *method* *
Line 10: text string "Author :" (a21) + author email (a40)

**method* denotes the means of specifying the error in the quantity and must be replaced by
"nominal" (if provided by manufacturer, and not checked),
"measured" (if actually measured) , or
"unknown" (if neither of the first two options. If no value is found this field, ICET will enter 0.).

In tabular form the first 10 lines appear as

Line	Text (a21)	Parameter 1 text (a30) or value (f10.4)	Parameter 2 error (f10.4)	Text (a10)
1	Filename :	(a30)		
2	Station :	(a30)		
3	Instrument :	(a30)		

4	Time Delay (sec) :	(f10.4)	(f10.4)	*method
5	N. Latitude (deg) :	(f10.4)	(f10.4)	*method
6	E. Longitude (deg) :	(f10.4)	(f10.4)	*method
7	Elevation MSL (m) :	(f10.4)	(f10.4)	*method
8	Gravity Cal (uGal/V):	(f10.4)	(f10.4)	*method
9	Pressure Cal (hPa/V):	(f10.4)	(f10.4)	*method
10	Author :	[email address of author] (a40)		

NOTE:

Line 4 (Phase lag) must be specified as the time delay in sec, NOT AS DEGREES PER CPD OR OTHER UNIT

Line 7 (Geoid Height) for the sphere is given only as f10.2 because more precision is not required.

Line 8 (Gravity Cal) must be specified as microgal per volt (uGal/V), NOT IN NM/SEC^2 or OTHER UNIT

1.2 - Optional text lines inserted by SG group

text line (a60)
text line (a60)
..
text line (a60)

NOTE: This is the only place in the header where additional lines of information about the station are permitted

1.3 - 2 essential text lines

Line 1: fixed text string "yyyymmdd hhmmss gravity(V) pressure(V)" (a60)

Line 2: fixed text string "C**********" (a60)

In tabular form these header lines appear as:

Line	Text (a60)
1	optional text line
2	optional text line
3	..
4	optional text line
5	yyyymmdd hhmmss gravity(V) pressure(V)
6	C**********

2. DATA

2.1 One required introductory line

Line: "77777777 0.0 0.0"denotes start of record or data block. The values 0.0 0.0 are placed in the columns defined for the data values (see next entry below) to denote the initial offsets of all columns in the data. This is probably not useful for GGP data, but is required for PRETERNA.

2.2 Lines of gravity and pressure data

Lines: year month day hr min sec gravity_value pressure_value `(i4,2i2,1x,3i2,2f10.6)`

2.3 last required termination line

Line: "99999999" (a8) denotes end of the data file.

NOTE:

1. Time of samples is given in UTC
2. Note that additional individual lines beginning with "77777777" were allowed in the original PRETERNA format to allow step corrections to be added to the channel values. This is not part of the GGP conventions.
3. As part of the PRETERNA format, it is permitted to specify multiple data blocks within the file, in which case each data block should be terminated with a line containing a string of eight "8"s, and the next block restarted with a line containing eight "7"s, followed by the indication of a jump value for each channel (normally 0.0), for example:

```
..
20050320 042800 -1.1410631001.19516
20050320 042900 -1.1415471001.19009
20050320 043000 -1.1420611001.18142
88888888
77777777         0.0        0.0
20050320 161100 -0.151548 998.28556
20050320 161200 -0.146616 998.29147
20050320 161300 -0.141674 998.30143
..
```

   This device is best suited to long data gaps. It is always possible also to replace a few missing values by 999999.999. Note TSOFT accepts both "8's" and "9's" to end a block.

4. PRETERNA and ETERNA are slightly different. The ETERNA format specifies that the end of a block is denoted by "99999999" and the end of data is denoted by an additional "88888888". GGP data follows the PRETERNA format.

5. The gravity and pressure values must both fit within the two f10.6 fields allowed. It is up to the file creator to format the values so that overflow in writing or reading does not occur. Normally the gravity values will be limited to ±10 volt from the DVM, thus up to 6 decimal places in gravity is normal; further decimal digits are not meaningful*. For the barometer, some are calibrated directly in hPa (calibration 1.0), thus a maximum of 5 decimal places can be allowed, as in the sample above.

*Some data acquisition systems produce 8 digits (7 decimals) of apparent precision from the DVM, but the 7'th decimal is noise if it derives from a 7.5 digitizing voltmeter. For example, using a calibration factor of -70 microgal / V, a voltage of 10^{-7} V = only 0.007 nanogal.

Example File

An example file from Bad Homburg might appear as follows

```
Filename            :  H2050300.GGP
Station             :  Bad Homburg, Germany
Instrument          :  GWR CD030_U
Time Delay (sec)    :  45.0       2.0    estimated
N Latitude (deg)    :  50.2285    0.0001 measured
E Longitude (deg)   :   8.6113    0.0001 measured
Elevation MSL (m)   : 190.0000    0.1000 measured
Gravity Cal (uGal/V): -67.92      0.02   measured
Pressure Cal (hPa/V):   1.0       0.001  nominal
Author              :  P. Wolf (peter.wolf@bkg.bund.de)
yyyymmdd hhmmss gravity(V) pressure(V)
```

```
C*********************************************************
77777777          0.0        0.0
20050301 000000 -0.504559 993.78749
20050301 000100 -0.502637 993.79867
20050301 000200 -0.500711 993.81193
..
20050320 042800 -1.1410631001.19516
20050320 042900 -1.1415471001.19009
20050320 043000 -1.1420611001.18142
88888888
77777777          0.0        0.0
20050320 161100 -0.151548 998.28556
20050320 161200 -0.146616 998.29147
20050320 161300 -0.141674 998.30143
..
20050331 235700 -0.8851071004.02740
20050331 235800 -0.8876941004.03534
20050331 235900 -0.8902831004.04113
99999999
```

Acknowledgments
Thanks to Bernard Ducarme, Vojtech Palinkas, Jacques Liard, and others for useful comments.

Note concerning 1hr decimated files
It has come to our attention that the original specification of 1 hr files has not been followed, and we therefore should acknowledge officially the naming of these files, as in the table below.

h1	data processed by user	one hour data decimated from 1 min
h2	data processed by ICET*	as above, but done by staff at ICET*

*International Center for Earth Tides. Note the data is already multiplied by the appropriate calibration factors.

This has already been changed on the GGP website
http://www.eas.slu.edu/GGP/repaircodes.html

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