

GGP File Format. V5 2010-07-04. **Note points in red. This updates V4 released 2008/12/12.**

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)	<i>*method</i>
5	N. Latitude (deg)	: (f10.4)	(f10.4)	<i>*method</i>
6	E. Longitude (deg)	: (f10.4)	(f10.4)	<i>*method</i>
7	Elevation MSL (m)	: (f10.4)	(f10.4)	<i>*method</i>
8	Gravity Cal (uGal/V)	: (f10.4)	(f10.4)	<i>*method</i>
9	Pressure Cal (hPa/V)	: (f10.4)	(f10.4)	<i>*method</i>
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 (gravity calibration in microgal/volt)

```
Filename           : H2050300.GGP
Station            : Bad Homburg, Germany
Instrument          : GWR CD030_U
Time Delay (sec)   : 45.0000      2.0000 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) : -67.9200    0.0200 measured
Pressure Cal (hPa/V) : 1.0000      0.0010 nominal
Author             : P. Wolf (peter.wolf@bkg.bund.de)
yyymmdd 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
```

Alternatively, for gravity calibration in $\text{nm s}^{-2}/\text{volt}$, we may have:

```
Gravity Cal (nms-2/V) : -679.2000      0.0200 measured
```

Acknowledgments

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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. 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>

David Crossley, Feb 1, 2011