GFZ
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Report on the Data Base of the International Geodynamics and Earth Tide Service (IGETS)

Erratum
corrections in red,
last update: 03 Sep 2018

Scientific Technical Report STR16/08 – Data

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7. File Name Convention (Data Product Types)

All files are stored as monthly files with the exception of Level 2 (h1, h2) and Level 3 (r1, r2) hour files being stored as yearly files and the calibration files, only one per sensor (CAL; see section 9.4). The IGETS file name convention provides unique file identifiers as follows

IGETS-<instrument>-<type>-<sensor>-<year><month><code>.<extension>

with

	IGETS-	constant prefix
<instrument>	*SG*	Observatory superconducting gravimeter
	IOSG	New generation observatory superconducting gravimeter
	IGRAV	Transportable superconducting gravimeter iGrav
	LCR	Spring gravimeter LaCoste & Romberg
	…	Additional instruments to be added.
<type>	*SEC*	Level 1 second files with raw gravity and pressure data
	MIN	Level 1 minute files with raw gravity and pressure data
	AUX	Level 1 auxiliary data files content
	STATLOG	Level 1 station log files content
	CAL	Level 1 calibration files with a history of calibration values
	CORMIN	Level 2 minute files with corrected gravity and pressure data
	HOUR	Level 2 hour files with corrected gravity and pressure data
	RESHOUR	Level 3 hour files with residual gravity data after geophysical corrections
<sensor>		2 digit station code and 3 digit instrument serial number (for single sphere SGs) and serial number-sensor (for dual sphere SGs), respectively, e.g., su052, *su037-1, su037-2*
<year>		4 digit indication of the year, e.g., *2016*
<month>		2 digit indication of the month from *01* to *12*
<code>		2 digit indication of the GGP Repair Codes (see next section)
<extension>		3 digit file extension

.ggp	for all kinds of gravity and pressure files
.aux	for auxiliary files
.log	for station log files
.cal	for calibration files
.zip	compressed version of all files.

Specific examples are

IGETS-SG-SEC-su052-20160100.ggp

for Level 1 second file with repair code "00" from January 2016 observed with SG 052 at Sutherland and

IGETS-SG-CORMIN-we030-1-20160122.ggp

for Level 2 minute file with repair code "22" from January 2016 observed with the lower sensor of dual SG 030 at Wettzell. The format of the IGETS files follows the GGP File Format V5 from 2010. CAL files represent a special case as there is only one file per station stored in the individual <station> directory given the name IGETS-SG-CAL-<sensor>-<year><month><code>.cal (see section 9.4). The already existing earthquake files GGP-SG-EARTHQ with different second samplings are not stored separately anymore. Instead these moved to the corresponding yearly directories.

8. Repair Codes

The repair codes originating from GGP documented in the GGP Newsletters 5 (1997) and 19a (2009) are part of the IGETS file names as well. They are used to indicate the processing steps of the data sets. The repair codes of GGP are taken over by IGETS with extensions concerning the residual gravity data as Level 3 products. Table 2 lists and explains the various repair codes.

Table 2: IGETS repair codes

Repair Code	Significance	Explanation
00	Raw gravity and pressure data (as recorded), 1 s or decimated to 1 min	No pre-processing prior to decimation (IGETS standard) with the exception that very short gaps or spikes shorter than about 10 s can be filled by linear interpolation between good data points on the raw data, i.e. the full signal, prior to decimation. This will avoid unnecessary spreading of minor problems through the filtering and decimation procedure to 1 min data. Data (gravity and pressure) processed in this way can still be given the '00' code, Level 1.
01	Gaps and disturbances filled with synthetic signal, 1 s or	Gaps and other disturbances are linearly interpolated after removal of synthetic data for tidal and atmospheric effects.

	decimated to 1 min	All models are restored before decimation to 1 min, Level 1.
02	As 01 + offsets adjusted, 1 s or decimated to 1 min	As above including the removal of offsets in the residual signal, generally when there is a clear jump of non-geophysical origin (such as power surge due to lightening), Level 1.
11	Gaps and disturbances filled with synthetic signal, 1 min data	Pre-processing done by station operator on data after decimation to 1 min, Level 2.
12	As 11 + offsets adjusted, 1 min data	As above, Level 2.
21	Gaps and disturbances filled with synthetic signal, 1 min data	Pre-processing done by the University of French Polynesia, prior to tidal analysis, Level 2.
22	As 21 + offsets adjusted, 1min data	As above, Level 2.
h1	Data processed by station operator, 1 h data	Decimated from 1 min, Level 2.
h2	Data processed by University of French Polynesia, 1 h data	Decimated from 1 min, Level 2.
r1	Residual data provided by station operator, 1 h data	Reductions of tidal and atmospheric effects by station operator on Level 2 data. Treatment of non-tidal effects to be discussed by the IGETS directing board, Level 3.
r2	Residual data provided by EOST	Reductions of tidal and atmospheric effects by EOST on Level 2 data. Treatment of non-tidal effects to be discussed by the IGETS directing board, Level 3.

9. File Formats

The IGETS data base continues to provide different types of data, which can be distinguished by *<type>* in the file name, by extension and file format. All files are formatted text files. Observed gravity and barometric pressure data are stored in GGP files with the extension *.ggp.* Major events at a station are documented in STATLOG files (*.*log*), whereas AUX files (*.*aux*) give some additional hydrological and/or meteorological data for further interpretation of the gravity signal. As a new data type in IGETS, CAL files (*.*cal*) provide a compilation of the amplitude and phase calibrations of the sensors.

9.1 GGP Files

The IGETS GGP files follow the GGP File Format V5 from 2010 acknowledging Bernhard Ducarme, Vojtech Pálinkáš, Jacques Liard and others for useful comments. This format applies to the one second and one minute *.ggp* files uploaded by the station operators. It is intended for files coded "00", "01", or "02" as specified in the repair codes (see previous section). The

Table 3: The header section of *.ggp files

Line	Text (a21)		Parameter 1 Text (a30) or value (f10.4)	Parameter 2 Uncertainty (f10.4)	Text (a10)
1	`Filename`	:	(a30)		
2	`Station`	:	(a30)		
3	`Instrument`	:	(a30)		
4	`N. Latitude (deg)`	:	(f10.4)	(f10.4)	*method
5	`E. Longitude (deg)`	:	(f10.4)	(f10.4)	*method
6	`Elevation MSL (m)`	:	(f10.4)	(f10.4)	*method
7	`Author`	:	[e-mail address of author] (a40)		

1.2 Optional comment lines inserted by SG station operator
text line (a60)
text line (a60)
…
text line (a60)
Please note that this is the only place in the header, where additional lines of information about the station are permitted.

1.3 Two required text lines
Line 1: fixed text string "`yyyymmdd hhmmss gravity(V) pressure(V)`" (a60)
Line 2: fixed text string "`C********************************`" (a60)
These header lines appear as in table 4.

```
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. Moreover, it is always possible to replace a few missing values by 999999.999. Please note that TSOFT accepts both "8's" and "9's" to end a block.

d. 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". IGETS accepts both formats.

e. The gravity and pressure values must both fit within the two f10.6 fields allowed. It is up to the station operator to format the values so that overflow in writing or reading does not occur. Usually, the gravity values will be limited to ±10 volt from the digital voltmeter (DVM), thus up to 6 decimal places in gravity is normal; further decimal digits are not meaningful[1]. 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.

3. Example

An example GGP file "IGETS-SG-MIN-su052-20160100.ggp" from Sutherland should appear as follows:

```
Filename          : IGETS-SG-MIN-su052-20160100.ggp
Station           : Sutherland, South Africa
Instrument        : GWR SG052
N. Latitude (deg) :  -32.3814    0.0003  measured
E. Longitude (deg) :   20.8109    0.0003  measured
Elevation MSL (m) : 1755.0000    5.0000  measured
Author            : C. Voigt (cvoigt@gfz-potsdam.de)
Approximate position from IGS/ITRF station SUTM.
Orthometric height from approximate WGS84 height
of SG pillar (1791 m) subtracted by geoid height
from SAGEOID10 (36 m).
yyyymmdd hhmmss  gravity(V)  pressure(V)
C*************************************************
77777777         0.000000    0.0000
20160101 000000  4.694506 829.06000
20160101 000100  4.699112 829.05000
20160101 000200  4.703689 829.05000
20160101 000300  4.708038 829.04000
20160101 000400  4.712238 829.01000
```

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[1] Some data acquisition systems produce 8 digits (7 decimals) of apparent precision from the DVM, but the 7th decimal is noise if it derives from a 7.5 digitizing voltmeter. For example, using a calibration factor of -700 nm/s² / V, a voltage of 10^{-7} V = only 0.007 nGal.