

GPS •H Grid Formats

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1. Extension ".byn"

The files with the extension ".byn" are binary. The "byn" file is split into two sections: header and data.

Header

The size of the header is 80 bytes and the elements of the header are the following:

Contents	Format type	bytes	Unit/Options
South boundary	long integer	4	arcseconds
North boundary	long integer	4	arcseconds
West boundary (negative west)	long integer	4	arcseconds
East boundary (negative west)	long integer	4	arcseconds
North-South Spacing	short integer	2	arcseconds
East-West Spacing	short integer	2	arcseconds
Global	short integer	2	0: Local Model 1: Global Model
Data type	short integer	2	0: Undefined 1: Geoid heights 2: NS Deflections 3: EW Deflections 4: Gravity 5: Elevations 6: Sea Surface Heights 7: Sea Surface Topography 8: Other
Factor	double	8	Multiplication factor for data to integer value
Size of Data	short integer	2	2: shorth integer 4: long integer
Standard deviation	short integer	2	0: std dev not available in file
Factor Std Dev	double	8	Multiplication factor for standard deviation to integer value
Datum	short integer	2	0: ITRF 1: NAD83 (CSRS)
Ellipsoid	short integer	2	0: GRS80 1: WGS84 2: TOPEX/EGM96 3: GRS67
Bytes Order	short integer	2	0: HP,Sun, ... 1: PC (Window, Linux)
Scale for boundaries	short integer	2	0: No Scale

			1: Scale applied
Spare	---	28	---

Data

The data are stored by rows starting from the north. Each row is stored from the west to the east. All data are stored as short or long integer, as indicated in the header (see *Size of data*). For the transformation from integer to float, the user must divide the integer value by the *Factor*. The file may contain undefined values. These values are indicated by 9999.0*Factor when the data are stored as long integer. For the data in short integer, the undefined values are expressed as 32767.

The size of the file is 80 bytes plus the number of rows multiply by number of columns times the size of the data in bytes.

Size of file in bytes = (80 bytes + Rows*Columns*(2 bytes or 4 bytes)).

2. Extension ".bin" (USA)

The information regarding the US ".bin" format was taken from the [US National Geodetic Survey \(NGS\)](#) Web site. The text in red was added by GSD.

What do the filenames indicate about the type of data they contain?

A typical filename, "tyyyyrnn.fff", would indicate:

- **t: The type of data contained in the file**
 - t = g means hybrid geoid model undulations (i.e. GEOID96, GEOID99 , HTv1.01 , HTv2.0)
 - t = s means gravimetric geoid model undulations (i.e. G99SSS, G96SSS , GSD95 , CGG2000)
 - t = x means Deflections of the vertical in the North/South direction (Xi)
 - t = e means Deflections of the vertical in the East/West direction (Eta)
- **yyyy: The year the data was created**
- **r: The main region where the data are located**
 - r = u means "Conterminous USA"
 - r = a means "Alaska"
 - r = h means "Hawaii"
 - r = p means "Puerto Rico and the American Virgin Islands"
 - r = c means "Canada"
 - r = m means "Mexico"
- **nn: The sub-region number of this file**

- CONUS has 8 overlapping sub-regions (nn=01 to 08)
- Alaska has 4 overlapping sub-regions (nn=01 to 04)
- Hawaii has 1 sub-region (nn=01)
- Puerto Rico and the American Virgin Islands have 1 sub-region (nn=01)
- Canada has 3 overlapping sub-regions (nn=01 to 03)
 - if nn = 00, it is whole Canada
 - if nn = 01, it is western Canada
 - if nn = 02, it is eastern Canada
 - if nn = 03, it is northern Canada
- **fff: The format of the data file**
 - fff = bin means binary file
 - fff = asc means ASCII file

So, for example, "g2000c01.bin" means "HTv2.0 in Canada, sub-grid #1 (western Canada), in binary"

What is the new format for the data files?

The new file format for any sub-grid file (GEOID99, G99SSS or DEFLEC99 files) is identical: A 44-byte header followed by "nla" rows of data, each row being "nlo" elements long, each element being a 4-byte floating point number. The format chosen is known in FORTRAN lingo as "direct access binary". The exact ordering of the bytes is mapped below:

Bytes	Data Type	Variab Name	Variable Description
1- 8	real*8	glamn	Southermost Latitude of grid (decimal degrees)
9-16	real*8	glomn	Westernmost Longitude of grid (decimal degrees)
17-24	real*8	dla	Latitude spacing of grid (decimal degrees)
25-32	real*8	dlo	Longitude spacing of grid (decimal degrees)
33-36	int*4	nla	Number of rows of grid
37-40	int*4	nlo	Number of columns of grid
41-44	int*4	ikind	Set to "1", meaning the gridded data is "real*4"
45-48	real*4	data(1,1)	Gridded value at element 1,1 (Southwest corner)
.	.	.	.

The rest of the file continues as 4-byte real values, filling in first the

south row (data(1,nlo) being the last variable in the south row), and then proceeding northward.

The total number of bytes in a "*.bin" file is:
 $44 + 4*nla*nlo$

3. Extension ".grd"

The files with the extension ".grd" are ASCII. The data are stored by rows from the north to the south. Each row is stored from the west to the east. Each record has one value with the exception of the first record, which is the header. The header is made of 6 values describing the area of the grid and its spacing. The values of the header are in this following order: North latitude, South latitude, West Longitude, East Longitude, North-South spacing and East-West spacing. These 6 values are in decimal degrees.

4. Extension ".slv"

The "slv" format is made of two file: One file with the extension "slv" and a second file with the extension "bin". The former file is ASCII and contains information related to the data grid such as the boundaries of the grid and its spacing. The latter file is the data; and this file is binary.

The data are stored by rows starting from the north. Each row is stored from the west to the east. All data are stored as short integer. For the transformation from integer to float, the user must divide the integer value by the scale *Factor*, which is given in the "slv" file. The file may contain undefined values. The undefined values are expressed as a value of 32767.

The size of the file is the number of rows multiply by number of columns times 2.

Size of file in bytes = (Rows*Columns*2 bytes).

Important: This format is discontinued. GSD will not support this format after CGG2000 and HTv2.0.