SAFARI 2000 Hydrographic Data, 1-Deg, Release 2.2 (Cogley)

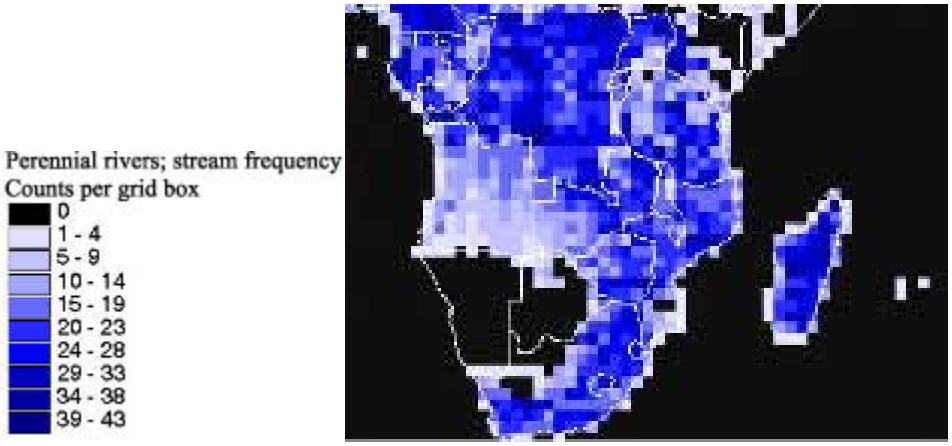
Summary:

The Global Hydrographic data set (GGHYDRO) Release 2.2 is organized into 19 files containing terrain type, stream frequency counts, major drainage basins, main features of the cryosphere surface, and ice/water runoff per year for the entire Earth's surface at a spatial resolution of 1 degree longitude by 1 degree latitude.

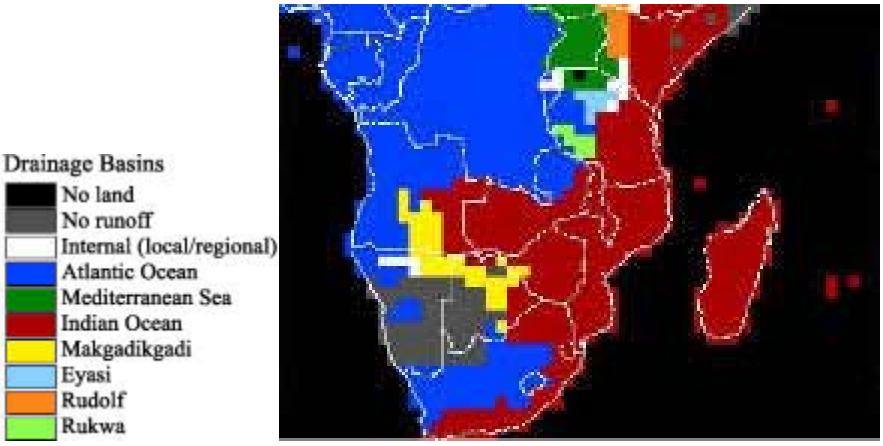
This southern African subset of the Global Hydrographic data are provided in both ASCII GRID and binary image files formats.

Example thumbnails of hydrographic data types at 1-degree resolution:

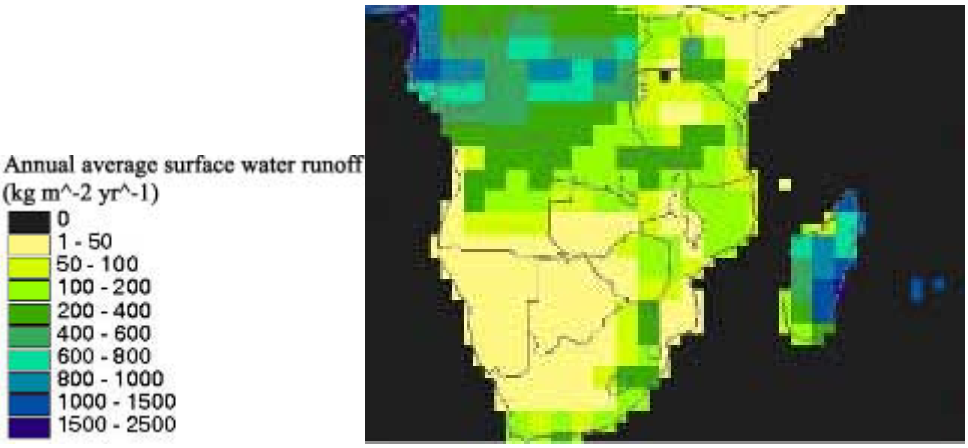
Perennial rivers (FRIV)



Major drainage basins (BAS1)



Surface runoff of water (kg/m**2/yr) (RNOF)



Data Set Information:

The gghydro.tar.gz file contains a subset of the Global Hydrographic Data, Release 2.2 (GGHYDRO). The subset is for southern Africa.

This README file contains information regarding:

1. Data format
2. Procedure used to create the southern Africa subset
3. Legend and data source

DATA FORMAT

The downloadable file, gghydro.tar.gz, is a UNIX compressed tar file. Once the file is untarred there are 19 separate files:

1	gghbas1.dat *	Major drainage basins, ~30 drainage systems
2	gghbas2.dat *	Smaller drainage basins, ~150 drainage systems
3	gghcryo.dat *	Main features of the cryosphere
4	gghdsrf.dat	Dry surface (% of grid cell) this is equal to the sum of the percentages in gghland. dat, gghswmp, gghdune.dat, and gghsmrs.dat
5	gghdune.dat **	Sand dunes (% of grid cell)
6	gghflak.dat **	Perennial freshwater lakes (% of grid cell)
7	gghfriv.dat	Perennial rivers; stream frequency (counts per grid box)
8	gghglac.dat **	Glacier ice, including shelf ice excluding pack ice (% of grid cell) for this subset all values are 0 but the file was included for sake of completeness
9	gghilak.dat **	Intermittent water bodies (% of grid cell)
10	gghiriv.dat	Intermittent rivers; stream frequency (counts per grid box)
11	gghland.dat **	Exposed land not covered by swamp, intermittent water bodies, glacier ice, sand dunes, saltmarsh or salt flats (% of grid cell)
12	gghms05.dat	5 percent land mask; value of 1 is assigned where the sum of gghdsrf.dat, gghglac.dat, gghsflt.dat, and gghilak.dat exceeds 5%, elsewhere value is 0
13	gghrice.dat	Annual average of runoff of glacier ice (kg m^-2 yr^-1) for this subset all all values are 0 but the file was included for sake of completeness
14	gghrner.dat	Estimated root mean square error of gghrnof.dat (%)
15	gghrnof.dat	Annual average of surface water runoff from land surfaces kg m^-2 yr^-1)
16	gghsflt.dat **	Salt flats (% of grid cell)
17	gghsltw.dat **	Saltwater, whether marine or terrestrial (% of grid cell)
18	gghsmrs.dat **	Saltmarsh (% of grid cell)
19	gghswmp.dat **	Swamp, marsh, and other wetlands (% of grid cell)

* Categorical data, go to legend section for further information.
** The sum of these nine terrain types (land, flak, swmp sltw, , ilak, glac, dune, smrs, sflt) is 100 for each grid cell.

It is highly recommended that you review the original documentation for this data set for more specifics. The original documentation, gghrls22.doc, can be downloaded from the following anonymous ftp site at Trent University:

ftp://ftp.trentu.ca/pub/gghydro/

The data files are in ASCII Grid format for ArcInfo. Each file contains a single ASCII array with integer values. Coordinates listed below are in decimal degrees.

Rows 40
Columns 55
UpLeftX 5
UpLeftY 5
LoRightX 60
LoRightY -35
cellsize 1
Projection geographic

The ASCII file consists of header information containing a set of keywords, followed by cell values in row-major order. The file format is

<NCOLS xxx>
<NROWS xxx>
<XLLCORNER xxx>
<YLLCORNER xxx>
<CELLSIZE xxx>
{NODATA_VALUE xxx}
row 1
row 2
...
row n

where xxx is a number, and the keyword NODATA_VALUE is optional and defaults to -9999. Row 1 of the data is at the top of the grid, row 2 is just under row 1 and so on. The end of each row of data from the grid is terminated with a carriage return in the file.

To import this file into ArcInfo use the following command at an ARC prompt:

ASCIIGRID <in_ascii_file> <out_grid> {INT | FLOAT}

Arguments
<in_ascii_file> - the ASCII file to be converted.
<out_grid> - the name of the grid to be created.
{INT | FLOAT} - the data type of the output grid.
INT - an integer grid will be created.
FLOAT - a floating-point grid will be created.

Binary File Information

Each ASCII data file has also been converted into a binary image file that can be viewed in any standard image viewing package. The files are single-byte images, no header, 55 columns by 40 rows. Missing data (ASCII -9999) have been converted to the maximum value of 255.

PROCEDURE USED TO CREATE THE SOUTHERN AFRICA SUBSET

The original data were obtained and read following the directions in the original documentation. The data were converted to ascii arrays and then imported into ArcInfo using the ASCIIGRID command.

Using GRID (a raster- or cell-based geoprocessing toolbox that is integrated with ArcInfo) the SETWINDOW command was used to define the subarea of interest. This subarea was defined by identifying the bounding coordinates as follows:

x_min 5 y_min -35 x_max 60 y_max 5

The "snap_grid" option of the SETWINDOW command was used. This snaps the lower-left corner of the specified window to the lower-left corner of the nearest cell in the snap_grid and snaps the upper-right corner of the specified window to the upper-right corner of the nearest cell in the snap_grid. In this case the snap_grid is an original data grid. The purpose of this is to ensure the proper registration of the newly set analysis window. The command format used is as follows:

SETWINDOW x_min y_min x_max y_max original_grid

Once the window was set, creating the new grid was simply a matter of setting the new subset grid equal to the original grid.

subset_grid = original_grid

An ASCII array was created from the new subset grid using the GRID command GRIDASCII.

file.dat = GRIDASCII(subset_grid)

LEGEND & ADDITIONAL SOURCES OF INFORMATION

The following legends are used in the original data for the categorical fields:

******bas1.dat******

32: no land
48: no runoff
49: internal (local/regional)
50: Arctic Ocean
51: Atlantic Ocean
52: Mediterranean Sea
53: Indian Ocean
54: Pacific Ocean
65: Caspian Sea
66: Aral Sea
67: Lake Balkhash
68: Lop Nor
69: Helmand/Seistan
70: Lake Chad
71: Makgadikgadi
72: Lake Eyre
73: Abbe
74: Assale
75: Blanche
76: Bulloo
77: Eyasi
78: Frome
79: Gholkarteniz
80: Issyk Kul
81: Mar Chiquita
82: Nazas
83: Rudolf
84: Rukwa
85: Poopo
86: Tengiz
87: Urmia
88: Van
89: Uvs Nor
90: Hyargas Nor
91: Tsaidam

******bas2.dat******

32: No land
48: No runoff
49: Internal drainage
50: Arctic Ocean
51: Atlantic Ocean
52: Mediterranean Sea
53: Indian Ocean
54: Pacific Ocean
65: Caspian
66: Aral
67: Balkhash
68: Lop Nor
69: Helmand-Seistan
70: Chad
71: Makgadikgadi
72: Eyre
73: Abbe
74: Assale
75: Blanche
76: Bulloo
77: Eyasi
78: Frome
79: Gholkarteniz
80: Issyk Kul
81: Mar Chiquita
82: Nazas
83: Rudolf
84: Rukwa
85: Poopo
86: Tengiz
87: Urmia
88: Van
89: Uvs Nor

90: Hyargas Nor
91: Tsaidam
97: Anabar
98: Back
99: Churchill (Manitoba)
100: Colville
101: Hayes
102: Indigirka
103: Kazan
104: Khatanga
105: Kolyma
106: Lena
107: Mackenzie
108: Nelson
109: Ob
110: Olenek
111: Onega
112: Pechora
113: Pyasina
114: Severnaya Dvina
115: Albany
116: Taymyr
117: Thelon
118: Yana
119: Yenisei
120: Pur-Taz
121: Parana
122: Moose
123: Alabama
125: Brazos
128: Amazon
129: Chubut
130: Churchill (Nfld)
131: Cuanza
132: Cunene
133: Douro
134: Ebro
135: Elbe
136: Essequibo
137: Gambia
138: Garonne
139: Jequitinhonha
140: Koksoak
141: Loire
142: Magdalena
143: Mississippi
144: Neva
145: Niger
146: Oder
147: Ogoue
148: Orange
149: Orinoco
150: Parnaiba
151: Rhine
152: Rio Grande
153: Saguenay
154: Sanaga
155: Sao Francisco
156: Senegal
157: St Lawrence
158: Tocantins
159: Uruguay
160: Vistula
161: Volta
162: Zaire
163: Zapadnaya Dvina
164: Danube
165: Dnepr
166: Dnestr
167: Don
168: Nile
169: Rhone
170: Brahmaputra
171: Euphrates
172: Ganges
173: Godavari
174: Indus
175: Irrawaddy
176: Juba
177: Krishna
178: Limpopo
179: Mahanadi
180: Murray-Darling
181: Rufiji
182: Salween
183: Tigris
184: Zambezi
185: Amur
186: Anadyr
187: Chao Phraya
188: Colorado
189: Columbia

190: Fraser
191: Hwai
192: Hwang Ho
193: Kuskokwim
194: Liao
195: Mekong
196: Pearl
197: Red
198: Rio Grande de Santiago
199: Yangtze
200: Yukon
201: Kura
202: Ural
203: Volga
204: Amu Darya
205: Syr Darya
206: Cooper
207: Warburton
208: Bandama
209: Save
210: Ruvuma
220: Baltic
221: Black Sea
222: Red Sea
223: Persian Gulf
224: Hudson Bay-Foxe Basin
225: Gulf of Mexico
226: San Francisco Bay

******gghcryo.dat******
32: water without ice cover
48: permafrost absent or extremely restricted
49: permafrost restricted
50: permafrost common
51: permafrost ubiquitos
53: permanent sea or lake ice
54: seasonal sea or lake ice
55: ice shelf
57: ice sheet

Although not all of these categories may be represented in the subset of the data, the original legend has been retained.

The original data and documentation may be downloaded from the anonymous ftp site at Trent University: ftp://ftp.trentu.ca/pub/gghydro/

ORIGINAL DATA SET CITATION

Cogley, J.G., 1998, GGHYDRO -- Global Hydrographic Data, Release 2.2. Trent Climate Note 98-1, Department of Geography, Trent University, Peterborough, Ontario, Canada. Data available on-line at ftp://ftp.trentu.ca/pub/gghydro/