A Description for the Output Data of Global Flood Monitoring System (GFMS)

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Introduction

The GFMS (<u>http://flood.umd.edu</u>) is a NASA-funded experimental system using real-time TRMM Multi-satellite Precipitation Analysis (TMPA) precipitation information as input to a quasi-global (50°N - 50°S) hydrological runoff and routing model running on a 1/8th degree latitude/longitude grid. Flood detection/intensity estimates are based on 13 years of retrospective model runs with TMPA input, with flood thresholds derived for each grid location using routed runoff statistics (95th percentile plus parameters related to basin hydrologic characteristics). The intensity value is the calculated water depth above the flood threshold.

The flood model is based on the University of Washington Variable Infiltration Capacity (VIC) land surface model (Liang et al., 1994) coupled with the University of Maryland Dominant River

Tracing Routing (DRTR) model (Wu et al., paper in preparation). The flood detection algorithm is described in Wu et al. (2012). The real-time TMPA precipitation data product (Huffman et al., 2010) is obtained from the NASA Goddard TRMM/GPM Precipitation Processing System (PPS). An initial evaluation of the new GFMS based on 15-yr (1998~2012) retrospective simulation against gauge streamflow observations and reported flood event archives has been performed and presented recently in 2013 American Meteorological Society(AMS) Annual Meeting. The PDF file of the slides from the talk is available

http://flood.umd.edu/2013_01_09_AMS_Austine_Wu.pdf.

The Table below shows the details of some of the variable outputs from the GFMS. Currently only the flood intensity (in depth) above threshold is available for public access. All these variables are straight-forwardly written to binary files without any additional operations (i.e. no multiplies) in 4-byte float type for the domain of 50°N - 50°S at 3-hour time step and 1/8th deg. spatial resolution. The dimension and the geo-reference information for the data grid of each file are: row=800, col=2458, xllcorner= -127.25, yllcorner=-50 and cellsize=0.125. The NoData in the files are -9999.

	File Name	Var. Name	Unit
1	Flood_byStor_yyyymmddhh.bin	Flood intensity (in depth) above threshold	mm
2	Flood_byQ_yyyymmddhh.bin	Streamflow above flood threshold	m³/s
З	Q_yyymmddhh.bin	Streamflow	m³/s
4	Routed_yyyymmddhh.bin	Surface water storage	mm
5	V_yyyymmddhh.bin	Channel water velocity	m/s
6	yyyymmddhh.inst.bin	Instant rain	mm/h
7	yyyymmddhh.1day.bin	1 day accumulated Rain	mm
8	yyyymmddhh.3days.bin	3 day accumulated Rain	mm
9	yyyymmddhh.7days.bin	7 day accumulated Rain	mm

Example of reading the data using C

An episode of C code which can be used for reading the data is provided below.

void readLayer(char *filename, float *buffer,int row, int col)

{

int i,j;

```
FILE *pfile;
size_t size;
if((pfile=fopen(filename, "rb"))==NULL)
{
    printf("The thresholdfile is not available yet! %s \n", filename);
    exit(-1);
}
for(i=0;i<row;i++)
for(j=0;j<col;j++)
{
    size=fread(&(buffer[i*col+j]),sizeof(float),1,pfile);
}
fclose(pfile);
return;
```

References

}

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