

# Explains contents of this folder and how to run RRAWFLOW—Rainfall-Response Aquifer and Watershed Flow Model

Contained in this directory is example F5 as described by Long (2014), a simulation of discharge from Barton Springs. System input is daily precipitation, and the impulse-response function (IRF) is single gamma and time variant, using option 2. The RRAWFLOW user's manual is located in the doc directory.

## Scripts

batch\_R.r – This is an R script that runs RRAWFLOW from the R Console command line.

rrawflow.r – RRAWFLOW program in R.

rf\_utilities.r – This is an R script containing support functions for RRAWFLOW.

run\_batch\_wcp.bat – This is to run RRAWFLOW from the Microsoft® Windows command prompt (wcp) when applying automated parameter estimation. R needs to be installed on your computer.

batch\_wcp.r – The batch file run\_batch\_wcp.bat invokes R to run the script batch\_wcp.r, which runs RRAWFLOW from the Microsoft® Windows command prompt.

## Directories

data – Contains input data for the example simulation in Long (2014).

doc – RRAWFLOW user's manual.

other\_tools – Contains tools to assist the user in setting the parameters for parametric IRFs or control points for nonparametric IRFs.

PEST – Contains input files for automated parameter estimation using PEST (Doherty, 2005). This also contains a spreadsheet to assist the user in creating the PEST control file (pest\_files.xlsx). Additional PEST input and output files are stored in the main directory, each having the root file name "pest." A detailed description of the operation of PEST is in Doherty (2005).

## How to run RRAWFLOW from the R command line

1. Open the R program and start a new project in the folder rrawflow\_1.11. Type `source("batch_R.r")` at the command prompt.
2. Model output is written to files `rf_output.csv`, `rf_output.txt`, and `rf_summary.csv`.
3. Plots created: `Rplots.png`, `IRF_days.png`, and `IRF_years.png`.

## How to run RRAWFLOW from the Windows command prompt

This option is for application of automated parameter optimization (e.g., PEST). This option does not generate all of the output that is generated when executing RRAWFLOW from the R command line.

1. Open a Windows command prompt and navigate to the working directory
2. Open the file `run_batch_wcp.bat` in a text editor and set the path to where `R.exe` is located on your computer.
3. From the command line type "`run_batch_wcp.bat`". This batch file invokes R to run the script `batch_wcp.r`, which runs RRAWFLOW.
4. Model output is written to the file `rf_output.txt` only.
5. No plots are generated.

## How to estimate parameters for RRAWFLOW using PEST

See Doherty (2005) for instructions on the full operation of PEST.

1. The file `pest.pst` is the PEST control file and contains a list of all parameters to be estimated.
2. At the Windows command prompt, type "`pest pest.pst`"
3. Upon completion of PEST, execute RRAWFLOW one last time from the R command prompt to generate all RRAWFLOW output files.

## References

Doherty, J.: Pest: Model-Independent Parameter Estimation. User Manual, fifth ed. Watermark Numerical Computing, variously paged, <http://www.pesthomepage.org/>, 2005.

Long, A. J.: RRAWFLOW: Rainfall-response aquifer and watershed flow model, Hydrology and Earth System Sciences, *in review*, 2014.