PRE & POST PROCESSING
GRAPHICAL USER INTERFACES (GUIs)

Why a GUI?

•Ease of input (graphical)
•Intuitive input (visual)
•Model features input as objects so grid can be changed without a human re-entering text in files
•Import of data sets in various formats and/or use of functions to generate values

What does a GUI do?

•Renders a graphical picture of properties & boundary conditions
•Facilitates investigation of the input information
•Creates text files given your graphical depiction of the system and input of values to GUI menus
•The GUI runs the model codes with those text files as input
•Imports results from the output files of the model run and produces maps, charts, & graphs of results
•Facilitates investigation os the results

USGS GUIs

Out-dated: USGS MF-GUI (needs ArgusONE)
NOW ModelMuse (1st released May 2009 updated often)

Commonly Used Commercial GUIs

Ground Water Vistas (GWV)
Ground Water Modeling System (GMS)
Visual MODFLOW

Problems with commercial GUIs:
* Do not keep up with USGS developments
* Much to learn, less intuitive than you may think
* It is easy to miss modeling errors when using a GUI
* Difficult to get problems resolved (exception GWV is very responsive)
* Some use modified versions of MODFLOW with different binary output format
* Cannot import individual module files
* Those you share models with must own the same GUI

Benefits
* Ease of visualizing and accomplishing input and output especially for large models

GUIs available in our lab:

ModelMuse MM
There is an old version under wrdapp
I suggest you download from the USGS software page
And install it in a folder where you have access

The documentation is very useful and
The videos are good tutorials:
http://water.usgs.gov/nrp/gwsoftware/ModelMuse/ModelMuseVideos.html

Ground Water Vistas GWV (student version is free to anyone and fully functional for 50x50x4)
GWV tutorial:
C:\Program Files\gwv5\manuals\gv5manual.pdf
after opening that pdf, see the tutorial right after intro and concepts

Ground Water Modeling System (GMS) phasing out soon
GMS tutorial:
Start GMS and go to help
Take quick tour and then start the tutorial (pdfs are in the doc directory)

The best way to learn to use a GUI is to follow the tutorial and mimic their steps while setting up a model you need for a project

If you receive a model and do not have the GUI, sometimes you can import a model to a GUI
Beware that importing often produces bugs because the GUI authors focus on building new models.
DID YOU CONFIRM YOUR MODEL WAS CORRECT WHEN IMPORTED TO GWV?

Whenever Importing Files:
REMOVE TABS
ADD carriage returns at the end of files
AVOID missing data from a file (eg blanks read as zeros in dos)
May need to delete comments

If you work with ModelMuse or GWV they will respond promptly with a "fix" unless they have stated that they do not support a package that you are trying to import so carefully read their user manual/help

Our focus is on learning about
MODFLOW &associated Codes
Not on learning a GUI
which can be quite time consuming in itself

Having knowledge of the MODFLOW files and processes
will make you a good GUI user

The following 2 slides guides you in opening the
transient model we create in class in ModelMuse.
Use this only if you decide it benefits you.
It is not a required task.

Create a file folder ep_modelmuse
Copy the files from a MODFLOW model run into the new folder
Download ModelMuse and install to where you can write & launch
Choose to import an existing MF2005 model
In the dialog box change the x,y origin as needed
Then browse for and select the nam file
OK
The model will appear and the introductory video may launch
View videos any time from the web page as noted on 2 previous slides
File > SaveAs > ep.gpt
Use the green triangle to run the model
Notice the contents of the model monitor
Xit that and the list file should appear
Review the contents of the list file
Notice the command window stays open as well so Xit that
Notice the files created
(now you can delete the files you imported)
View them and notice how they differ from the files you created manually, but provide the same result. If not let the author know and he will fix it promptly.
Notice ModelMuse preserves your parameters.
Notice history is saved in the zip file (it includes the exe file you ran the model with)
The ep.gpt file contains all information for the model except the exe.

Import results:

File > Import > ModelResults

Choose the fhd file which contains the heads in text format

Notice a 3D color flood contour map of heads appears

(to see head value place cursor over the grid and look at the lower right panel)

Examine heads on various rows, columns, layers

by rotating the 3D view in the lower right window

compare SP1TS1 to SP4TS30 choose via colored checker board

File > Import > ModelResults

Choose the cbc file which contains flow info, select all of them

Notice a color flood can be chosen for different flows, compare recharge for SP1TS1 compare to SP3TS1, look at other flows of interest

(to see flow value place cursor over the grid and look at the lower right panel)

Choose a different item to view using the colored checker board

This time choose flow to the right face of the cells or flows to one of the boundary types

Take a little time to investigate the model.

If you were to build a model from scratch in ModelMuse you would use objects to define properties and they would be independent of the grid.

Again our focus is on learning about MODFLOW and associated software specifically how to "find your way around" the codes, manuals, and files so we will not spend much time on the GUI, but we will import more complex models later in the course

Building New Models with GUI

To create a model from "scratch" using the graphical objects

Select the GUI you prefer

Follow their tutorial and mimic for your groundwater system

When you have features they did not have in the tutorial:

1) Attempt to follow similar steps for say another HDF boundary
2) Try their help menu
3) Read their manuals
4) Experiment
5) View the files created by the GUI to determine how it is interpreting your input and adjust appropriately

GUI authors offer short courses to help people become adept