

MT3DMS Benchmark Test Problems

Chunmiao Zheng (czecheng@ua.edu)
02/20/2010

TABLE OF CONTENTS

.....

INTRODUCTION

RUNNING MT3DMS WITH MODFLOW-96

RUNNING MT3DMS WITH MODFLOW-2000

RUNNING MT3DMS WITH MODFLOW-2005

EXAMINING AND VISUALIZING MODEL RESULTS

INTRODUCTION

After MT3DMS is installed on your hard drive, a folder named [examples] is created which contains the input and output files for all 10 benchmark test problems described in the MT3DMS User's Manuals ([Zheng and Wang, 1999](#), p. 130-163) as well as additional examples described MT3DMS v5.x Supplemental User's Guide ([Zheng, 2010](#)). Further under [examples] are three folders named [mf96mt3d], [mf2kmt3d], [mf2005mt3d], i.e.,

```
--examples
|
|  --mf96mt3d
|
|  --mf2kmt3d
|
|  --mf2005mt3d
```

The first folder [mf96mt3d] contains the MT3DMS transport files along with the flow files prepared for MODFLOW-96. The second subdirectory [mf2kmt3d] and third subdirectory [mf2005mt3d] contain additional MT3DMS transport examples along with the flow files prepared for MODFLOW-2000 and MODFLOW-2005, respectively.

RUNNING MT3DMS WITH MODFLOW-96

To run any test problem under [mf96mt3d], first go to the folders **P01**, **P02**, ..., or **P10**. For each example, there are a NAME file for MODFLOW-96 called **p1mf.nam**, **p2mf.nam**, ..., or **p10mf.nam**, and a NAME file for MT3DMS called **p1mt.nam**, **p2mt.nam**, ..., or **p10mt.nam**. These NAME files specify the input/output files required by MODFLOW-96 and MT3DMS v5.

To start a MODFLOW-96 run, enter a command as follows in command prompt mode under Microsoft Windows:

```
C:\MT3DMS5\Bin\mf96  p1mf.nam
```

where "mf96" is the name of the executable code for the version of MODFLOW-96 with Link-MT3DMS interface, and [C:\MT3DMS5\Bin] is the subdirectory where the MT3DMS and MODFLOW executables are located. If the folder name has already been added to the command prompt configuration file AUTOEXEC.bat or the Windows PATH environment variable, enter the command simply as

mf96 plmf.nam

After each MODFLOW-96 run is completed, a flow-transport link file with a name such as **p1.ftl**, **p1.ftl**, ..., or **p10.ftl** is created which contains the flow model information required by the transport model.

To start a MT3DMS run after the flow solution is obtained by MODFLOW-96, enter the command as

C:\MT3DMS5\Bin\mt3dms5s plmt.nam

or simply

mt3dms5s plmt.nam

where [mt3dms5s] is the name of the executable code for the standard version of MT3DMS v5 that requires the flow-transport link file to be in the style of **structured, unformatted** files generated by Lahey Fortran 95 (LF95) or Compaq/HP Visual Fortran (VF).

RUNNING MT3DMS WITH MODFLOW-2000

To run any test problems under [mf2kmt3d], first go to the folder for a particular example. To start a MODFLOW-2000 run, enter a command as follows in command prompt mode under Microsoft Windows:

C:\MT3DMS5\Bin\mf2k p7mf2k.nam

where "mf2k" is the name of the executable code for MODFLOW-2000 version 1.17 or later with Link-MT3DMS Package 6.3 or later, and [C:\MT3DMS5\Bin] is the folder where MT3DMS and MODFLOW executables are located. If the folder name has already been added to the command prompt configuration file AUTOEXEC.bat or the Windows PATH environment variable, enter the command simply as

mf2k p7mf2k.nam

Note that if a newer version of MODFLOW-2000 is installed on your PC, you can replace the file "mf2k.exe" under C:\MT3DMS5\Bin with the newer version, or use the newer version by specifying the PATH of the newer executable code.

After a MODFLOW-2000 run is completed, a flow-transport link file with a name such as **p7.ftl** is created which contains the flow model information required by the transport model.

To start a MT3DMS run after the flow solution is obtained by MODFLOW-2000, enter the command as

C:\MT3DMS5\Bin\mt3dms5b p7mt.nam

or simply

mt3dms5b p7mt.nam

where [mt3dms5b] is the name of the executable code for a version of MT3DMS v5 that requires the flow-transport link file to be in the style of **unstructured**,

true binary files that are based on a non-standard Fortran feature but are more transportable among different Fortran compilers.

RUNNING MT3DMS WITH MODFLOW-2005

To run any test problems under [mf2005mt3d], first go to the folder for a particular example. To start a MODFLOW-2005 run, enter a command as follows in command prompt mode under Microsoft Windows:

```
C:\MT3DMS5\Bin\mf2005 p7mf2005.nam
```

where "mf2005" is the name of the executable code for MODFLOW-2005 version 1.8 or later with Link-MT3DMS Package 7 or later, and [C:\MT3DMS5\Bin] is the folder where MT3DMS and MODFLOW executables are located. If the folder name has already been added to the command prompt configuration file AUTOEXEC.bat or the Windows PATH environment variable, enter the command simply as

```
mf2005 p7mf2005.nam
```

Note that if a newer version of MODFLOW-2005 is installed on your PC, you can replace the file "mf2005.exe" under C:\MT3DMS5\Bin with the newer version, or use the newer version by specifying the PATH of the newer executable code.

After a MODFLOW-2005 run is completed, a flow-transport link file with a name such as **p7.ftl** is created which contains the flow model information required by the transport model.

To start a MT3DMS run after the flow solution is obtained by MODFLOW-2005, enter the command as

```
C:\MT3DMS5\Bin\mt3dms5b p7mt.nam
```

or simply

```
mt3dms5b p7mt.nam
```

where [mt3dms5b] is the name of the executable code for a version of MT3DMS v5 that requires the flow-transport link file to be in the style of **unstructured, true binary** files that are based on a non-standard Fortran feature but are more transportable among different Fortran compilers.

EXAMINING AND VISUALIZING MODEL RESULTS

After each MT3DMS run, some or all of the following output files are generated:

px.m3d:	standard text output file for test problem no. x ;
mt3d001.obs:	optional output file with concentrations vs. total elapsed time at user-specified observation points where 001 is species index;
mt3d001.mas:	optional output file with a one-line summary of mass budgets at each transport step or a user-specified interval;
mt3d001.ucn:	optional output file with unformatted concentrations for the dissolved phase at user-selected times;
mt3d001s.ucn:	optional output file with unformatted concentrations for the sorbed (or immobile) phase at user-selected times;
mt3d.cnf:	optional output file with model discretization data.

The PostMODFLOW|MT3DMS (PM) program distributed with MT3DMS can be used to create concentration data files from the UCN and CNF files for use with a graphical program such as Surfer or Tecplot. For more information, refer to the readme file for MT3DMS utilities [Utilities.PDF].

The USGS Model Viewer software can also be used to visualize 2D or 3D concentration distributions. MV uses the UCN and CNF files directly. A Model Viewer configuration file named 'conc.mv' has been created for most test problems. The *.mv configuration file assumes the default UCN file name 'mt3d001.ucn' and default CNF file name 'mt3d.cnf'. To start MV for each test problem, simply click on the conc.mv file name. For more information on using Model Viewer, refer to its User's Guide ([Hsieh and Winston, 2002](#)).