

Documentation of Conversion of the MODFLOW Interbed Storage (IBS) Package To MODFLOW-2005

This documentation describes the changes to the Interbed Storage (IBS) Package (Leake and Prudic, 1991) to convert it to work with MODFLOW-2005. See Chapter 9 of Harbaugh (2005) for further information about the MODFLOW-2005 program. The modified code is designated version 7, and this code has the same functionality as version 1 of this package, which is the version used in MODFLOW-2000.

1. Fortran module GWFIBSMODULE was created to store the shared data for the IBS Package; GWFIBSMODULE incorporates the capability to support Local grid Refinement. The following table describes the data.

Variable Name	Size	Description
IIBSCB	Scalar	Cell-by-cell budget file unit
IIBSOC	Scalar	IBS output control flag
ISUBFM	Scalar	Format code for writing subsidence
ICOMFM	Scalar	Format code for writing compaction
IHCMFM	Scalar	Format code for writing preconsolidation head
ISUBUN	Scalar	Unit number for writing subsidence
ICOMUN	Scalar	Unit number for writing compaction
IHCUN	Scalar	Unit number for writing preconsolidation head
IBQ	NLAY	Layer flag for interbed storage – < or =0 : no interbed storage, >0: interbed storage
IBQ1	NLAY	List of layers that have interbed storage
HC	NCOL,NROW,naql	Preconsolidation head – naql is the number of layers for which IBQ>0
SCE	NCOL,NROW,naql	Elastic storage capacity – naql is the number of layers for which IBQ>0
SCV	NCOL,NROW,naql	Inelastic storage capacity – naql is the number of layers for which IBQ>0
SUB	NCOL,NROW,naql	Computed compaction – naql is the number of layers for which IBQ>0

2. All subroutines were changed to designate 2 for the process version and 7 for the package version: GWF2IBS7.

3. Subroutines GWF2IBS7ALP and GWF2IBS7RPP were combined and renamed GWF2IBS7AR.

4. GWF2IBS7AR was modified to use ALLOCATE statements to reserve memory for the data in GWFIBSMODULE rather than reserving space in the RX array used by MODFLOW-2000.

5. Subroutine arguments that are contained in Fortran modules were replaced with USE statements in all subroutines.

6. Subroutine GWF2IBS7DA was created to deallocate memory.

7. To support the Local Grid Refinement capability, subroutine SGWF2IBS7PNT was created to set pointers to a grid, and subroutine SGWF2IBS7PSV was created to save the pointers for a grid. The grid number, IGRID, was added as a subroutine argument to all of the primary subroutines, and subroutines SGWF2IBS7PSV and SGWF2IBS7PNT are called as appropriate.

Input for version 7 of IBS is read from the file that has file type "IBS" in the MODFLOW name file. The input is the same as for version 1.

REFERENCES

Harbaugh, A.W., 2005, MODFLOW-2005, the U.S. Geological Survey modular ground-water model—the Ground-Water Flow Process: U.S. Geological Survey Techniques and Methods 6-A16, variously p.

Leake, S.A. and Prudic, D.E., 1991, Documentation of a computer program to simulate aquifer-system compaction using the modular finite-difference ground-water flow model: U.S. Geological Survey Techniques of Water-Resources Investigations, Book 6, Chapter A2, 68 p.