Workflow van Basisdata naar grondwatermodel

Overal in Nederland

19 januari 2023

Basisdata

- [Boundary]
- [Breuken]
- [GeoTOP]
- [GeoTOP-CSV]
- [LHM]
- [Maaiveld]
- [Measurements]
- [MetaSWAP]
- [Meteo]
- [Onttrekkingen]
- [Oppervlaktewater]
- [REGIS]
- [REGISzones]
- [SHD]
- [Stuwwallen]
- [Verrijkingsdata]

DBASE

- [ANI]
- [BND]
- [BOT]
- [DRN]
- [HFB]
- [ISG]
- [KDC]
- [KDCKVA]
- [KHV]
- [KVA]
- [KVV]
- [LinkTable]
- [Maaiveld]
- [MEASUREMENTS]
- [METASWAP]
- [OLF]
- [REGIS+]
- [REGIS+_KDC]
- [REGIS+_KHKV]
- [RIV]
- [SHD]
- [STO]
- [TOP]
- [WEL]

Modflow 2005 groundwater model

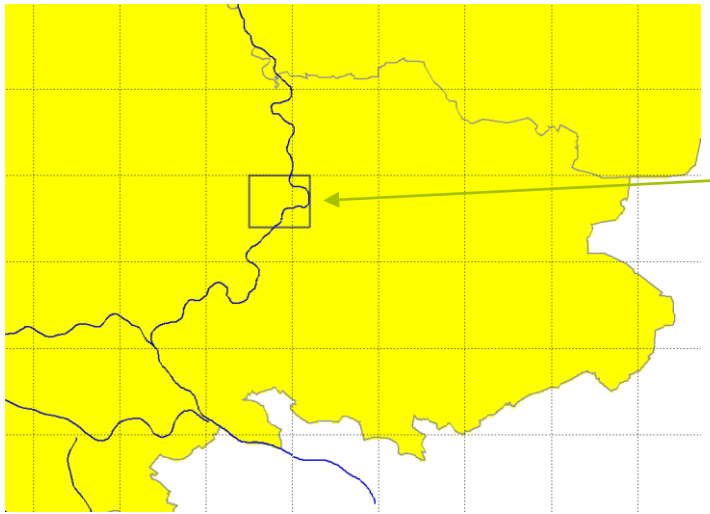
- [BAS6]
- [DIS6]
- [DRN7]
- [ISG7]
- [LPF7]
- [RIV7]
- [WEL7]
- IBR30_BASIS1_TA BAS6
- IBR30_BASIS1_TA DIS6
- IBR30_BASIS1_TA DRN7
- IBR30_BASIS1_TA DXC
- IBR30_BASIS1_TA ISG7
- IBR30_BASIS1_TA LPF7
- IBR30_BASIS1_TA MET7
- IBR30_BASIS1_TA OC
- IBR30_BASIS1_TA PCG7
- IBR30_BASIS1_TA RIV7
- IBR30_BASIS1_TA WEL7

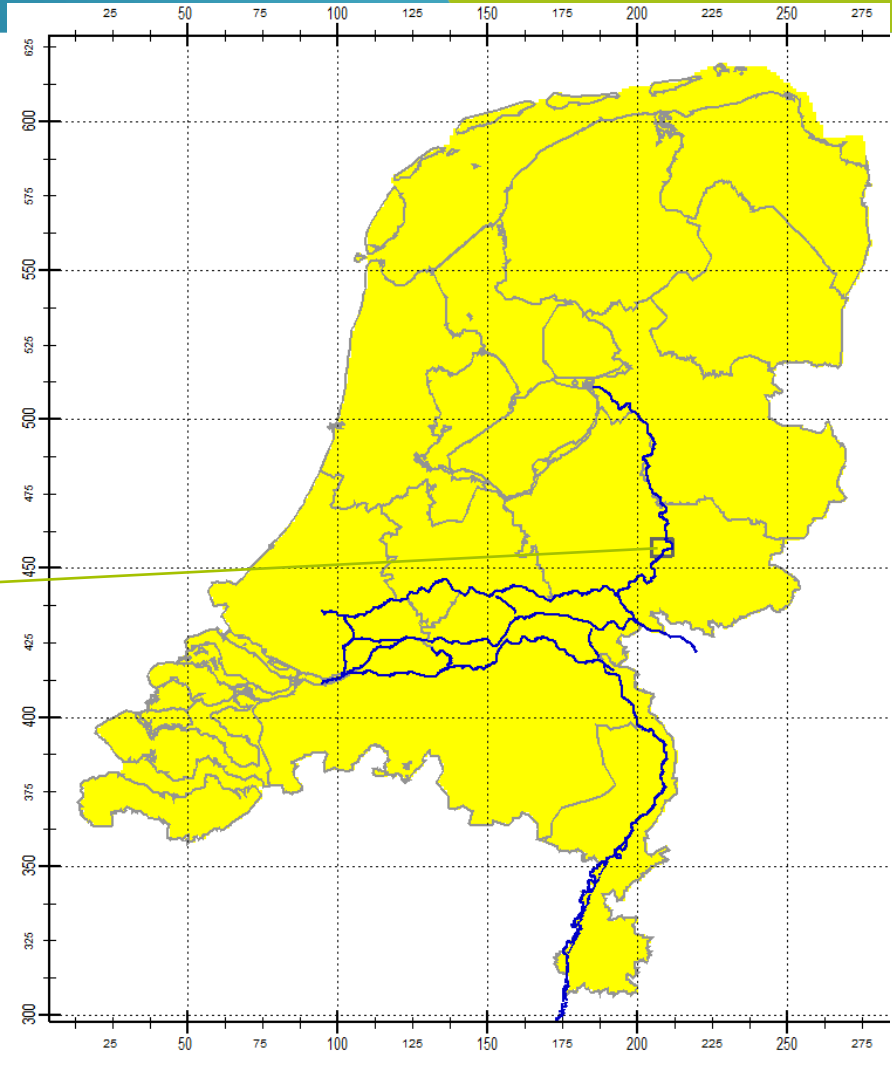
Modflow 6 groundwater model

- [CHD6]
- [DIS6]
- [DRN6]
- [IC6]
- [NPF6]
- [RCH6]
- [RIV6]
- [WEL6]
- IBR30_BASIS1_STAT_MF6_SYS1 CHD6
- IBR30_BASIS1_STAT_MF6_SYS2 CHD6
- IBR30_BASIS1_STAT_MF6_SYS3 CHD6
- IBR30_BASIS1_STAT_MF6_SYS4 CHD6
- IBR30_BASIS1_STAT_MF6_SYS5 CHD6
- IBR30_BASIS1_STAT_MF6_SYS6 CHD6
- IBR30_BASIS1_STAT_MF6_SYS7 CHD6
- IBR30_BASIS1_STAT_MF6_SYS8 CHD6
- IBR30_BASIS1_STAT_MF6_SYS9 CHD6

Overal in Nederland

- Overal in Nederland een model afleiden





Model afleiden in 4 clicks

- Stap 1: CopyClipModelTemplate.
  - Kopieert workflow voor gewenste modelextent naar modelfolder
- Stap 2: Clip Basisdata
  - Clipt de basisdata op de modelextent (batch onderdeel van de workflow)
- Stap 3: Run Workflow 1 t/m 6
  - Genereert het detail lagenmodel (REGIS+) en LinkTable
- Stap 4: Run Workflow 7 t/m 19
  - Genereert lagenmodel en andere Modflow packages invoer
  - Genereert iMOD Projectfiles voor MF2005 en MF6, stationair en tijdsafhankelijk

Stap 1: Clip copy ModelTemplate

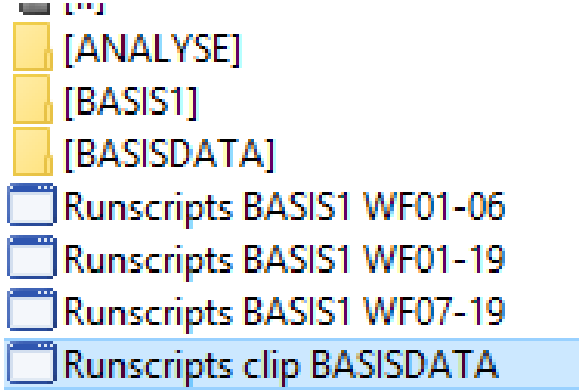
```
REM ***************
REM * Description *
REM ***************
REM This script copies and clips all files from the specified ModelTemplate-directory (TEMPLATESOURCEPATH) to a specified (sub)directory (TARGETPATH).
REM GIS-files are clipped to the specified extent (MODELEXTENT plus optional BUFFERDIST). See script parameters below. After running this scripts further instructions are given.

REM ********************
REM * Script variables *
REM ********************
REM TEMPLATESOURCEPATH:  Path to Model-directory of source model template (relative path is allowed).
REM BASISDATASOURCEPATH: Path to source BASISDATA-directory (relative path is allowed).
REM TOOLS_PYTHONEXEPATH: Path to executable version of Python-tools for AZURE+UGM-workflows (relative path is allowed), or leave empty when Python exe-tools can be found in defaul path (EXE\TOOLS_PYTHON)
REM TARGETPATH:          Path to target model (use relative or absolute path).
REM MODELEXTENT:         Base extent coordinates (xll,yll,xur,yur) to use as MODELEXTENT for clipped model, or leave empty avoid clipping and use AZURE+UGM-extent.
REM BUFFERDIST:          Bufferdistance around MODELEXTENT for clipping, or leave empty to not use an extra buffer around MODELEXTENT. If MODELEXTENT is empty BUFFERDIST is ignored.
REM CELLSIZE:            Cellsize (m) for created model which will be equal for x- and y-direction.
REM MODELREF0:           Abbreviation for the project/model that will be part of the PRJ/RUN-filename.
REM MODELREF1:           Main version string for the created submodel, as found under Model-subdirectories WORKIN, DBASE, RUNFILES, RESULTS and in PRJ/RUN-filenames. E.g. ORG, BASIS1 or DEF.
REM                      Note: Full modelname is defined as: %MODELREF0%_MODELREF1[_MODELREF2[_MODELREF3]], where MODELREF0 is defined in SETTINGS\SIF.Settings.Project.bat.
REM                            and MODELREF1 is determined automatically from subdirectoryname under Model\WORKIN in WORKIN\MODELREF1\00 Settings.bat.
SET TEMPLATESOURCEPATH=..\ModelTemplate_NL\Model
SET BASISDATASOURCEPATH=..\ModelTemplate-BASISDATA_NL
SET TOOLS_PYTHONEXEPATH=
SET TARGETPATH=ModelV1
SET MODELEXTENT=205000,454000,212000,460000
SET BUFFERDIST=
SET CELLSIZE=100
SET MODELREF0=NHI-V1
SET MODELREF1=BASIS1
```

- Folder structuur met de workflows hierin wordt aangemaakt (copy van ModelTemplate_NL\model)

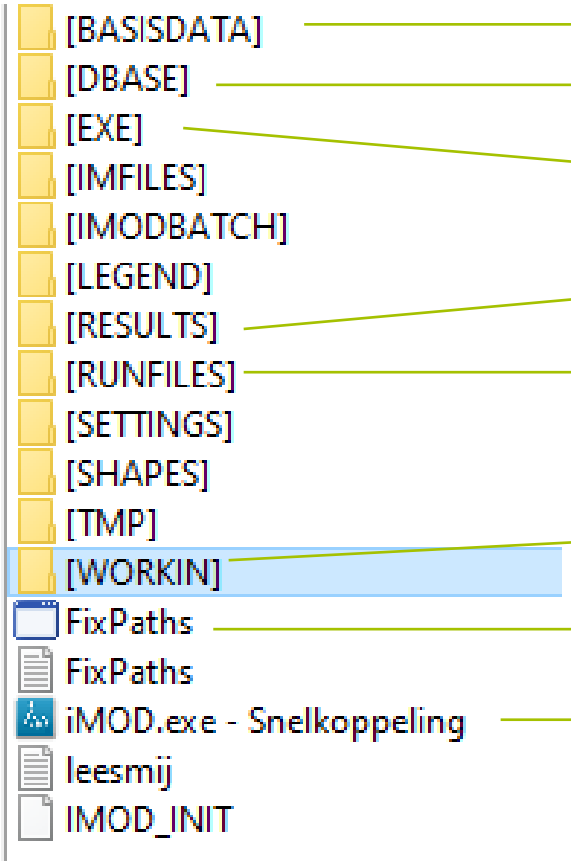
Stap 2: Clip Basisdata

- De workflows met stap 2 clip Basisdata



Instrument: Model base folder (Rootpath)

*WF = Workflow



Basic data (input parameters for WF*)

Result of WF*: model parameters

Tools (programs) used in WF*

Result of model calculations

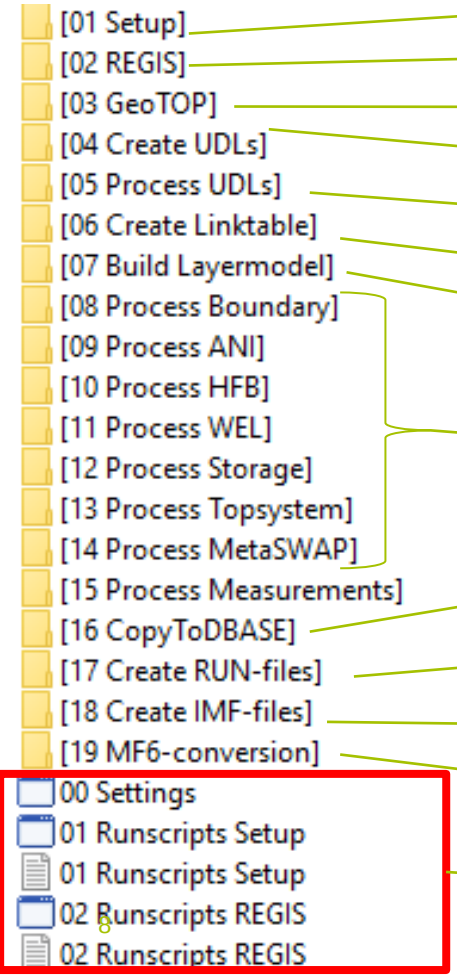
Project files needed for starting Modflow calculations

The Workflows

Fix paths (needed when folder is moved)

Viewer for input and model parameters

WORKIN folder



Model extent

Geological model “REGIS” copy and checks

Geological model “GeoTOP” conversion t User Defined Layer

Create other User Defined Layers (UDL)

Process UDL’s in geological model REGIS

Create LinkTable for coupling geo-model to groundlayers

Create Model groundlayers

Creating input for Modflow modules, example RIV, WEL,BND

Copy generated data to DBASE folder in Model Root

Create iMOD Projectfile (creating MF2005 model)

Create iMOD IMF files

Create iMOD Projectfile (creating MF 6 model)

Batch files to run Workflows separately

LinkTable

Number	Name	Type	Percentage	Schema	Part	Kfactor	AverageK	ANI_factor	ANI_hoek	ANI_KVA	HFB_GEN-files	HFB_weerstande	BND	SHD
1	MV_eenheid	Aquifer	100	1	1	1	8.02982						IBOUND.ID	SHD_MV_eenheid.IDF
2	hlc	Aquitard	42.21	-1	1	1	0.001						IBOUND.ID	SHD_hlc.IDF
3	bxz2	Aquifer	84.95	2	1	1	5.84929						IBOUND.ID	SHD_bxz2.IDF
4	bxz3	Aquifer	87.5	2	1	1	5.79271						IBOUND.ID	SHD_bxz3.IDF
5	bxz4	Aquifer	87.38	2	1	1	5.86804						IBOUND.ID	SHD_bxz4.IDF
6	krz2	Aquifer	12.38	2	1	1	51.1514						IBOUND.ID	SHD_krz2.IDF
7	krk1	Aquitard	4.74	-2	1	1	0.03434						IBOUND.ID	SHD_krk1.IDF
8	krz3	Aquifer	100	3	1	1	41.1944						IBOUND.ID	SHD_krz3.IDF
9	krzuk1	Aquitard	96.4	-3	1	1	0.0255						IBOUND.ID	SHD_krzuk1.IDF
10	krz4	Aquifer	100	4	1	1	51.9565						IBOUND.ID	SHD_krz4.IDF
11	krtwk1	Aquitard	100	-4	1	1	0.00047						IBOUND.ID	SHD_krtwk1.IDF
12	krz5	Aquifer	56.69	5	1	1	41.931						IBOUND.ID	SHD_krz5.IDF
13	drz1	Aquifer	2.81	5	1	1	34.904						IBOUND.ID	SHD_drz1.IDF
14	drgik1	Aquitard	85.71	-5	1	1	0.01016						IBOUND.ID	SHD_drgik1.IDF
15	drz3	Aquifer	26.74	6	1	1	31.652						IBOUND.ID	SHD_drz3.IDF
16	DTc_z5	Aquifer	5.76	6	1	1	20	anisotropie_factor.IDF	anisotropie_hoek.IDF	KVA_DTC.IDF			IBOUND.ID	SHD_DTc_z5.IDF
17	DTc_glijvlak	Aquitard	5.79	-6	1	1	0.00002						IBOUND.ID	SHD_DTc_glijvlak.IDF
18	pzwaz2	Aquifer	36.55	7	1	1	39.2542				Peelrand_hoofd.GEI	1000	IBOUND.ID	SHD_pzwaz2.IDF
19	pzwaz3	Aquifer	34.19	7	1	1	49.6825				Peelrand_hoofd.GEI	1000	IBOUND.ID	SHD_pzwaz3.IDF
20	wak3	Aquitard	6.26	-7	1	1	0.0127				Peelrand_hoofd.GEI	1000	IBOUND.ID	SHD_wak3.IDF
21	pzwaz4	Aquifer	31.33	8	1	1	32.3173				Peelrand_hoofd.GEI	1000	IBOUND.ID	SHD_pzwaz4.IDF
22	msz1	Aquifer	99.74	8	1	1	8.70729				Peelrand_hoofd.GEI	1000	IBOUND.ID	SHD_msz1.IDF
23	msk1	Aquitard	99.33	-8	1	1	0.00319				Peelrand_hoofd.GEI	1000	IBOUND.ID	SHD_msk1.IDF
24	msz2	Aquifer	99.69	9	1	1	6.85813				Peelrand_hoofd.GEI	1000	IBOUND.ID	SHD_msz2.IDF
25	msk2	Aquitard	76.6	-9	1	1	0.00392				Peelrand_hoofd.GEI	1000	IBOUND.ID	SHD_msk2.IDF
26	msz3	Aquifer	88.88	10	1	1	7.014				Peelrand_hoofd.GEI	1000	IBOUND.ID	SHD_msz3.IDF
27	msz4	Aquifer	99.07	10	1	1	6.58109				Peelrand_hoofd.GEI	1000	IBOUND.ID	SHD_msz4.IDF
28	ooz1	Aquifer	35.31	10	1	1	7.01445				Peelrand_hoofd.GEI	1000	IBOUND.ID	SHD_ooz1.IDF
29	ook1	Aquitard	100	-10	1	1	0.00568				Peelrand_hoofd.GEI	1000	IBOUND.ID	SHD_ook1.IDF
30	ooz2	Aquifer	100	11	1	1	6.71266				Peelrand_hoofd.GEI	1000	IBOUND.ID	SHD_ooz2.IDF
31	brz1	Aquifer	100	11	1	1	2.50795				Peelrand_hoofd.GEI	1000	IBOUND.ID	SHD_brz1.IDF
32	brk1	Aquitard	100	0	1	1	0.002				Peelrand_hoofd.GEI	1000	IBOUND.ID	SHD_brk1.IDF

Well workflow

- In preprocessing step with python scripts data transformed to uniform format in Excel.
- Workflow transforms excel data to model transient model input, and:
  - Assignment to model layers
  - Calculation average over “steady state” modelling period
- Result: