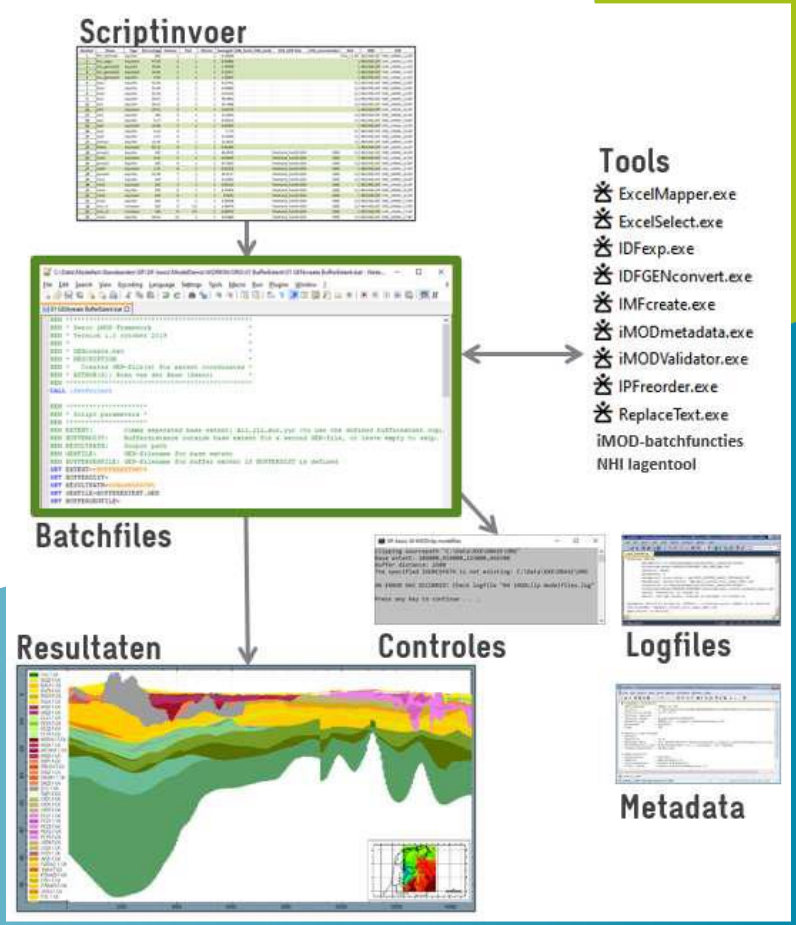
NHI grondwaterdata en tooling

Modelling on the fly

Koen van der Hauw - Sweco
Wouter Swierstra – RHDHV

18 januari 2024



Inhoud

- iMOD en Workflow concepten
- Modelling on the fly
- NHI onverzadigde zone projectresultaat
- Demo Workflow

Royal HaskoningDHV
Enhancing Society Together

SWECO

Deltares

Modelinstrumentarium

Intro iMOD en workflow concepten

Koen van der Hauw - Sweco
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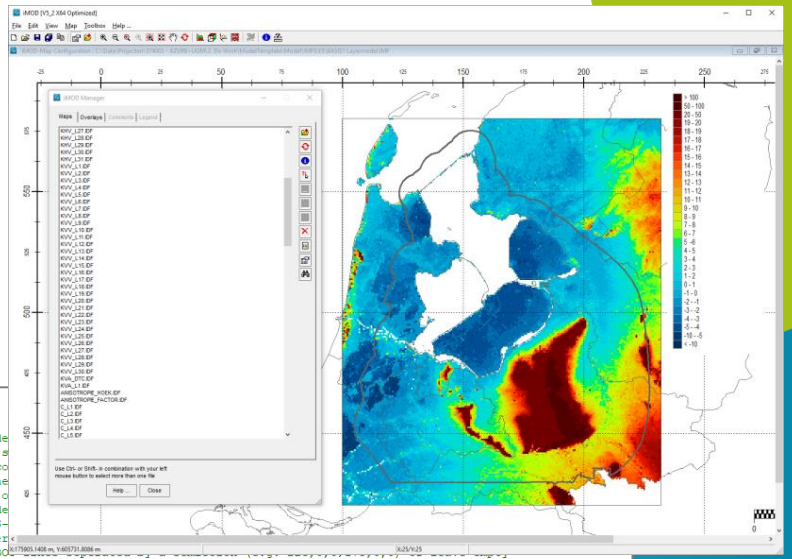
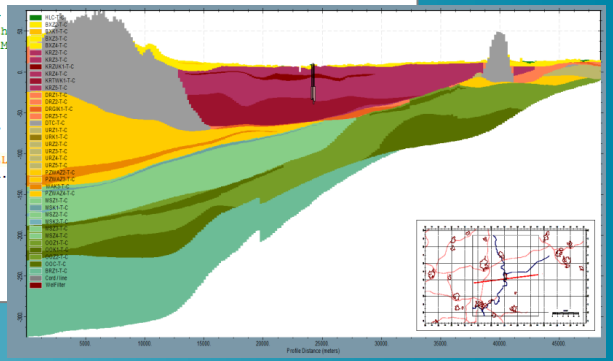
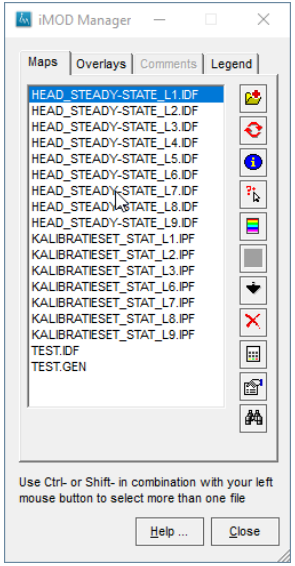
18 januari 2024

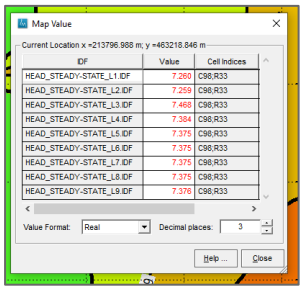


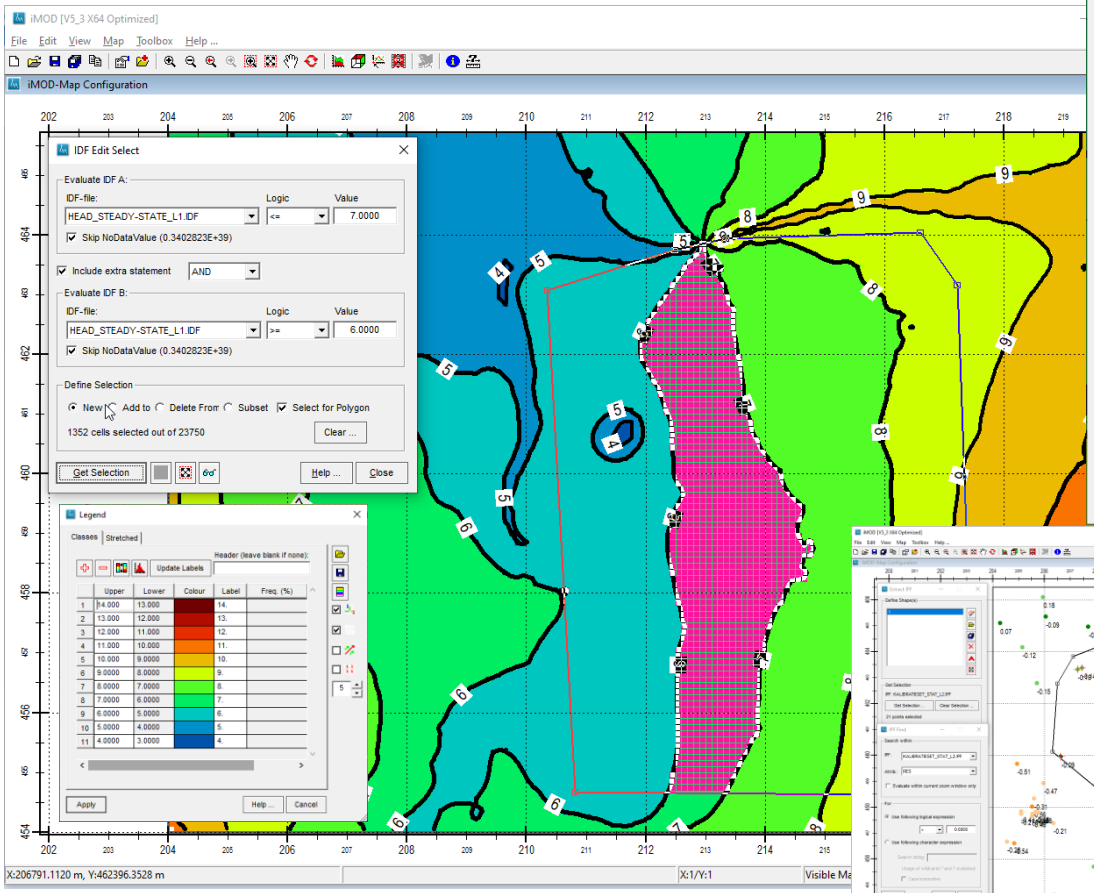
```
REM **********************
REM * Script parameters *
REM **********************
REM Note: an IMF-file is created with an INI de
REM       an existing INI-file can be used by s
REM       the GEN-files as defined in the Sweco
REM CREATEINI:        Use value 1 to create a ne
REM REGISPATH:        Path to REGIS IDF-files, c
REM REGISORDER:       Path to textfile with orde
REM REGISCOLORS:      Either TNO (for TNO REGIS-
REM MODELTOPBOTPATH:  Specify path to modellayer
REM MODELLINESCOLOR:  RGB colors for TOP- and BO
REM IMODFILES:        Comma seperated list of iMOD-files (or path with filter) to be added before REGIS-files. Use double quotes around
REM IMODLEGENDS:      Comma seperated list of iMOD-legends for one or more of the IDF-files/paths. The last legend is used for remainin
REM FILESELECTIONS:   Comma seperated list of 0/1-values to specified if iMOD-file/path should be selected/highlighted in IMF-file
REM EXTENT:           Extent of the IMF-file datafiles (llx,lly,urx,ury or llx lly urx ury)
REM RESULTPATH:       Result path for IMF-file
REM IMFFILENAME:      Specify result filename for IMF-file
REM ISADDCDTOIMF:     Use value 1 to add the name of the current subdirectory
REM ISOPENIMOD:       Specify with value 1 if iMOD should be opened, use 0 oth
REM IMODEXE:          path to iMOD-executable, or use %IMODEXE% to refer to iM
REM IMFCREATEEXE:     path to IMFcreate-executable
SET CREATEINI=1
SET REGISPATH=
SET REGISORDER=
SET REGISCOLORS=
SET MODELTOPBOTPATHS=%DBASEPATH%\%MODELREF1%\TOP;%DBASEPATH%\%MODELREF1%\BOT
SET MODELLINESCOLOR=25,25,25;100,100,100
SET IMODFILES="%BASISDATAPATH%\Maaiveld\AHN3-WSS_25M.IDF","%DBASEPATH%\%MODEL
SET IMODLEGENDS="%LEGENDPATH%\maaiveld_-10-100.leg","%LEGENDPATH%\kh-waarden.
SET FILESELECTIONS=1,0,0,0,0
SET EXTENT=%MODELEXTENT%
SET RESULTPATH=%IMFILESPATH%
SET IMFFILENAME=%MODELREF1% Layermodel
SET ISADDCDTOIMF=0
SET ISOPENIMOD=1
SET IMODEXE=%IMODEXE%
SET IMFCREATEEXE=%TOOLSPATH%\IMFcreate.exe
```

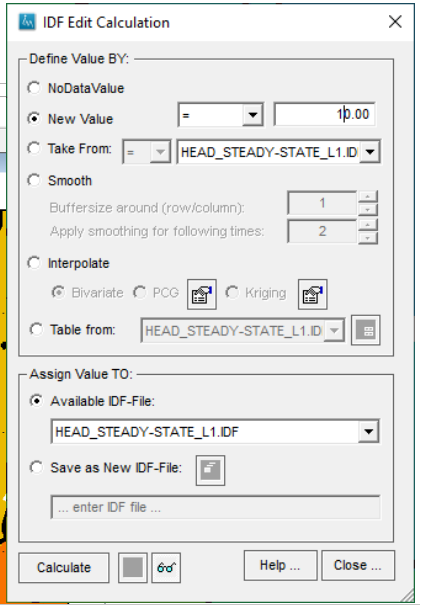


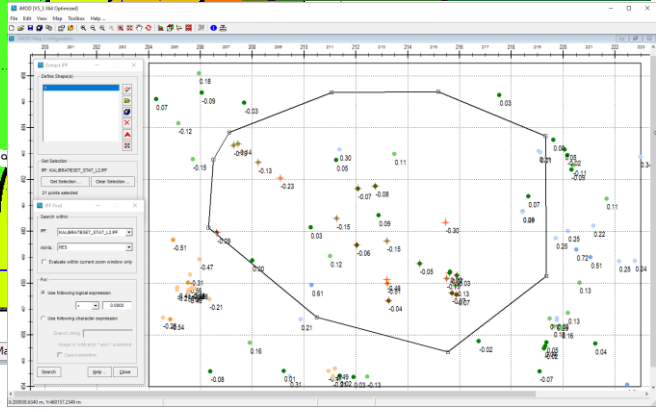
iMOD - GUI











IDF Editing in iMOD

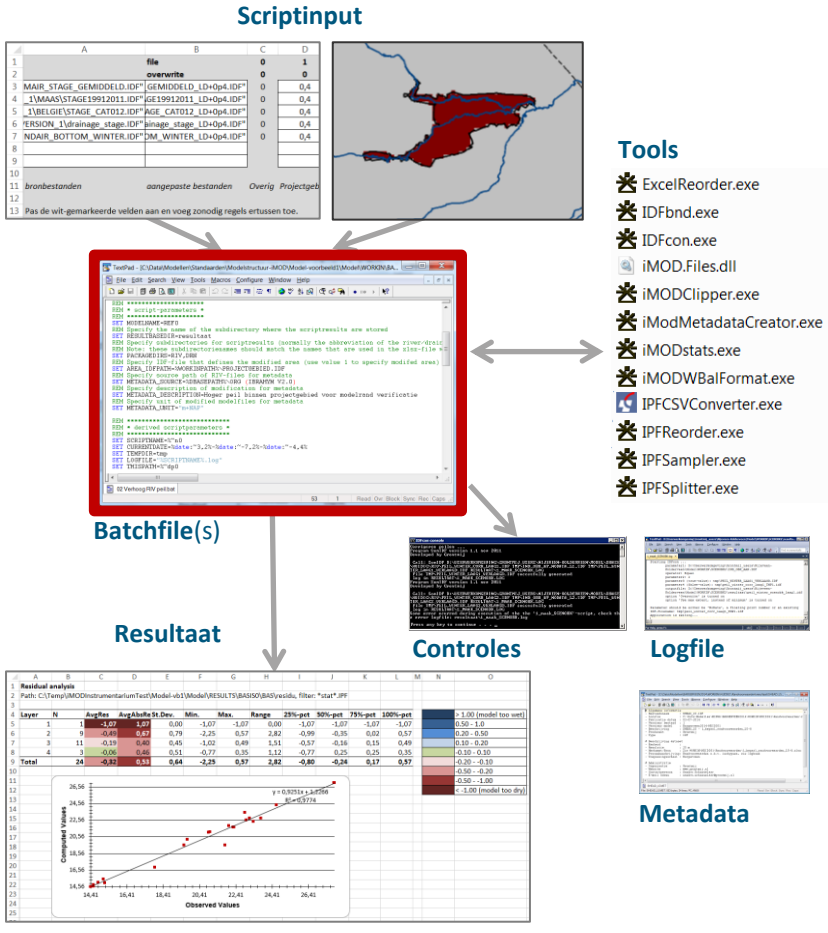
SIF iMOD-Framework (Sweco)

Goals

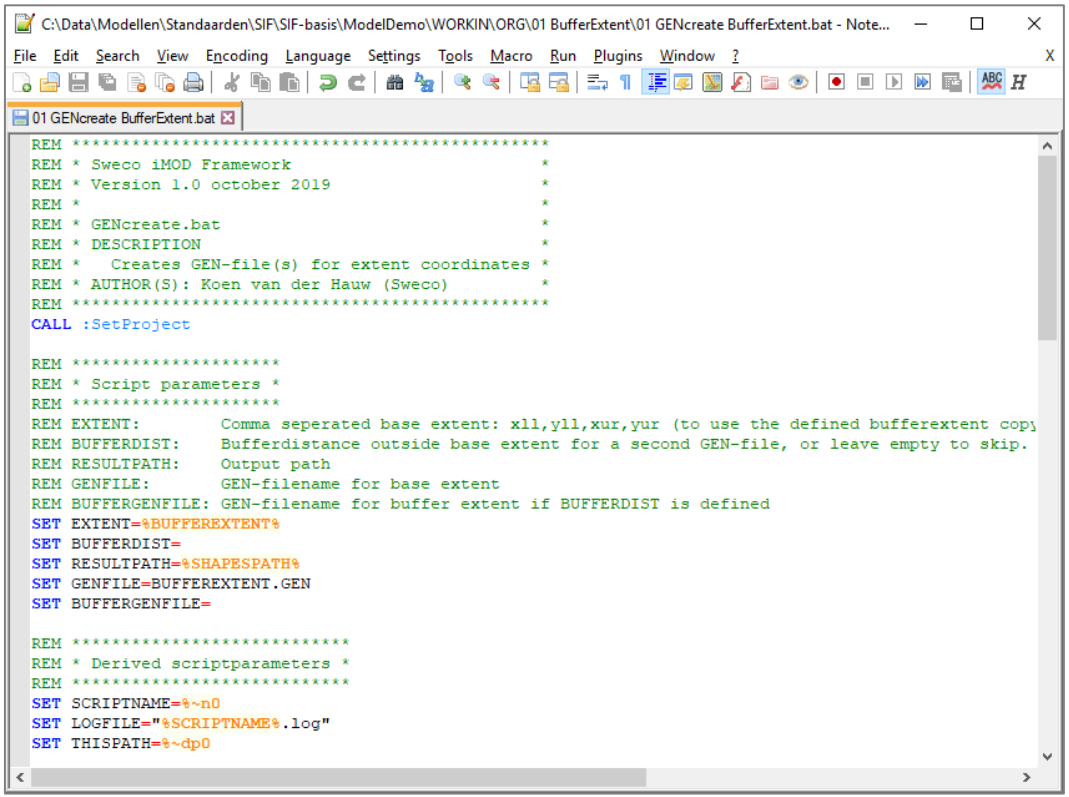
- Transparancy
- Reproducable
- Simple
- Flexible
- Support A-Z
- Errorhandling

Elements of framework

- Small, flexible tools
- Batchfiles for execution
- Directory structure
- Naming
- Log journal
- Logging
- Checks
- Metadata



Batchfiles



Example SIF-batchfile

Batchfiles are:

- Link between model input, tools, checks, logging
- Powerful, standard and relatively simple
- readable with comments and settings in upper part
- Flexible, allowing settings and relative paths with environment-variables

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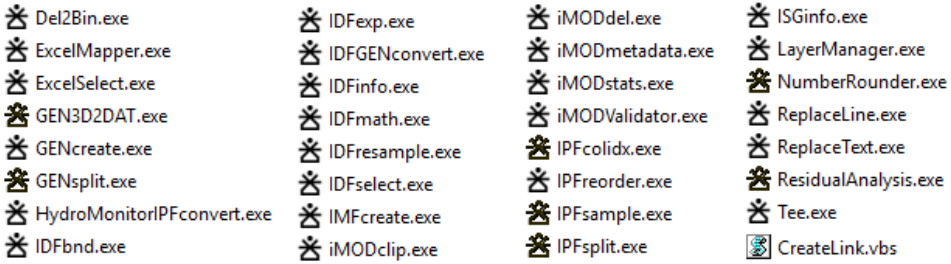
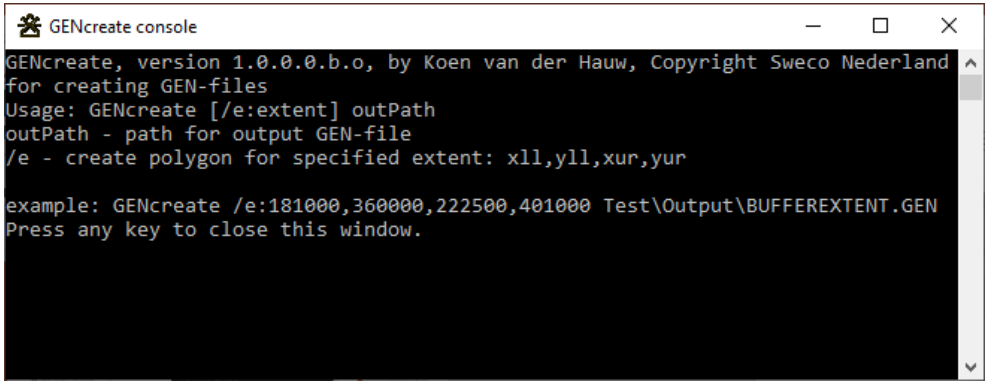
SIF-tools

- Small, flexible tools
- Less risk for errors
- Replaceable
- Mostly executables
- Fast
- Extendable
- Started via batchfiles
- TortoiseSVN for version management





Example info for tool syntax

External tools: Python scripts, iMOD batchfunctions, etc.

Possible integration with script languages, for example Python

PlotMeetreeksen.py - C:\Data\Projecten\51006738 - SIF-Pilot Dommel\W300 Uitvoering\Demos\SIF\Pyth...

File Edit Format Run Options Window Help

```python
# -*- coding: utf-8 -*-
# PlotMeetreeksen by Robin Opdam, 11-1-2021
# Copyright(C) 2021 Sweco Nederland B.V.

# Import packages
from os.path import join
from pathlib import Path
import glob
import matplotlib.pyplot as plt
import sys
import imod

# Definieer functie en inputvariabelen
def PlotMeetreeksen(input_map, output_map):

    '''
    Deze functie maakt een grafiek van de gemeten grondwaterreeksen en de berekende reek

            Parameters:
                    input_map (str): Tekst met naam inputmap
                    output_map (str): Tekst met naam outputmap

            Benodigde packages:
                    os, pathlib, glob, matplotlib, sys, imod

            Returns:
                    Grafieken
    '''

    # Maak outputmap
    Path(output_map).mkdir(parents=False, exist_ok=True)

    # Maak een lijst van alle IPF-bestanden met reeksen in de inputmap
    search_criteria = "*.IPF"
    q = join(input_map, search_criteria)
    ipf_list = glob.glob(q)

    # Alle IPF bestanden worden per laag gelezen en daaruit wordt de modellaag en een li
    # Bij het inlezen (ipf.read) worden de onderliggende .txt files met de metingen dire
    # Tevens is er een error in iMOD gecorrigeerd, bij de berekende reeksen kent iMOD de
    for i in ipf_list:
        df = imod.ipf.read(i)
        print("reading... " + i)
        laagbestand = i.split('_')[-1]
        laag = laagbestand.split('.')[0]

        df['Peilbuis'] = df['NAME'] + "_" + df['FILTERNR'].map(str)
        df['Gemeten'] = df['Calculated']

        peilfilters = list(df.Peilbuis.unique())
```

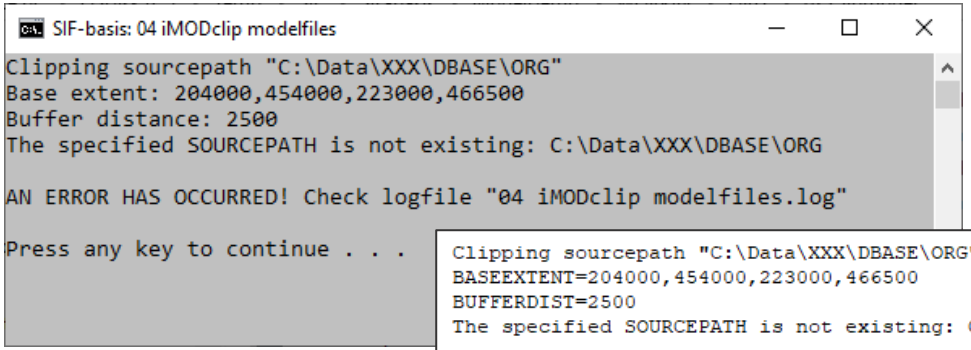
Ln: 1 Col: 0

Python scripts with use of imod-python

```
REM ********************
REM * Script variables *
REM ********************
REM INPUT_MAP:  Specify input folder
REM OUTPUT_MAP: Specify output folder
SET INPUT_MAP=Test\Input
SET OUTPUT_MAP=Test\Output\Plots

REM **********************
REM * Derived variables *
REM **********************
REM Use PUSHD to force temporary drive letter to be used for UNC-paths
PUSHD %~dp0
SET THISPATH=%~dp0
SET SCRIPTNAME=%~n0
SET LOGFILE="%THISPATH%%SCRIPTNAME%.log"

REM Define scriptname, conda environment and searched conda path(s). Note: CONDABASEPAT
SET PYSCRIPT=PlotMeetreeksen.py
SET SCRIPTPARS="%INPUT_MAP%" "%OUTPUT_MAP%"
SET CONDAENV=imod
SET CONDAENVPATHS=C:\Anaconda3\envs,C:\Users\%USERNAME%\Miniconda3\envs,C:\Users\%USERN
SET CONDABASEPATHS=C:\Users\%USERNAME%\AppData\Local\Continuum\Miniconda3,C:\ProgramDat
CALL :FindConda
IF NOT DEFINED CONDAENVPATH GOTO error
IF NOT DEFINED CONDABASEPATH GOTO error

REM ********************
REM * Script commands *
REM ********************
TITLE SIF-plus: %SCRIPTNAME%

ECHO Starting script '%SCRIPTNAME%' ...
ECHO Starting script '%SCRIPTNAME%' in '%THISPATH%' > %LOGFILE%

REM Check input and output paths
IF NOT EXIST "%INPUT_MAP%" (
  ECHO Input path not found: %INPUT_MAP%
  ECHO Input path not found: %INPUT_MAP% >> %LOGFILE%
  GOTO error
)
IF NOT EXIST "%OUTPUT_MAP%" MKDIR "%OUTPUT_MAP%"

REM Activate conda environment if specified
SET ACTIVATE=%CONDABASEPATH%\Scripts\activate.bat
IF DEFINED CONDAENV (
  ECHO Using environment path: %CONDAENVPATH%\%CONDAENV% >> %LOGFILE%
  ECHO   activating environment '%CONDAENV%' ...
  ECHO CALL "%ACTIVATE%" "%CONDAENVPATH%\%CONDAENV%" >> %LOGFILE%
  CALL "%ACTIVATE%" "%CONDAENVPATH%\%CONDAENV%" >> %LOGFILE%
```

SIF-batchfile wrapper for running Python script

Checks, logfiles and metadata



Tool console window

```
Clipping sourcepath "C:\Data\XXX\DBASE\ORG"
BASEEXTENT=204000,454000,223000,466500
BUFFERDIST=2500
The specified SOURCEPATH is not existing: C:\Data\XXX\DBASE\ORG

AN ERROR HAS OCCURRED! Check logfile "04 iMODclip modelfiles.log"
```

Tool logfile with error message

- Checks
- Error messages
- Logfiles
- Metadata

```
# Algemene informatie
- Bestandsnaam      : iPEST_KHV_17_ZONEx2.IDF
- Locatie           : C:\Temp\iMODInstrumentariumTest\Model-vb1\Model\DBASE\BASIS1\KHV
- Publicatie datum  : 9-2-2017
- Versienr bestand  : 1
- Versienr model    : TESTPROJECT BASIS1
- Beschrijving      : Verhoging van KHV iPEST_KHV_17 met factor 2
- Producent         : Sweco
- Type              : IDF

# Beschrijving dataset
- Eenheid           :
- Resolutie         :
- Herkomst/Bron     : WORKIN\BASIS1\01 KHV aanpassen\resultaat\KHV\iPEST_KHV_17_ZONEx2.IDF
- Procesbeschrijving: WORKIN\BASIS1\01 KHV aanpassen\01 Verander KHV7x2.bat
- Toepassingsschaal : TESTPROJECT

# Administratie
- Organisatie       : Sweco
- Website           : www.sweco.nl
- Contactpersoon    : Ie Mand
- E-mail adres      : ie.mand@sweco.nl
```

(semi)automatic metadata

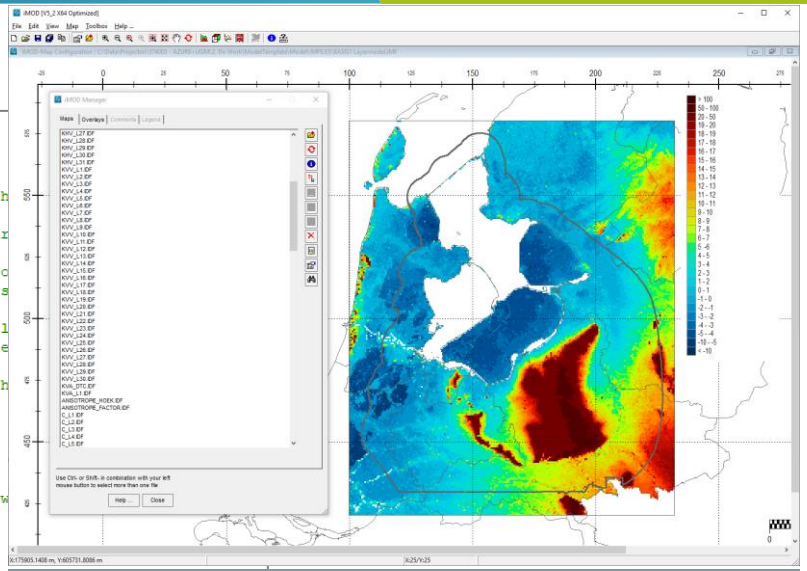
Tool example – IDFexp

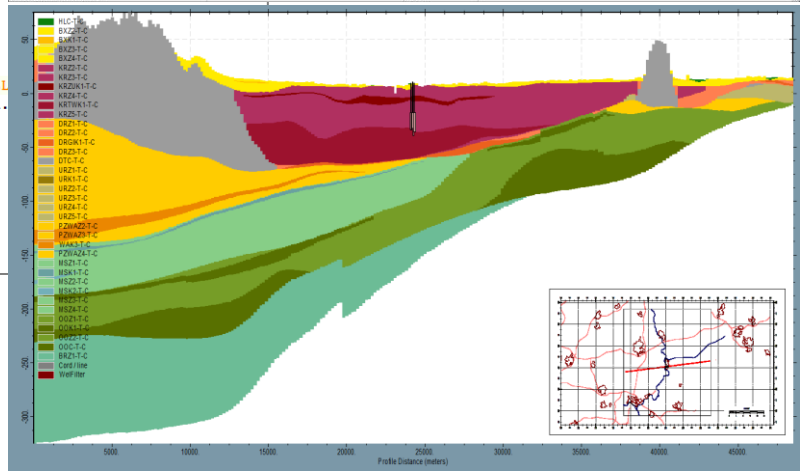
```
REM Example INI-script for IDFexp-tool

REM Example with use of assigning IDF-file to variabele and simple math
COND=cond_s_10.IDF
COND=COND*2

REM Example with use of NoData and scientific notition
SomeGrid=NoData
Horst=HORST.IDF
E6=HORST.IDF
Horst2=E6-6E-07+Horst
I3 = if(Horst>=0, NoData, 6E-07)

REM Example with use of min/max functions
I1 = Horst
I2 = if(Horst==1, Horst+1, Horst-1)
Imin = min(I1, I2)
Imax = max(I1, I2)

REM Example with nested expressions and multiple line expression
Test=(5 + 7 * if(Horst==1, _
                 if(I3!=NoData || I2>0, Imin , Imax), _
                 NoData))  + 2

REM Example with constant values and calculation of transmissivity out of course sand fractions
kZUG=50
kZZG=35

dL1_ZUG_Horst=dL1_ZUG.IDF
dL1_ZUG_Slenk=dL1_ZUG.IDF
dL1_ZUG=if(Horst==1,dL1_ZUG_Horst,dL1_ZUG_Slenk)

dL1_ZZG_Horst=dL1_ZZG.IDF
dL1_ZZG_Slenk=dL1_ZZG.IDF
dL1_ZZG=if(Horst==1,dL1_ZZG_Horst,dL1_ZZG_Slenk)

TX1=dL1_ZUG*kZUG + dL1_ZZG*kZZG
```

Input INI-file for IDFexp-tool: a notepad for readable IDF-expressions

Tool example – IMFcreate

```
REM **********************
REM * Script parameters *
REM **********************
REM Note: an IMF-file is created with an INI definition file. See below for syntax and all possibilities.
REM       an existing INI-file can be used by setting CREATEINI=0, otherwise a new INI-file is created with
REM       the GEN-files as defined in the Sweco.iMOD.settings.bat file.
REM CREATEINI:        Use value 1 to create a new INI-file with settings below, or 0 or empty to use the cur
REM REGISPATH:        Path to REGIS IDF-files, or leave empty when no REGIS-files have to be used for IMF
REM REGISORDER:       Path to textfile with ordered REGIS prefixes in seperate lines (with a single prefix o
REM REGISCOLORS:      Either TNO (for TNO REGIS-colors), AQF (or empty, for yellow/green colors for aquifers
REM MODELTOPBOTPATH: Specify path to modellayer TOP and BOT-files, or leave empty to skip
REM MODELLINESCOLOR: RGB colors for TOP- and BOT-lines seperated by a semicolon (e.g. 225,0,0;175,0,0) or l
REM IMODFILES:        Comma seperated list of iMOD-files (or path with filter) to be added before REGIS-file
REM IMODLEGENDS:      Comma seperated list of iMOD-legends for one or more of the IDF-files/paths. The last
REM FILESELECTIONS:   Comma seperated list of 0/1-values to specified if iMOD-file/path should be selected/h
REM EXTENT:           Extent of the IMF-file datafiles (llx,lly,urx,ury or llx lly urx ury)
REM RESULTPATH:       Result path for IMF-file
REM IMFFILENAME:      Specify result filename for IMF-file
REM ISADDCDTOIMF:     Use value 1 to add the name of the current subdirectory to the IMF-file
REM ISOPENIMOD:       Specify with value 1 if iMOD should be opened, use 0 otherwise
REM IMODEXE:          path to iMOD-executable, or use %IMODEXE% to refer to iMOD-executable as defined in Sw
REM IMFCREATEEXE:     path to IMFcreate-executable
SET CREATEINI=1
SET REGISPATH=
SET REGISORDER=
SET REGISCOLORS=
SET MODELTOPBOTPATHS=%DBASEPATH%\%MODELREF1%\TOP;%DBASEPATH%\%MODELREF1%\BOT
SET MODELLINESCOLOR=25,25,25;100,100,100
SET IMODFILES="%BASISDATAPATH%\Maaiveld\AHN3-WSS_25M.IDF","%DBASEPATH%\%MODELREF1%\KHV","%DBASEPATH%\%MODEL
SET IMODLEGENDS="%LEGENDPATH%\maaiveld_-10-100.leg","%LEGENDPATH%\kh-waarden.leg","%LEGENDPATH%\kv-waarden.
SET FILESELECTIONS=1,0,0,0,0
SET EXTENT=%MODELEXTENT%
SET RESULTPATH=%IMFILESPATH%
SET IMFFILENAME=%MODELREF1% Layermodel
SET ISADDCDTOIMF=0
SET ISOPENIMOD=1
SET IMODEXE=%IMODEXE%
SET IMFCREATEEXE=%TOOLSPATH%\IMFcreate.exe
```





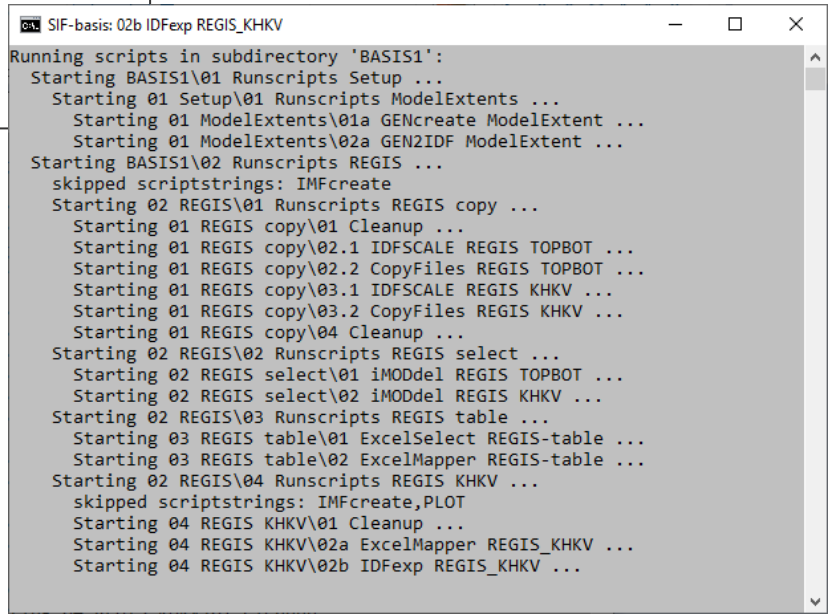
IMFcreate

Creates iMOD IMF-file with specified IDF-files, sorted REGIS-layers, modellayers, legends, labels, selection, cross sections legend

Run workflows with Runscripts

02b Runscripts IDFexp REGIS_KHKV.bat

```
REM **********************
REM * Script parameters *
REM **********************
REM BASEPATH:       Basepath to search specified SUBDIR-directory from, or leave empty to use
REM SUBDIR:         Subdirectory to run batchfiles from, or leave empty to use filename of thi
REM SKIPPEDSCRIPTS: Comma seperated list of substrings in scriptnames or subdirs that should b
REM ISRECURSIVE:    Specify (with value 1) that all batchfiles in all subdirectory's of the sp
REM ISSUBLOGSHOWN:  Specify (with value 1) that console messages of called lower level batchfi
REM ISSKIPSHOWN:    Specify (with value 1) that messages for skipped batchfiles should be show
SET BASEPATH=
SET SUBDIR=
SET SKIPPEDSCRIPTS="00 settings",IMFcreate
SET ISRECURSIVE=
SET ISSUBLOGSHOWN=
SET ISSKIPSHOWN=
```



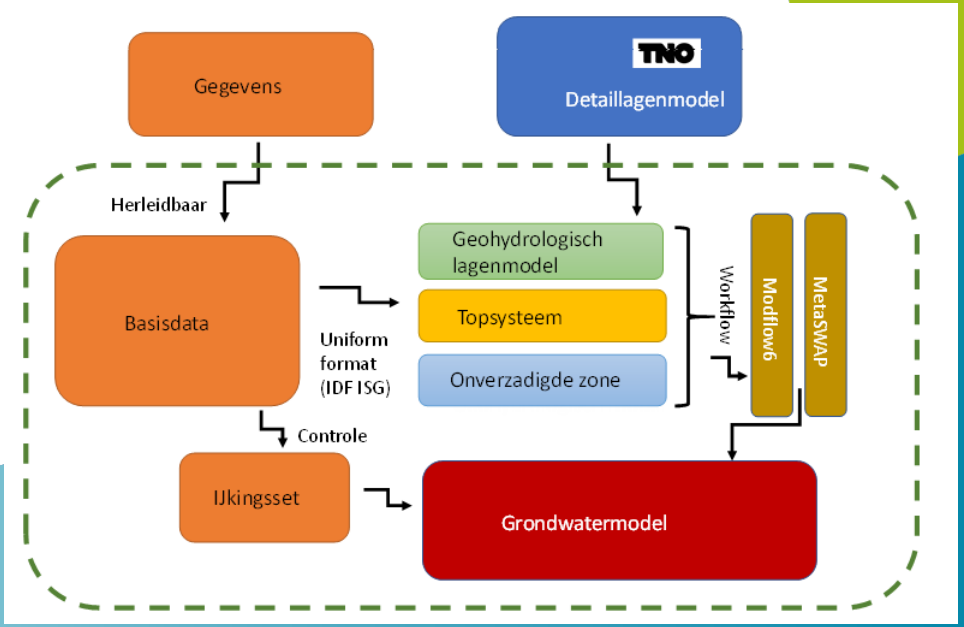
Starting (sub)workflows

With Runscripts batchfile all batchfiles in specified underlying directories are executed in alfabetic order.

Script stops when errors occur.

Modelinstrumentarium

Van Basisdata naar model

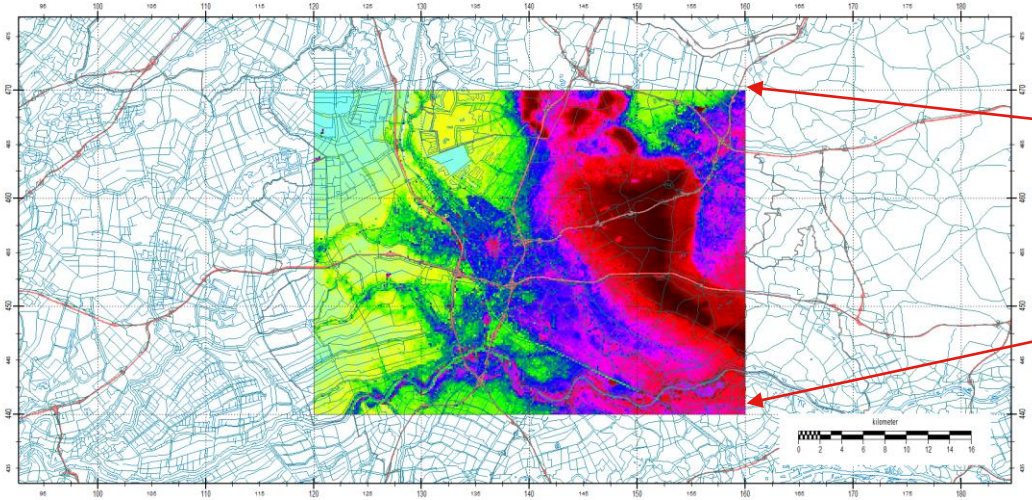


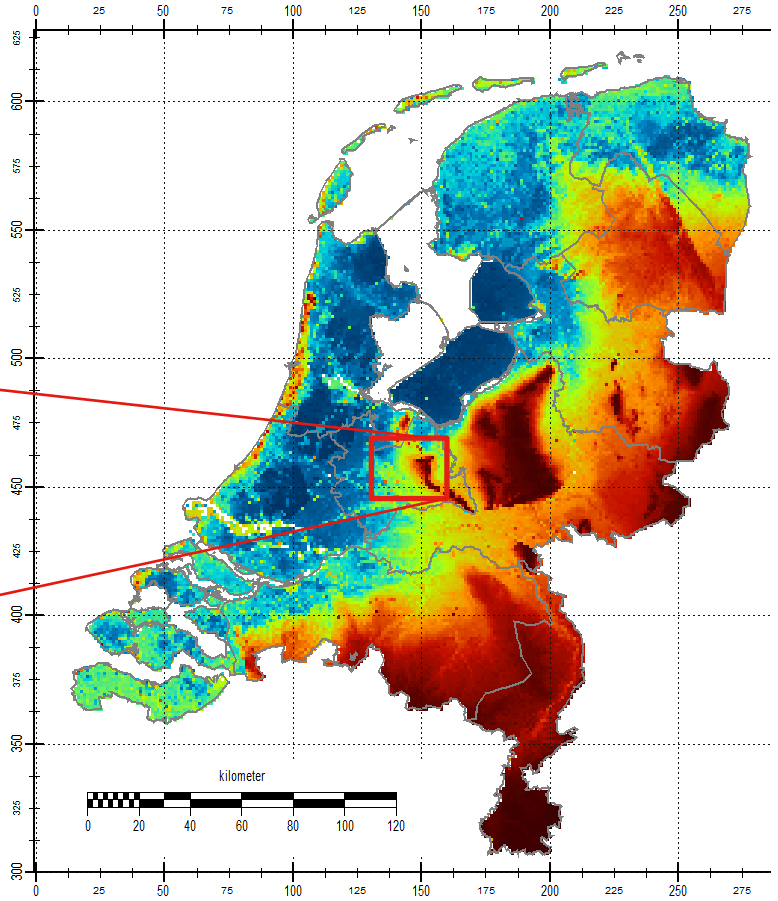
Koen van der Hauw - Sweco
Wouter Swierstra – RHDHV

18 januari 2024

Modelling on the fly

- Overal in Nederland een model afleiden





Deltares SWECO Royal HaskoningDHV

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

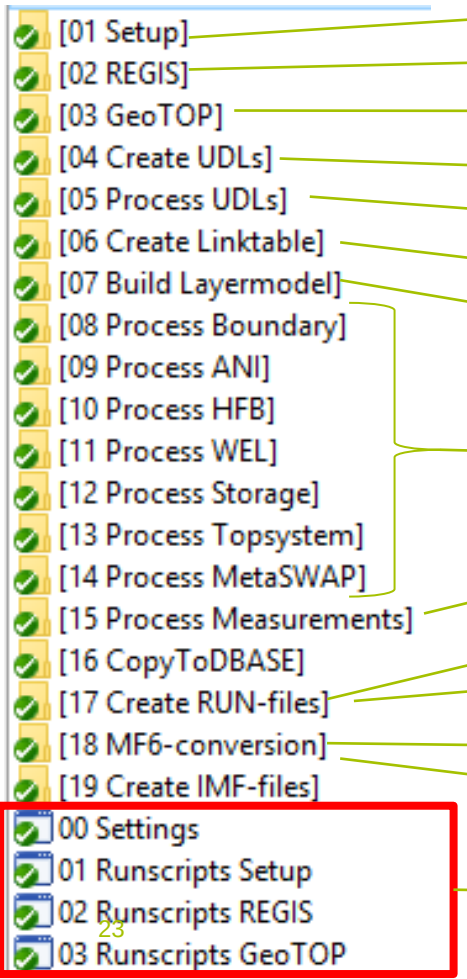
Modflow 6 groundwater model

- [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

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

WORKFLOW



Model-extent

Geohydrologisch model “REGIS” kopiëren en controle

Geohydrologisch model “GeoTOP” conversie UDL

Creëren overige User Defined Layers (UDL)

Processen UDL’s in Geohydrologisch model REGIS

Creëren LinkTable voor koppelen geo-model aan modellagen

Creëren grondwatermodel modellagen

Creëren input voor Modflow modules, bijv: RIV, WEL, BND

Creëren kalibratieset

Kopiëren gegenereerde data naar DBASE folder

Creëren iMOD Projectfile (creëren MF2005 model)

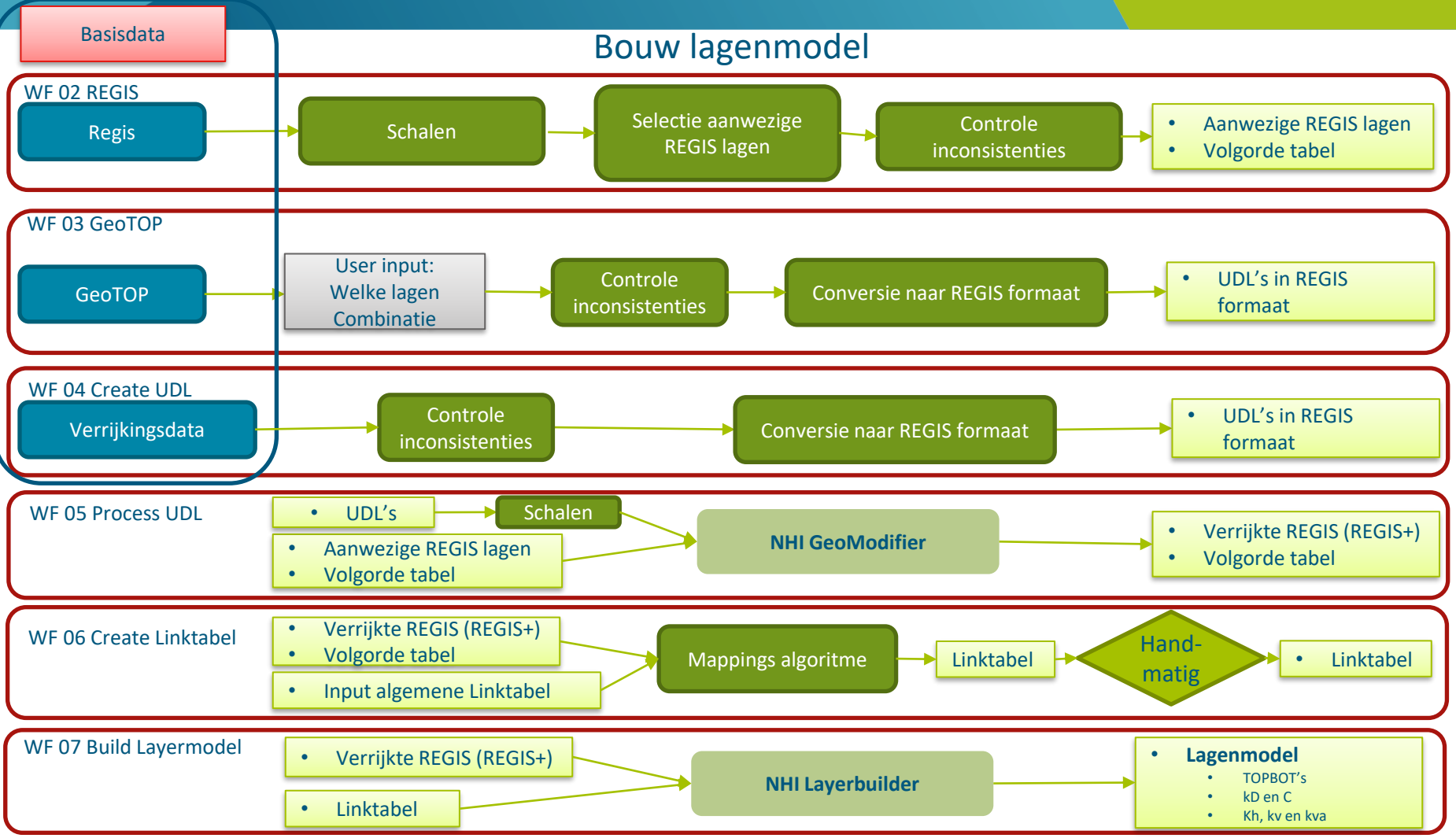
Creëren iMOD IMF files

Creëren iMOD Projectfile (creëren MF 6 model)

Batch files om de Workflows apart te kunnen runnen

Deltares SWECO Royal HaskoningDHV

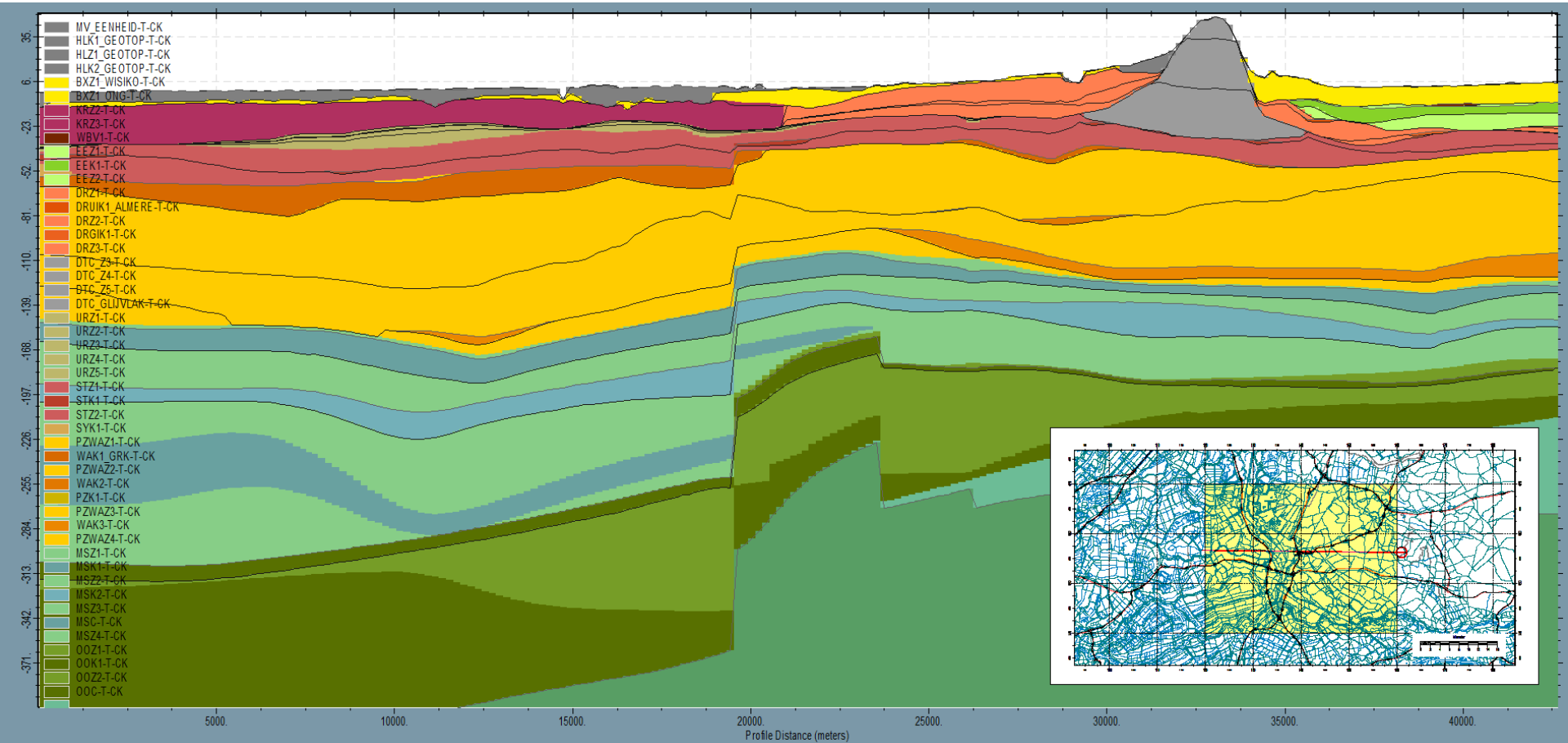
Bouw lagenmodel



Bouw lagenmodel aan de hand van LinkTabel

Number	Name	Type	Percentage	Schema	Part	Kfactor	AverageK	ANI_factor	ANI_hoek	ANI_KVA	BND	SHD
1	MV_eenheid	Complex	100	1	1	1	8.88152				IBOUND.ID	SHD_MV_eenheid.IDF
2	HLc_regis	Aquitard	25.23	-1	1	1	2.69989				IBOUND.ID	SHD_HLc_regis.IDF
3	HLk1_geotop	Complex	11.18	-1	1	1	1.1194				IBOUND.ID	SHD_HLk1_geotop.IDF
4	HLz1_geotop	Complex	2.91	-1	1	1	6.50145				IBOUND.ID	SHD_HLz1_geotop.IDF
5	HLk2_geotop	Complex	0.28	-1	1	1	1.44029				IBOUND.ID	SHD_HLk2_geotop.IDF
6	HLz2_geotop	Complex	0.01	-1	1	1	0.37938				IBOUND.ID	SHD_HLz2_geotop.IDF
7	BXk1_xsc	Complex	0.64	-1	1	1	0.45927				IBOUND.ID	SHD_BXk1_xsc.IDF
8	bxz3	Aquifer	0	2	1	1	6.05667				IBOUND.ID	SHD_bxz3.IDF
9	bxz4	Aquifer	0	2	1	1	6.094				IBOUND.ID	SHD_bxz4.IDF
10	BXz1_xsi	Complex	0.98	2	1	1	1.84482				IBOUND.ID	SHD_BXz1_xsi.IDF
11	BXz1_wiko	Complex	16.53	2	1	1	1.79671				IBOUND.ID	SHD_BXz1_wiko.IDF
12	BXz1_wisiko	Complex	1.11	2	1	1	2.68521				IBOUND.ID	SHD_BXz1_wisiko.IDF
13	BXz1_deko	Complex	3.42	2	1	1	6.97316				IBOUND.ID	SHD_BXz1_deko.IDF
14	BXz1_ong	Complex	20.39	3	1	1	4.9651				IBOUND.ID	SHD_BXz1_ong.IDF
15	krz3	Aquifer	14.48	4	1	1	58.2137				IBOUND.ID	SHD_krz3.IDF
16	krzuk1	Aquitard	0.04	-4	1	1	0.03515				IBOUND.ID	SHD_krzuk1.IDF
17	krz4	Aquifer	12.37	4	1	1	66.7948				IBOUND.ID	SHD_krz4.IDF
18	krtwk1	Aquitard	0.83	-4	1	1	0.00058				IBOUND.ID	SHD_krtwk1.IDF
19	krz5	Aquifer	11.58	4	1	1	70.638				IBOUND.ID	SHD_krz5.IDF
20	bez1	Aquifer	18.77	4	1	1	85.188				IBOUND.ID	SHD_bez1.IDF
21	bek1	Aquitard	1.84	-4	1	1	0.02675				IBOUND.ID	SHD_bek1.IDF
22	bez2	Aquifer	24.33	4	1	1	81.7413				IBOUND.ID	SHD_bez2.IDF
23	bek2	Aquitard	0.23	-4	1	1	0.02317				IBOUND.ID	SHD_bek2.IDF
24	bez3	Aquifer	28.56	4	1	1	78.5572				IBOUND.ID	SHD_bez3.IDF
25	qrz1	Aquifer	0.24	4	1	1	27				IBOUND.ID	SHD_qrz1.IDF
26	drz1	Aquifer	1.06	5	1	1	44.4406				IBOUND.ID	SHD_drz1.IDF
27	drgik1	Aquitard	0.01	-5	1	1	0.01329				IBOUND.ID	SHD_drgik1.IDF
28	drz3	Aquifer	1.12	5	1	1	44.791				IBOUND.ID	SHD_drz3.IDF
29	DTc_z1	Aquifer	0	5	1	1	20	anisotropie_factor.IDF	anisotropie_hoek.IDF	KVA_DTC.IDF	IBOUND.ID	SHD_DTc_z1.IDF
30	DTc_z2	Aquifer	0.46	5	1	1	20	anisotropie_factor.IDF	anisotropie_hoek.IDF	KVA_DTC.IDF	IBOUND.ID	SHD_DTc_z2.IDF
31	DTc_z3	Aquifer	1.33	5	1	1	20	anisotropie_factor.IDF	anisotropie_hoek.IDF	KVA_DTC.IDF	IBOUND.ID	SHD_DTc_z3.IDF
32	DTc_z4	Aquifer	1.94	6	1	1	20	anisotropie_factor.IDF	anisotropie_hoek.IDF	KVA_DTC.IDF	IBOUND.ID	SHD_DTc_z4.IDF
33	DTc_z5	Aquifer	2.88	7	1	1	20	anisotropie_factor.IDF	anisotropie_hoek.IDF	KVA_DTC.IDF	IBOUND.ID	SHD_DTc_z5.IDF
34	DTc_glijvlak	Aquitard	2.88	-7	1	1	0.00002				IBOUND.ID	SHD_DTc_glijvlak.IDF
35	urz1	Aquifer	0.1	8	1	1	55				IBOUND.ID	SHD_urz1.IDF
36	stz1	Aquifer	1.63	8	1	1	48.1338				IBOUND.ID	SHD_stz1.IDF
37	stk1	Aquitard	0.19	-7	1	1	0.04024				IBOUND.ID	SHD_stk1.IDF
38	stz2	Aquifer	2.1	8	1	1	51.3575				IBOUND.ID	SHD_stz2.IDF

Resultaat lagenmodel



Voorbeeld Onttrekkingen (WEL Worfklow)

Basisdata in Excel

Hydromonitor

Workflow

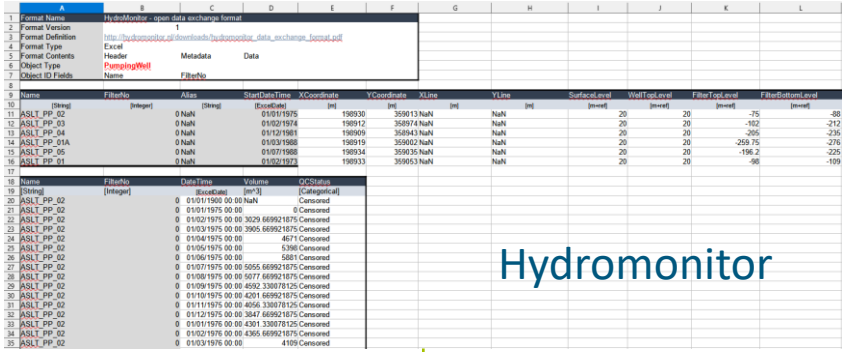
Converteer naar IPF

Clippen op modelgebied

Toekennen aan modellagen

Modelinvoer

iMOD IPF bestand



Hydromonitor

IPF

```
62
14
X
Y
Q_ASSIGNED
FilterTopLevel
FilterBottomLevel
Name
FilterNo
Q_ORG
FRACTION
ILAY
TOP
BOT
KD
ERROR_CODE
0,TXT
198912,358974,-26.668,-102,-212,ASLT_PP_03,0,ASLT\ASLT_PP_03_0,0.1991,18,-170.44,-182.65,1.0000,-
191443,356256,-129.492,-242.23,-274.83,HEEL_PP_60,0,HEEL\HEEL_PP_60_0,1.0000,18,-234.67,-282.04,1.0000,-
191359,356420,-119.862,-242.02,-277.84,HEEL_PP_61,0,HEEL\HEEL_PP_61_0,1.0000,18,-238.81,-280.39,1.0000,-
191546,355973,-28.237,-248.44,-278.34,HEEL_PP_62,0,HEEL\HEEL_PP_62_0,1.0000,18,-230.08,-282.19,1.0000,-
191622,355784,-105.691,-247.73,-276.47,HEEL_PP_63,0,HEEL\HEEL_PP_63_0,1.0000,18,-229.56,-280.41,1.0000,-
191166,356654,-127.792,-245.11,-282.51,HEEL_PP_64,0,HEEL\HEEL_PP_64_0,1.0000,18,-237.25,-278.32,1.0000,-
190315,355457,-145.697,-237.69,-275.69,HEEL_PP_65,0,HEEL\HEEL_PP_65_0,0.9324,18,-223.85,-265.14,1.0000,-
190477,355487,-140.003,-242.92,-276.66,HEEL_PP_66,0,HEEL\HEEL_PP_66_0,0.9068,18,-224.39,-266.13,1.0000,-
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191226,356552,-158.431,-244.24,-277.16,HEEL_PP_68,0,HEEL\HEEL_PP_68_0,1.0000,18,-238.14,-279.40,1.0000,-
191690,355490,-87.214,-235.57,-272.57,HEEL_PP_70,0,HEEL\HEEL_PP_70_0,1.0000,18,-228.42,-276.91,1.0000,-
191383,355298,-76.765,-234.7,-264.7,HEEL_PP_71,0,HEEL\HEEL_PP_71_0,1.0000,18,-226.57,-272.47,1.0000,-
191390,355298,-66.033,-231.85,-261.85,HEEL_PP_72,0,HEEL\HEEL_PP_72_0,1.0000,18,-226.57,-272.47,1.0000,-
```


DHV

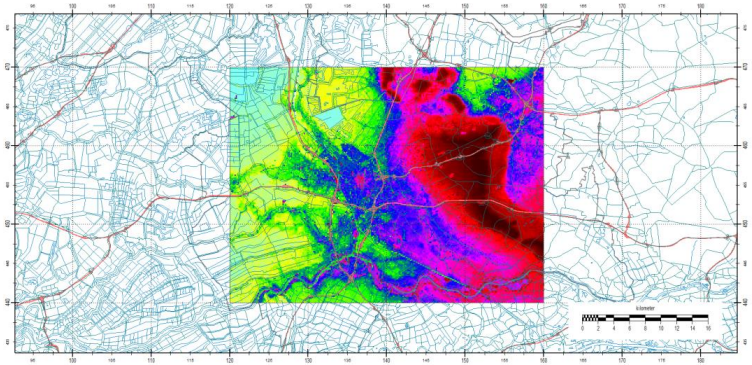
Voorbeeld Maaiveld Workflow

Maaiveldcorrecties: cellen in het MV-basisgrid worden eerst overschreven met de verrijkingsdata, daarna worden NoData-waarden opgevuld met MV-opvulgrid1 en tenslotte met MV-opvulgrid2 en 3

MV-basisdatapad	**%BASISDATAPATH%\Maaiveld**
MV-basisgrid	Nederland\AHN3-WSS\AHN3-WSS.IDF
MV-opvulgrid1	REGIS\TOPmaximum_REGIS.idf
MV-opvulgrid2	
MV-opvulgrid3	

Verrijkingsdata/UDL grids (bovenste grids in tabel, dus met kleiner rijnummer, worden eerder ingebrand en hebben daarmee lagere prioriteit)

Bron	Parameternaam	Correctiefactor	Methode	Pad	Waterbodem
Rijkswaterstaat	Maas_bathymetrie	1.000	Inbranden	%BASISDATAPATH%\Verrijkingsdata\Bathymetrie\Rijkswaterstaat\Maas\MaasBath_2020.idf	1
Provincie Limburg	Ontgrondingen	1.000	Inbranden	%BASISDATAPATH%\Verrijkingsdata\Ontgrondingen\Ontgrondingen_NAP.idf	1



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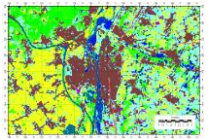
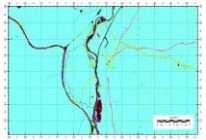
MetaSWAP Workflow

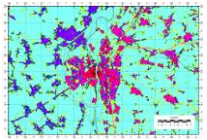
Basisdata



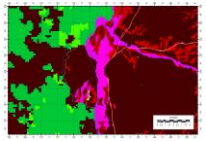
LUSE (Landuse)



NOPP (Nat oppervlak)



SOPP (Stedelijk oppervlak)



Bodemkaart

Schalen
en default waarde
voor NoData

Grid2MetaSWAP
Invoerparameters

Beregening → Toekennen aan modellagen
Overlandflow → Max(**maaiveld** en topsysteem peilen)
Worteldiepte → O.b.v. landgebruik en bodemtype)
inp bestanden → Kopieëren

Mete_grid.inp

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Resultaat model

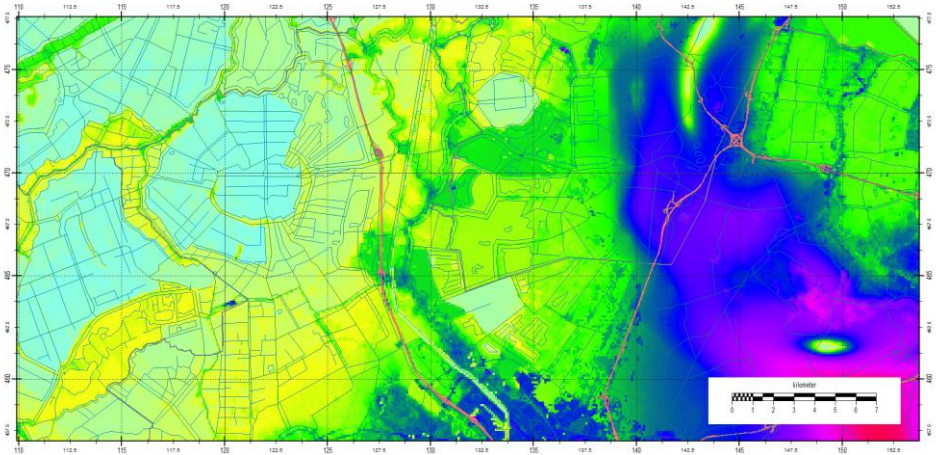
PRJ- en RUN-file:

- MODFLOW-2005 Stationair
- MODFLOW-2005 Tijdsafhankelijk

Inclusief batch files om Model te runnen

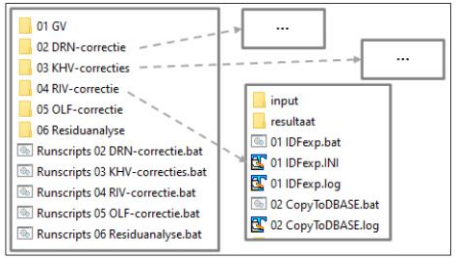
PRJ-file

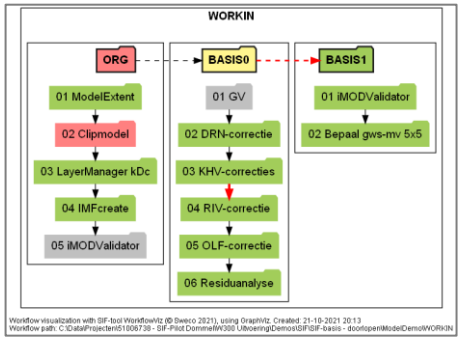
- MODFLOW 6 Stationair
- MODFLOW 6 Tijdsafhankelijk
- MODFLOW 6 Unconfined Stationair

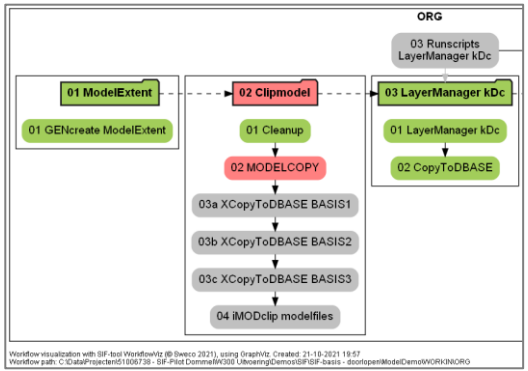


Ook opgeleverd

- Workflow unstructured
- DAMO2ISG
- GeoTOP csv-conversion
- GeoTOP Voxel selection
- GeoTOP complexe opschaling
- GeoTOP split layers
- Workflow VIZ







Deltares SWECO Royal HaskoningDHV