Overview of TNO Latest contributions to OPM

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TNO innovation for life

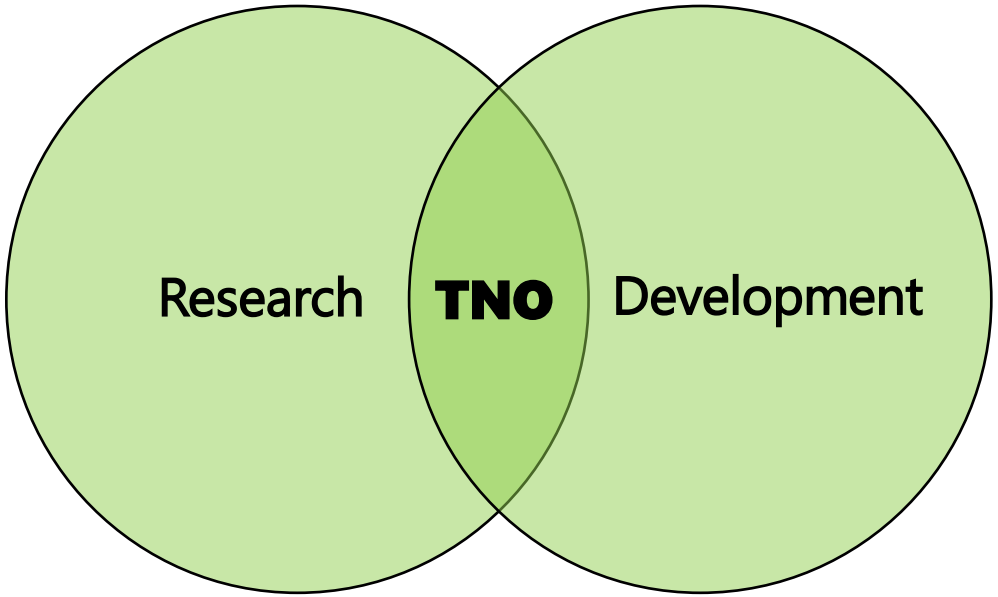
May 26, 2025

Summary

- TNO OPM Team Overview
- Group Controlled Wells
- Grid-independent Wells
- Groningen Model
- Isenthalpic Flash
- Local Grid Refinement

Overview of TNO Latest contributions to OPM

TNO OPM Team Overview



OPM Project

- **Strategic Position:** TNO integrates Development and Advanced Usage of subsurface reservoir simulators.
- **OPM Team:** Our biggest strength lies in the complementary skill set of our team members:
  - Paul Egbert – Senior Generalist Researcher
  - Negar Khoshnevis – Reservoir Engineer Researcher
  - Peter Verveer – Development Specialist
  - Artur Castiel – Field Integrator – Experience in Development and Research in Reservoir Simulation
  - Eduardo Barros – Project Manager

Overview of TNO Latest contributions to OPM

Group Controlled Wells

In reservoir simulations, especially for complex field development, wells are grouped (e.g., by reservoir zone, surface facility, platform).

Example is an **auto choke group**:

- Wells are operated on a common THP.
- THP such that a group rate target is fulfilled

```
NODEPROP
--   NodeName   Press   AutoChoke
     PLAT-A     21.0    NO    /
     M5S        1*      NO    /
     B1         1*      YES   /
     C1         1*      NO    /
```

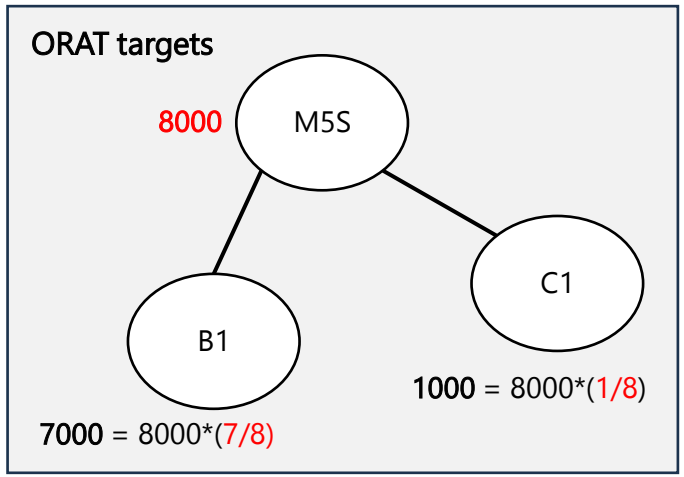
The **GCONPROD** keyword enables you to:

- Set production targets or limits for groups (e.g., total oil rate, gas rate, water rate, liquid rate).
- Apply group guide rates

Oil target

Guide rates

```
GCONPROD--
'M5S'  ORAT  8000   3*   'RATE'  'YES'   8.0   'OIL'   6* /
'B1'   FLD   1*     3*   'RATE'  'YES'   7.0   'OIL'   6* /
'C1'   FLD   1*     3*   'RATE'  'YES'   1.0   'OIL'    6*  /
```

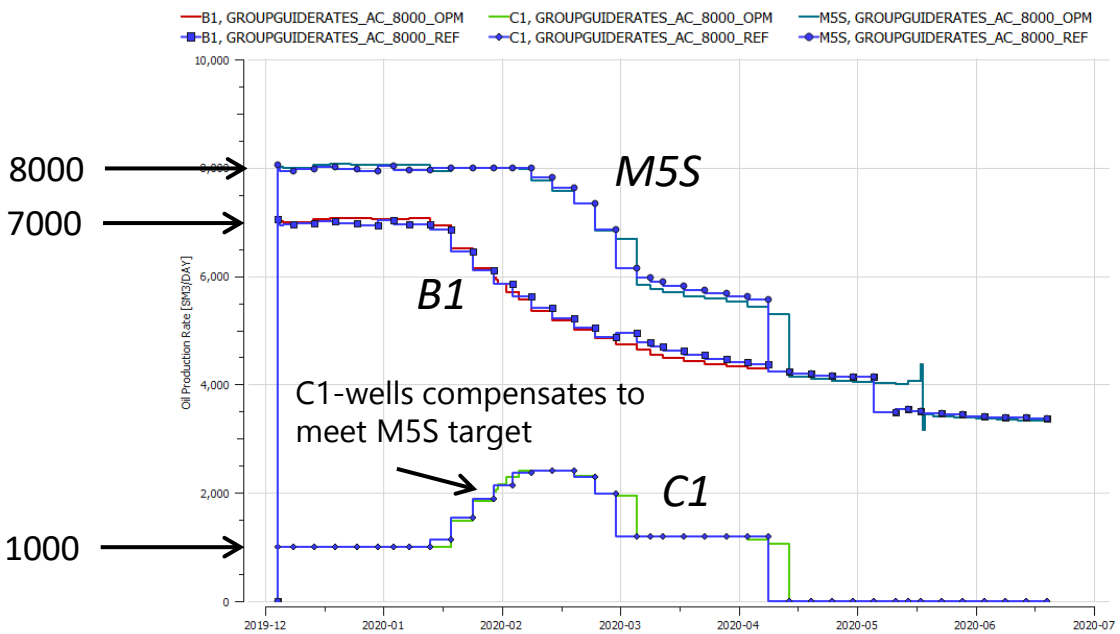


Overview of TNO Latest contributions to OPM

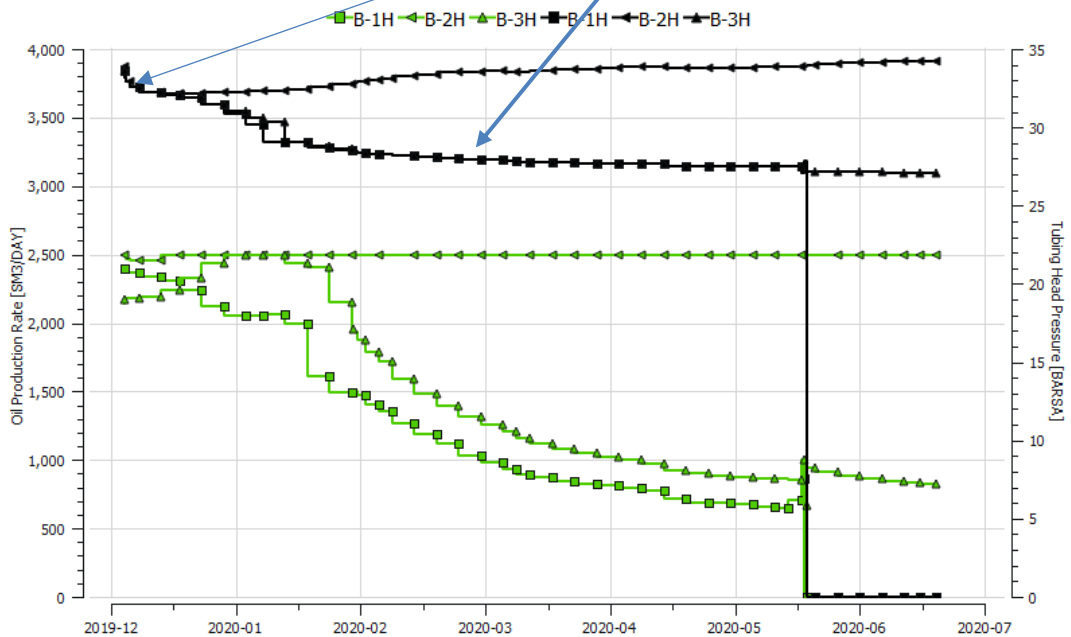
Group Controlled Wells

- Preliminary results show a good match between OPM and Reference Simulator in toy problems.

```
GCONPROD--
'M5S' ORAT  8000   3*   'RATE'  'YES'   8.0   'OIL'   6* /
'B1'  FLD   1*     3*   'RATE'  'YES'   7.0   'OIL'   6* /
'C1'  FLD   1*     3*   'RATE'  'YES'   1.0   'OIL'    6*  /
```



B1 is an autochoke group: wells having same THP



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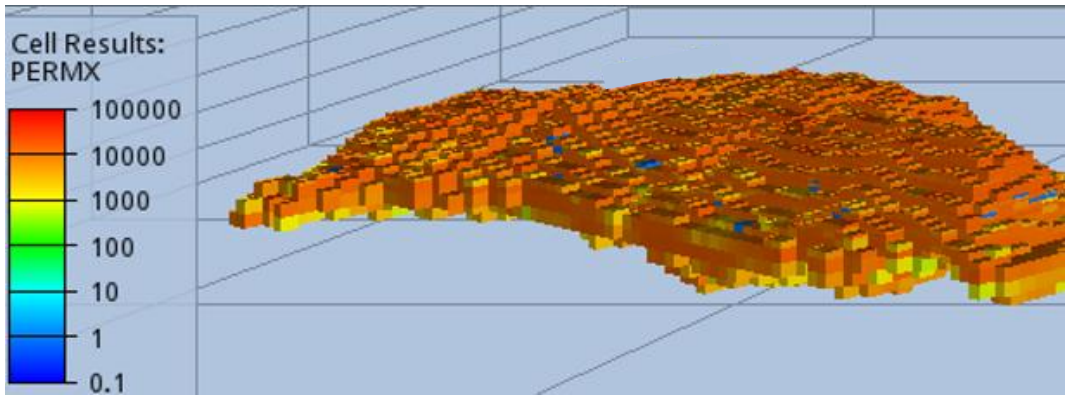
Group Controlled Wells

- Testing on Field case ~1.2M cells:



Oil target

Water constraint

Guide rates

Guide rate phase

```
GCONPROD
'AB'      'ORAT'   10000.0   5500.0   1*    10000.0   'RATE'  'YES'   10000.0   'LIQ'   'RATE'  'RATE'  'RATE'   3* /
'A'       'FLD'    1*        1*       1*    1*        'RATE'  'YES'   5000.0    'LIQ'   'RATE'  'RATE'  'RATE'   3*
'B'       'FLD'    1*        1*       1*    1*        'RATE'  'YES'   5000.0    'LIQ'   'RATE'  'RATE'  'RATE'   3* /
```

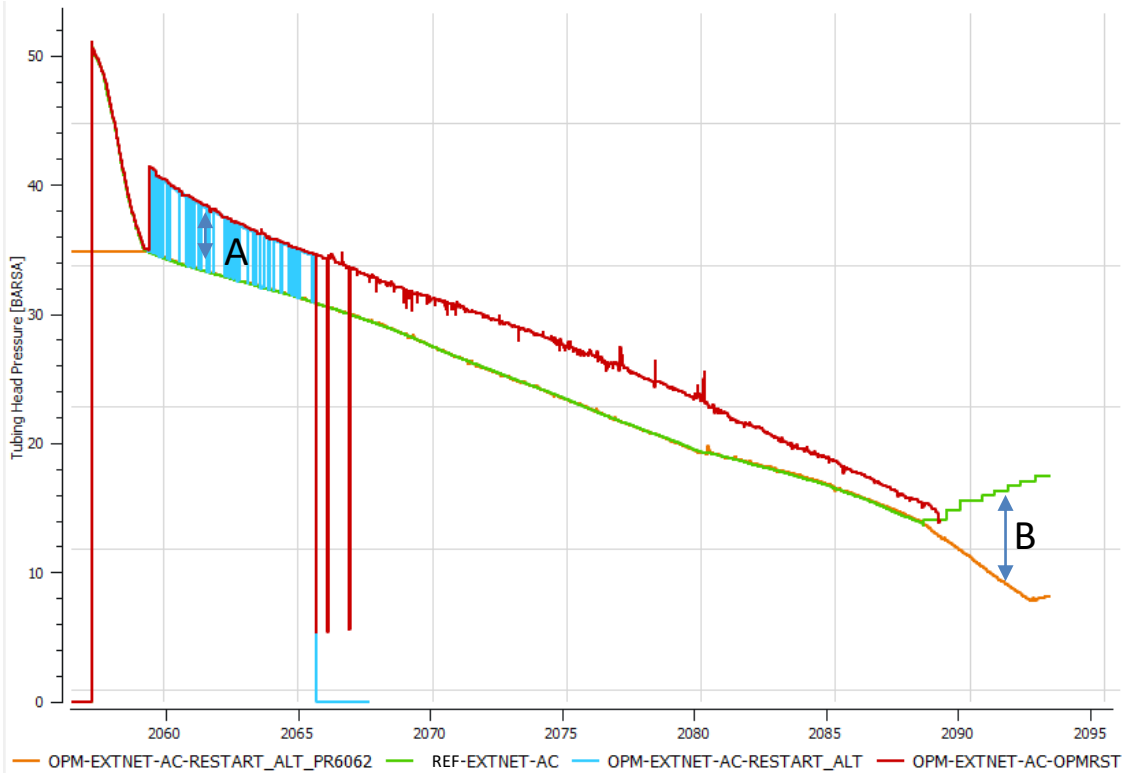
Parent AB, Children A and B are auto-choke groups

Overview of TNO Latest contributions to OPM

Group Controlled Wells

Initial Issues (Now Resolved)

- Well X exhibited significant deviations from the reference simulator
- Two major differences observed in THP (Tubing Head Pressure) behavior:
  - **Issue A:** Resolved by a recent PR from Tor
    - Not related to auto choke functionality
  - **Issue B:** Also resolved
    - Caused by incorrect handling of target rate switch
    - Old implementation failed during transition from ORAT to WRAT

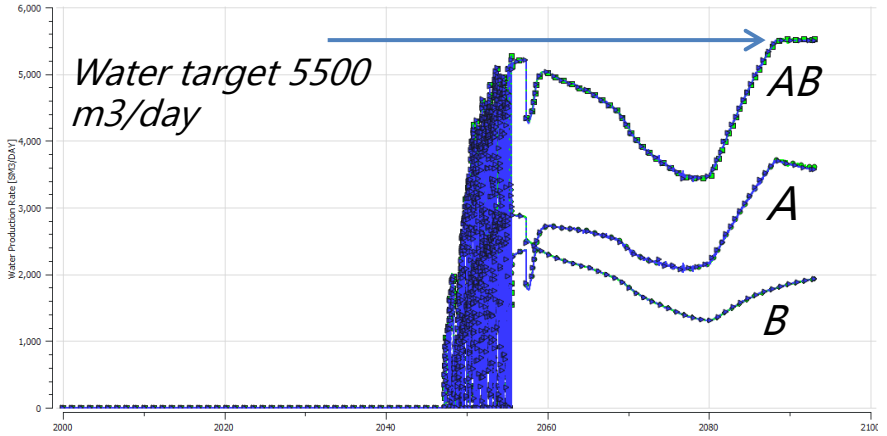


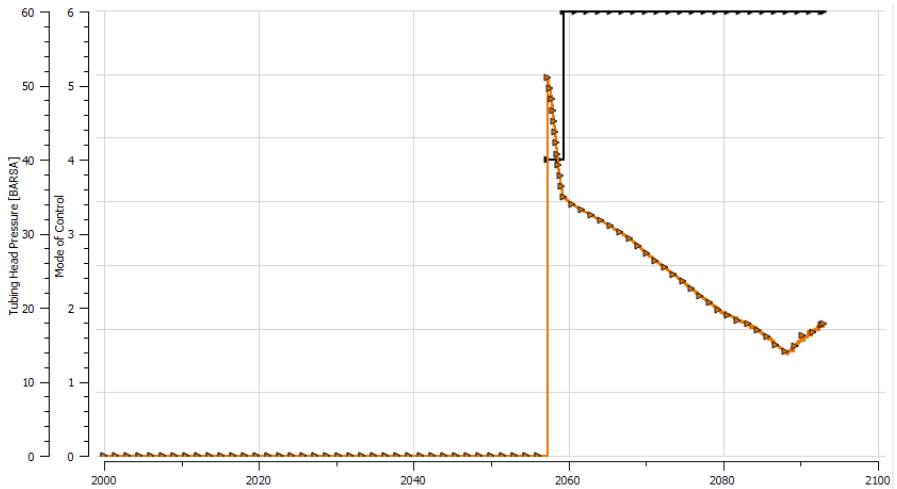
Overview of TNO Latest contributions to OPM

Group Controlled Wells

Progress and Next Steps

- ✅ Good match with reference simulator for field case
- ✅ Merged PRs:
  - opm-simulators#5754 and opm-common#4355: Enable group guide rates
  - opm-tests#1276: Test updates merged
- 📝 Upcoming PR to be released:
  - 🔁 More testing required
  - 🔧 Fix in progress: Allow wells to be defined after reading NODEPROP
  - 🚀 Performance optimization still needed

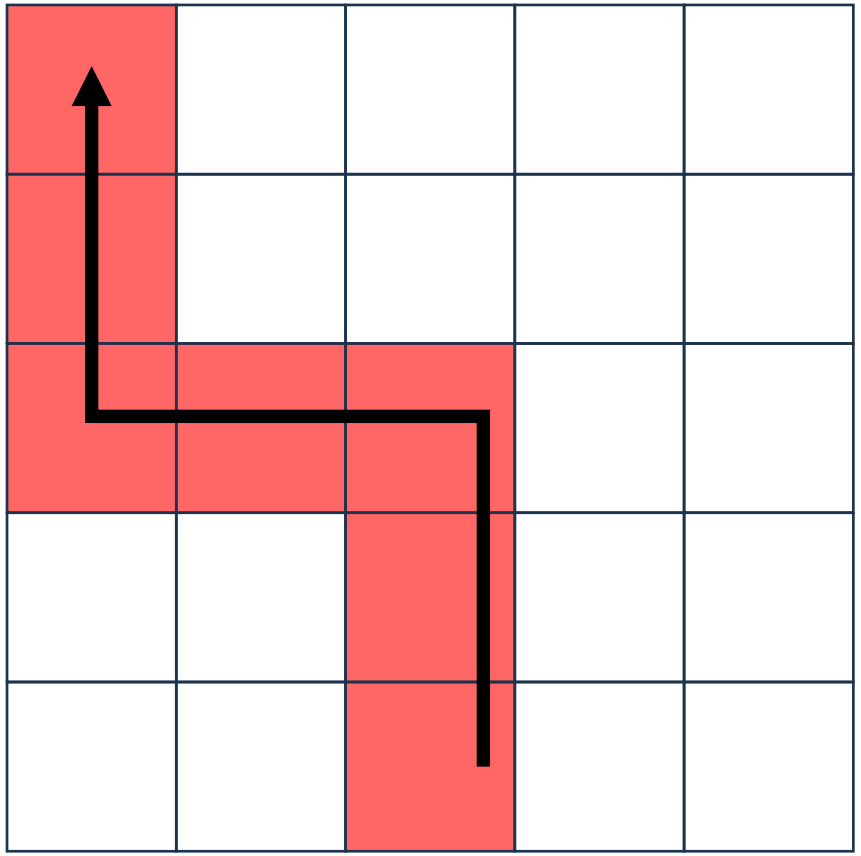




Overview of TNO Latest contributions to OPM

Grid-independent Wells

Grid Dependent Well

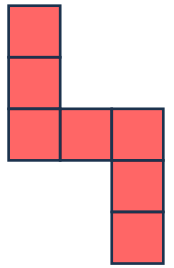


Well Geometry

i,j,k

User projects Well Geometry onto Reservoir Grid

WELSPECS + COMPDAT



Well location on the mesh is manually defined. Physical parameters such as Connection Factor are provided by user.

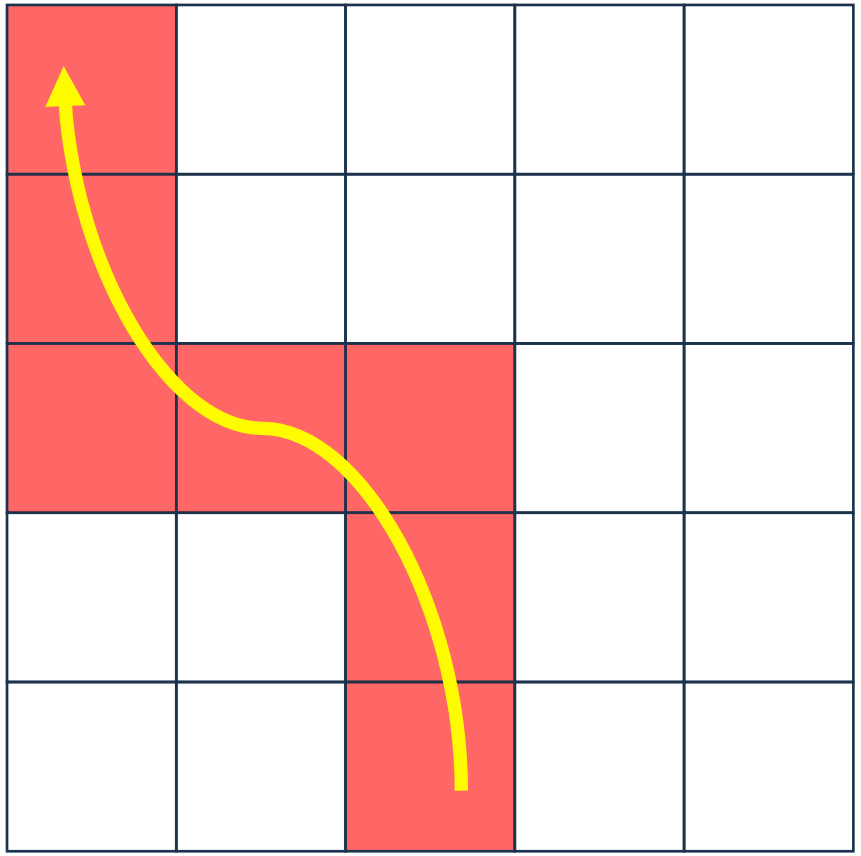
If mesh is modified, wells need to be redefined.

Wells are treated as zero-D objects with no internal flow!

Overview of TNO Latest contributions to OPM

Grid-independent Wells

Grid Independent Well

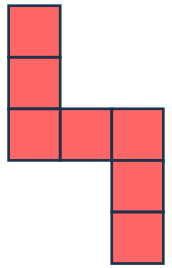


Well Geometry
(X,Y,Z)

x,y,z

User provides a piecewise linear representation of the well geometry

WELTRAJ + COMPTRAJ



Well location on the mesh and Connection Factor are automatically defined by OPM.

WELTRAJ and COMPTRAJ keywords are identical regardless of the mesh.

Wells are treated as zero-D objects with no internal flow!

Overview of TNO Latest contributions to OPM

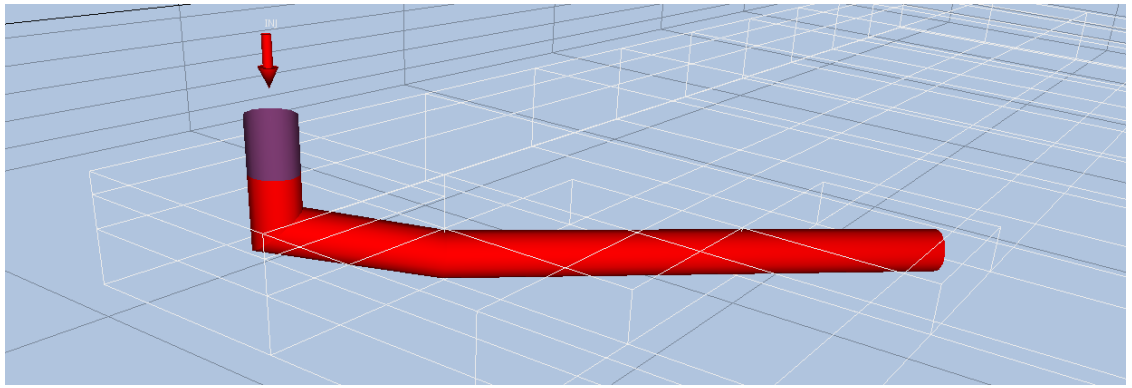
Grid-independent Wells

🧪 Original Implementation

- Pull Request #3384 – Author: Paul Egberts
  Introduced initial support for well trajectory (WELTRAJ) and component trajectory (COMPTRAJ) handling.

🧯 Key Fixes & Improvements

- PR #4279 – Author: Peter Verveer
  Refinements to enhance robustness and support complex configurations.



Fix / Enhancement	Description
✅ **Saturation Table Defaulting**	Ensures proper default behavior when saturation table is omitted in COMPTRAJ.
🌐 **Support for Non-Trivial Origins (MAPAXES)**	Correctly interprets coordinate transforms via MAPAXES for trajectory origin.
🔁 **Non-Linear Trajectory Bug Fix**	Addresses issues when dealing with curved or bent well paths.
🧪 **New Tests Added**	Verifies compatibility with non-linear paths and complex MAPAXES setups.

```
399  WELTRAJ
400  -- WELL BRANCH_NO X    Y      TVD      MD
401  'PROD'  1*       11500 12500 -10.0     0.0 /
402  'PROD'  1*       11500 12500  8425.0   8425.0 /
403  'INJ'   1*       2500  3500   -100.0    0.0 /
404  'INJ'   1*       2500  3500   8325.0   8325.0 /
405  'INJ'   1*       2750  3750   8375.0   8375.0 /
406  'INJ'   1*       3500  4500   8400.0   8400.0 /
407  'INJ'   1*       4500  5500   8425.0   8425.0 /
408  /
409
410  --PERF REF is MD or TVD, now assumed MD
411  COMPTRAJ
412  -- WELL  BRANCH  PERF     PERF    PERF COMPL STATE SAT    CONN DIAM KH  SKIN D_FACT
413  -- NAME  NO      TOP      BOT     REF  NO    --    TABLE  FACT --   --  --   --
414    'PROD' 1*      8325.0   8425.0  1*   1*    1*    1*     1*   0.5  1*  0.1  1*     /
415    'INJ'  1*      8325.0   8425.0  1*   1*    1*    1*     1*   0.5  1*  0.1  1*     /
416  /
```

```
80   MAPAXES
81   2000.0 3100.0
82   2000.0 3000.0
83   2100.0 3000 0  /
```

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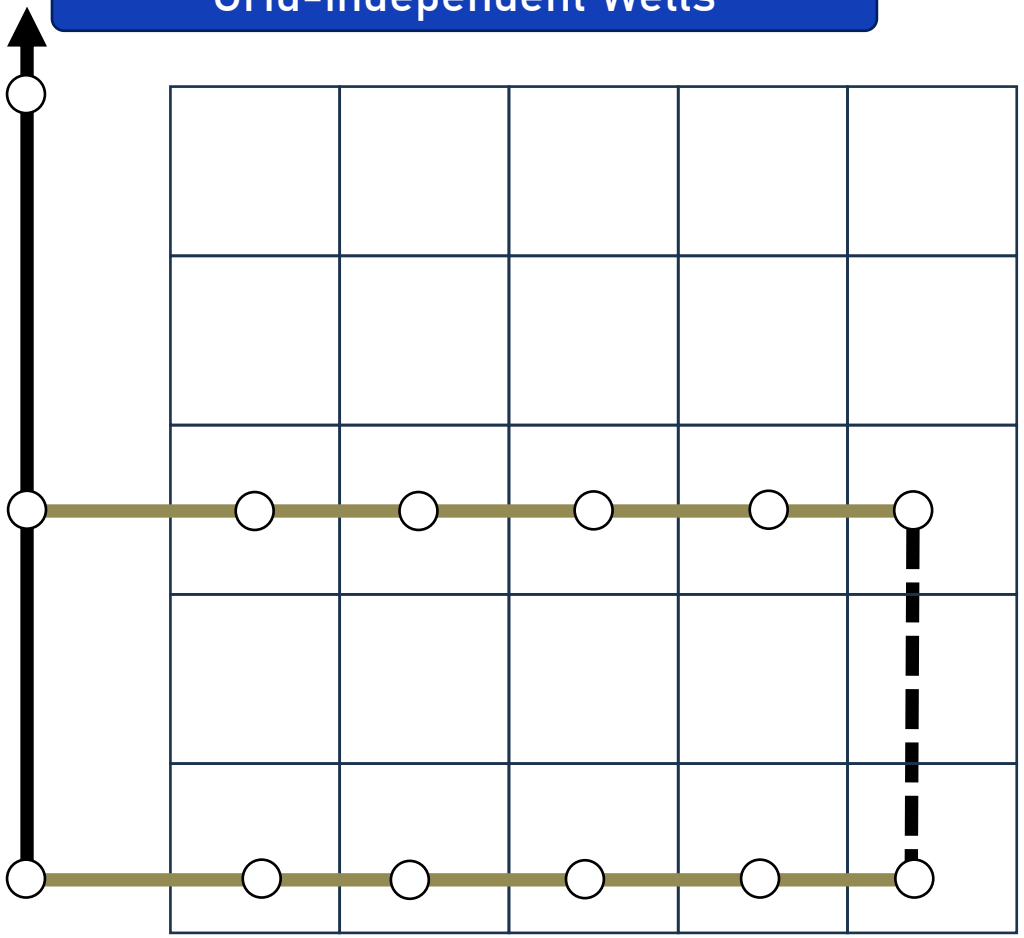
Grid-independent Wells



Wells is divided into segments. Flow is calculated segment-wise. Effects such as pressure and temperature gradient can be considered.

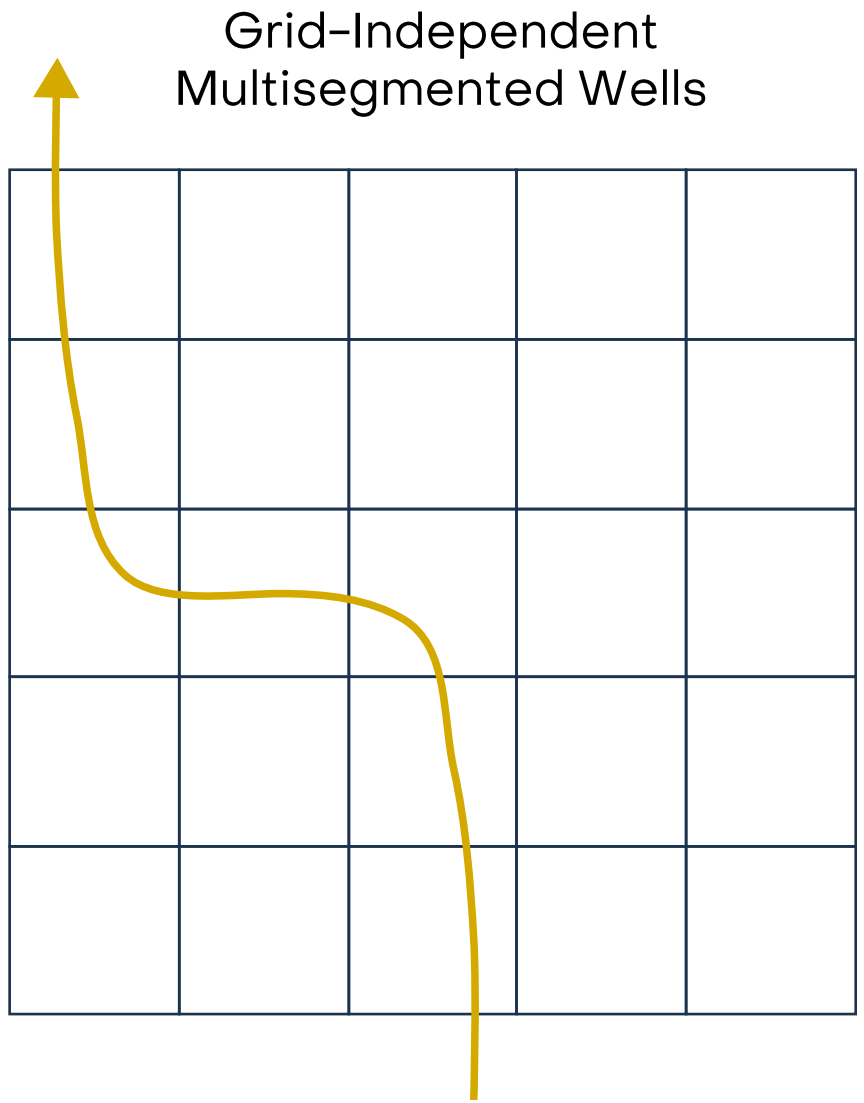
- **Multisegmented Wells (MSW)**
  Representation of wells with nodes and segments. DOF on nodes. Useful to compute wellbore effects.

  When are MSW required?
  - **Long Horizontal Wells**
  - **Multilateral Wells**
    Representation of wells branching out.
  - **Looped Wells**
    Representation of closed loop wells.

Multisegmented Wells are currently grid dependent on OPM.

Overview of TNO Latest contributions to OPM

Grid-independent Wells



Well Geometry
(X,Y,Z)

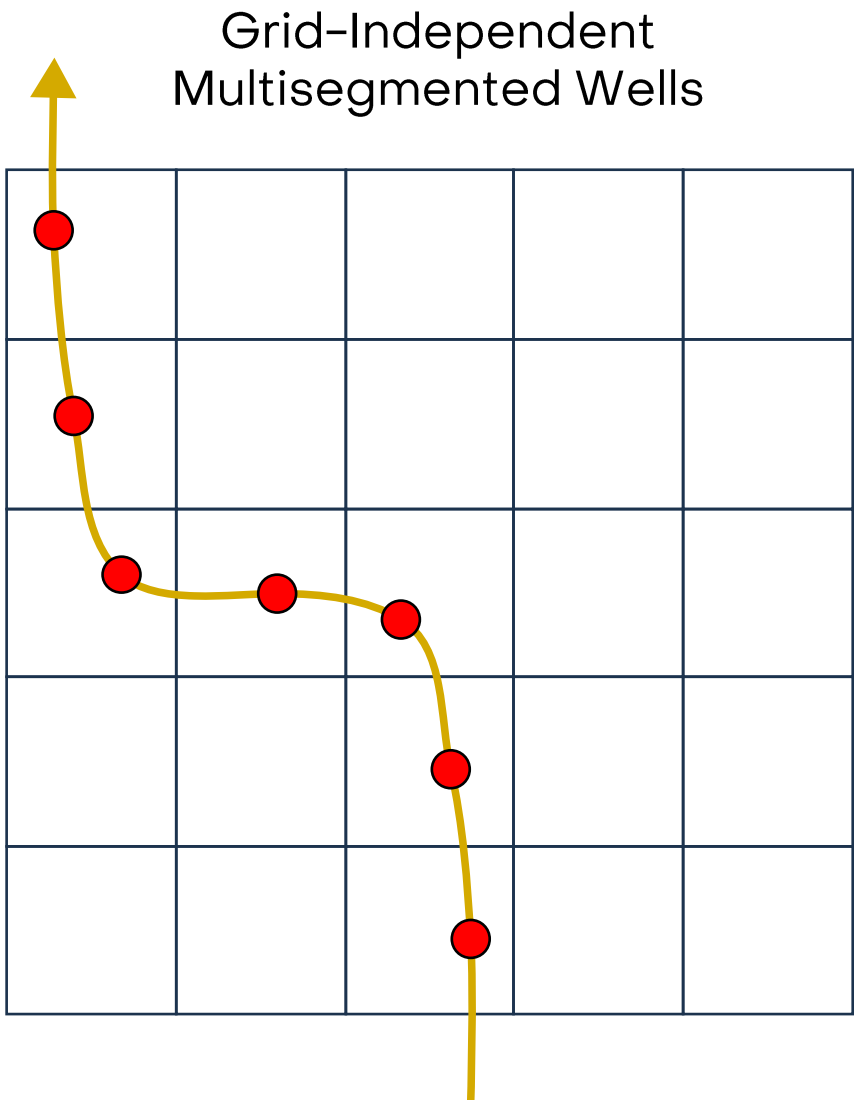
User inputs sampled well geometry

X,Y,Z

WELTRAJ + COMPTRAJ can now transform geometric well description into Multisegmented Wells

Overview of TNO Latest contributions to OPM

Grid-independent Wells



Well Geometry
(X,Y,Z)

User inputs sampled well geometry

X,Y,Z

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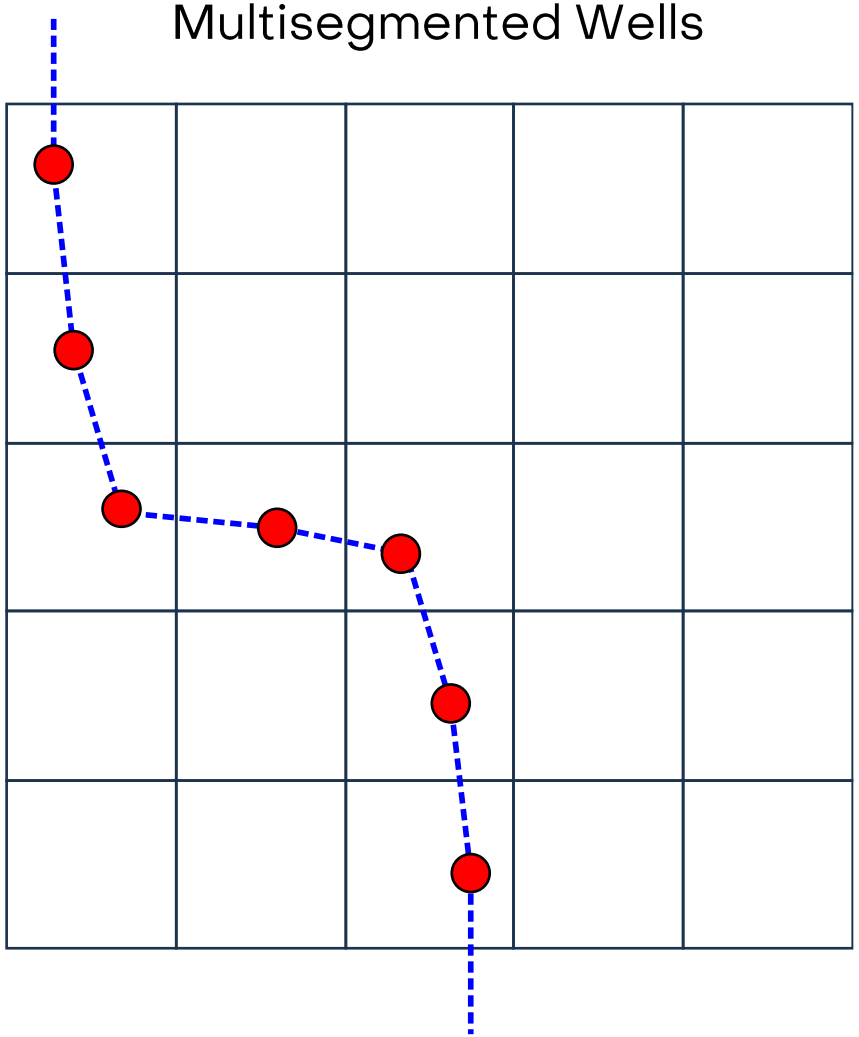
Overview of TNO Latest contributions to OPM

Grid-independent Wells

Grid-Independent
Multisegmented Wells



Well Geometry
(X,Y,Z)

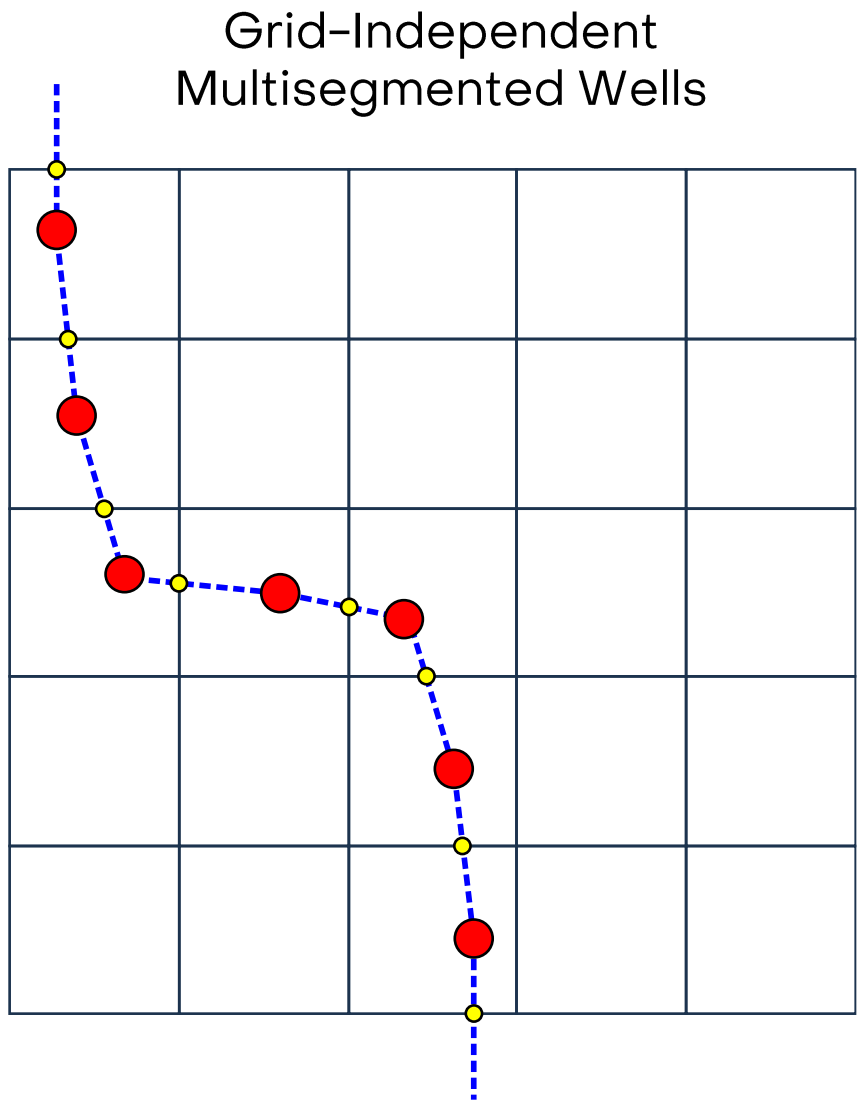
User inputs sampled well geometry

X,Y,Z

WELTRAJ + COMPTRAJ can now transform geometric well description into Multisegmented Wells

Overview of TNO Latest contributions to OPM

Grid-independent Wells



Well Geometry
(X,Y,Z)

User inputs sampled well geometry

X,Y,Z

WELTRAJ + COMPTRAJ can now transform geometric well description into Multisegmented Wells

Piece-wise linear well geometry (specified by user)

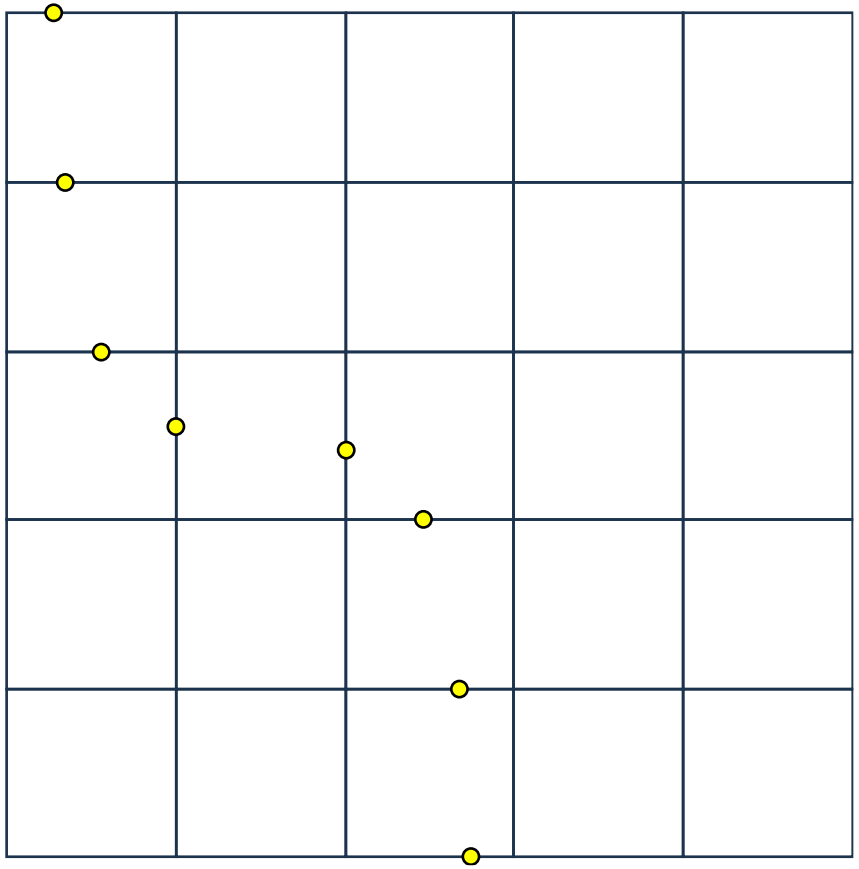
Position of well segment nodes (calculated by OPM-Flow)

Start / end of well segments (calculated by OPM-Flow)

Overview of TNO Latest contributions to OPM

Grid-independent Wells

Grid-Independent
Multisegmented Wells



Well Geometry
(X,Y,Z)

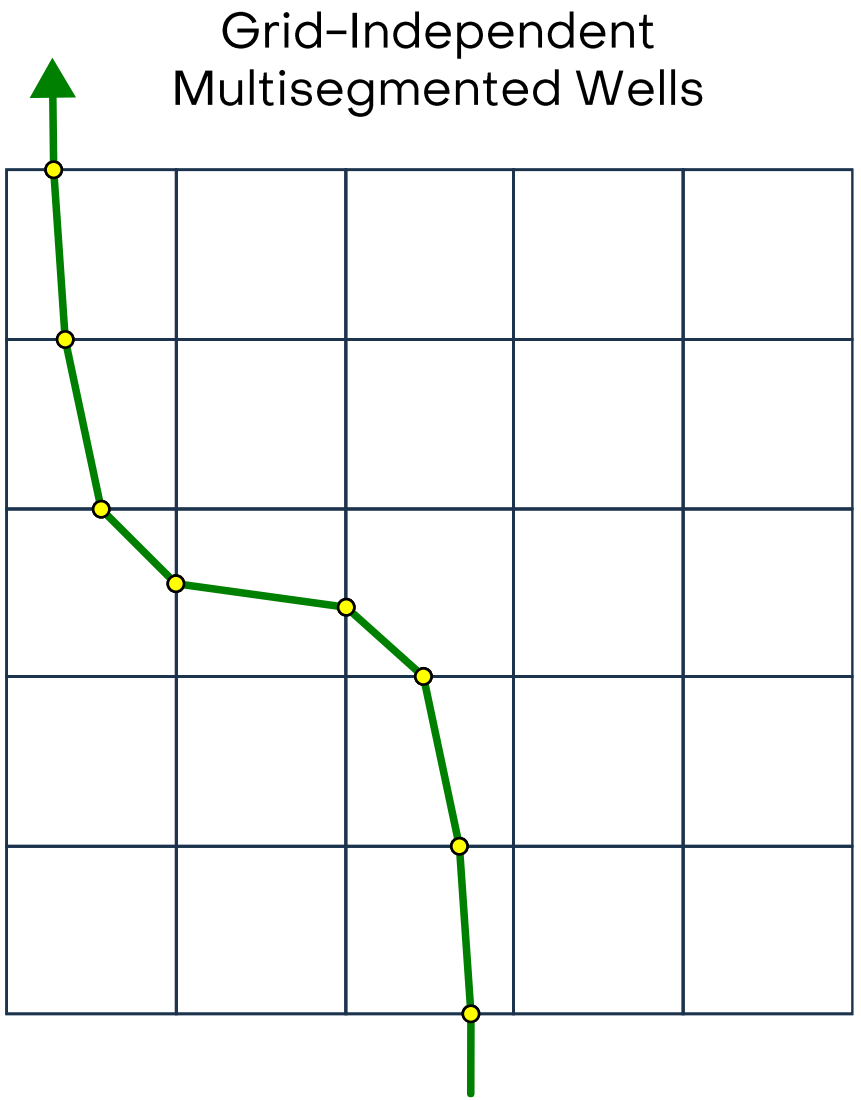
User inputs sampled well geometry

X,Y,Z

WELTRAJ + COMPTRAJ can now transform geometric well description into Multisegmented Wells

Overview of TNO Latest contributions to OPM

Grid-independent Wells



Well Geometry
(X,Y,Z)

User inputs sampled well geometry

X,Y,Z

WELTRAJ + COMPTRAJ can now transform geometric well description into Multisegmented Wells

Overview of TNO Latest contributions to OPM

Grid-independent Wells

```
WELSPECS
-- Item #: 1    2  3 4 5  6
  'PROD''G1' 1* 1*  1*   'OIL' /
  'INJ' 'G1' 1* 1*  8335 'GAS' /
/

WELTRAJ
-- WELL BRANCH_NO X    Y      TVD      MD
'PROD'  1*       11500 12500 -10.0     0.0 /
'PROD'  1*       11500 12500  8425.0   8425.0 /
'INJ'   1*       2500  3500  -100.0    0.0 /
'INJ'   1*       2500  3500   8325.0   8325.0 /
'INJ'   1*       2750  3750   8375.0   8375.0 /
'INJ'   1*       3500  4500   8400.0   8400.0 /
'INJ'   1*       4500  5500   8425.0   8425.0 /
/

--PERF REF is MD or TVD, now assumed MD
COMPTRAJ
-- WELL  BRANCH  PERF     PERF    PERF COMPL STATE SAT    CONN DIAM KH  SKIN D_FACT MSW
-- NAME  NO      TOP      BOT     REF  NO    --    TABLE  FACT --   --  --   --     --
  'PROD' 1*      8325.0   8425.0  1*   1*    1*    1*     1*   0.5  1*  0.1  1*     YES /
  'INJ'  1*      8325.0   8425.0  1*   1*    1*    1*     1*   0.5  1*  0.1  1*     YES /
/
```

WELTRAJ + COMPTRAJ for Multisegmented Wells

The following WELSEGS options have been defaulted for now:

- PRESSURE_COMPONENTS is defaulted to “HF-”
- WELLBORE_VOLUME is defaulted to 1e-5.
- ROUGHNESS is defaulted to 0.0.

PR #4279 – Author: Peter Verveer (Under Review)
Grid-Independent Multisegmented Well

New option

Overview of TNO Latest contributions to OPM

Grid-independent Wells

WELSEGS/COMPSEGS

MULTI-SEGMENT WELL: SEGMENT STRUCTURE

You, 2 weeks ago • Add segmented wells examples

:WELLNAME: SEG : BRN : MAIN : : SEGMENT :TOT LENGTH: DEPTH :T.V. DEPTH:DIA OR F:VFP TAB OR: AREA : VOLUME : P DROP :
: AND : NO : NO : INLET : OUTLET: LENGTH : TO END : CHANGE : AT END : SCALING:ABS ROUGHN: X-SECTN : : MULT :
:SEG TYPE: : :SEGMENT:SEGMENT: METRES : METRES : METRES : METRES : METRES : METRES : M**2 : M3 : FACTOR 1 :
:INJ : 1 : 1 : 2 : 0 : 8325.0 : 8325.0 : 8325.0 : 8325.0 : 0 : 0 : 0 : 0.000 : 1.000 :
: HF-: 2 : : 3 : 1 : 10.000 : 8335.0 : 10.000 : 8335.0 : 0.5000 : 0.000000 : 0.01824 : 0.349 : 1.000 :
: : 3 : : 4 : 2 : 25.000 : 8360.0 : 25.000 : 8360.0 : 0.5000 : 0.000000 : 0.01824 : 0.874 : 1.000 :
: : 4 : : 5 : 3 : 19.166 : 8379.1 : 19.166 : 8379.1 : 0.5000 : 0.000000 : 0.01824 : 0.670 : 1.000 :
: : 5 : : 6 : 4 : 18.750 : 8397.9 : 18.750 : 8397.9 : 0.5000 : 0.000000 : 0.01824 : 0.655 : 1.000 :
: : 6 : : 0 : 5 : 20.833 : 8418.7 : 20.833 : 8418.7 : 0.5000 : 0.000000 : 0.01824 : 0.728 : 1.000 :

WELTRAJ/COMPTRAJ:

MULTI-SEGMENT WELL: SEGMENT STRUCTURE

:WELLNAME: SEG : BRN : MAIN : : SEGMENT :TOT LENGTH: DEPTH :T.V. DEPTH:DIA OR F:VFP TAB OR: AREA : VOLUME : P DROP :
: AND : NO : NO : INLET : OUTLET: LENGTH : TO END : CHANGE : AT END : SCALING:ABS ROUGHN: X-SECTN : : MULT :
:SEG TYPE: : :SEGMENT:SEGMENT: METRES : METRES : METRES : METRES : METRES : METRES : M**2 : M3 : FACTOR 1 :
:INJ : 1 : 1 : 2 : 0 : 8325.0 : 8325.0 : 8325.0 : 8325.0 : 0 : 0 : 0 : 0.000 : 1.000 :
: HF-: 2 : : 3 : 1 : 10.000 : 8335.0 : 10.000 : 8335.0 : 0.5000 : 0.000000 : 0.01824 : 0.349 : 1.000 :
: : 3 : : 4 : 2 : 25.000 : 8360.0 : 25.000 : 8360.0 : 0.5000 : 0.000000 : 0.01824 : 0.874 : 1.000 :
: : 4 : : 5 : 3 : 19.166 : 8379.1 : 19.166 : 8379.1 : 0.5000 : 0.000000 : 0.01824 : 0.670 : 1.000 :
: : 5 : : 6 : 4 : 18.750 : 8397.9 : 18.750 : 8397.9 : 0.5000 : 0.000000 : 0.01824 : 0.655 : 1.000 :
: : 6 : : 0 : 5 : 20.833 : 8418.7 : 20.833 : 8418.7 : 0.5000 : 0.000000 : 0.01824 : 0.728 : 1.000 :

1: The pressure drop multiplier is not implemented in opm/flow and will always show the default value 1.0.

MULTI-SEGMENT WELL: CONNECTION DATA

: WELL : CONNECTION:SEGMENT: BRANCH : TUB LENGTH: TUB LENGTH: TUB LENGTH: TUB LENGTH:CONNECTION: SEGMENT : GRID BLOCK:
: NAME : : NUMBER: ID :START PERFS: END PERFS :CENTR PERFS: END SEGMT : DEPTH : DEPTH : DEPTH :
: : : : : METRES : METRES : METRES : METRES : METRES : METRES : METRES :
: INJ : 1, 1, 1: 2 : 1 : 8325.0 : 8345.0 : 8335.0 : 8335.0 : 8335.0 : 8335.0 : 8335.0 :
: : 1, 1, 2: 3 : 1 : 8345.0 : 8375.0 : 8360.0 : 8360.0 : 8360.0 : 8360.0 : 8360.0 :
: : 1, 1, 3: 4 : 1 : 8375.0 : 8383.3 : 8379.1 : 8379.1 : 8379.1 : 8379.1 : 8400.0 :
: : 2, 2, 3: 5 : 1 : 8383.3 : 8412.5 : 8397.9 : 8397.9 : 8397.9 : 8397.9 : 8400.0 :
: : 3, 3, 3: 6 : 1 : 8412.5 : 8425.0 : 8418.7 : 8418.7 : 8418.7 : 8418.7 : 8400.0 :

Next Steps:

- Add more entries to keywords for currently defaulted options (PRESSURE_COMPONENTS, WELLBORE_VOLUME, ROUGHNESS)
- Enable multi-lateral wells (multiple branches)
- Add option to pipe calculated connections (WELSPECS + COMPDAT) and segments (WELSEGS + COMPSEGS) to separate file

Overview of TNO Latest contributions to OPM

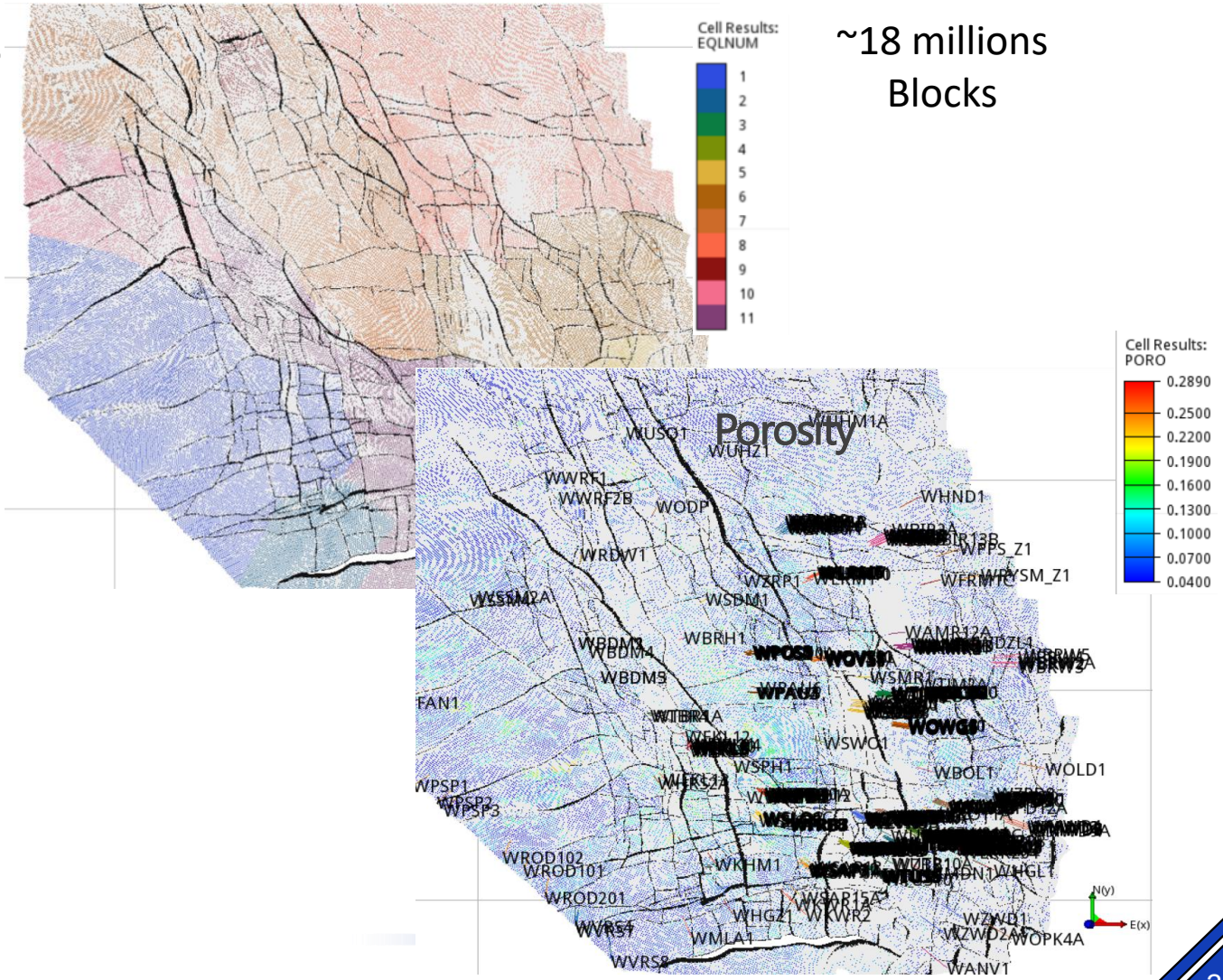
Groningen Model

OPM needs an open access large-scale model case for performance benchmarking.

Model specifications

- Grid (I×J×K): 522×629×55 (~49 km × 49 km)
- 365 wells
- 11 regions with different rock types and relative permeability curves
- SATNUM, PVT tables and different initialization regions EQLNUM PVTNUM and FIPNUM are copied from EQLNUM directly
- Carter-Tracey influence table for finite linear aquifer.
- Pseudo-wells aquifer: 10 wells
- Water injection wells: 5 wells
- Observation wells: 35 wells

Equilibrium regions



~18 millions Blocks

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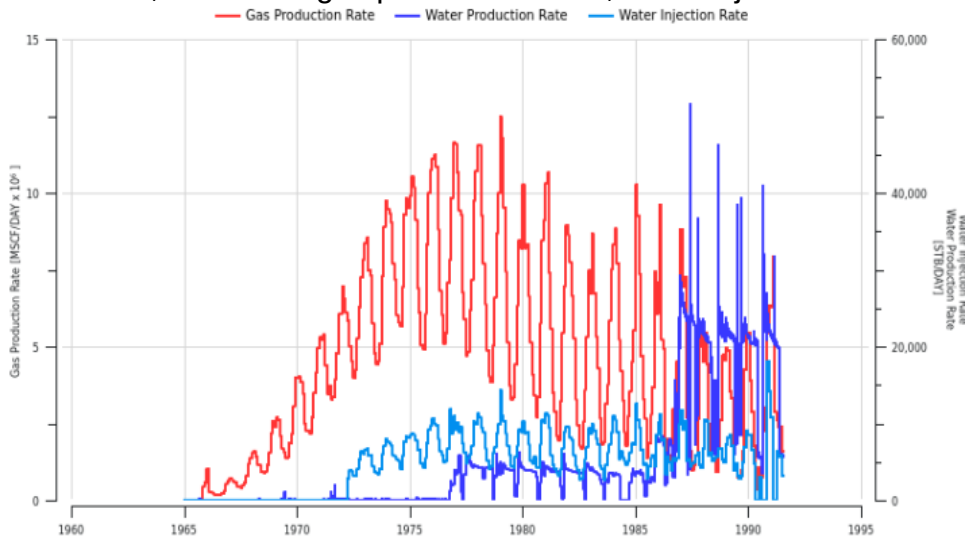
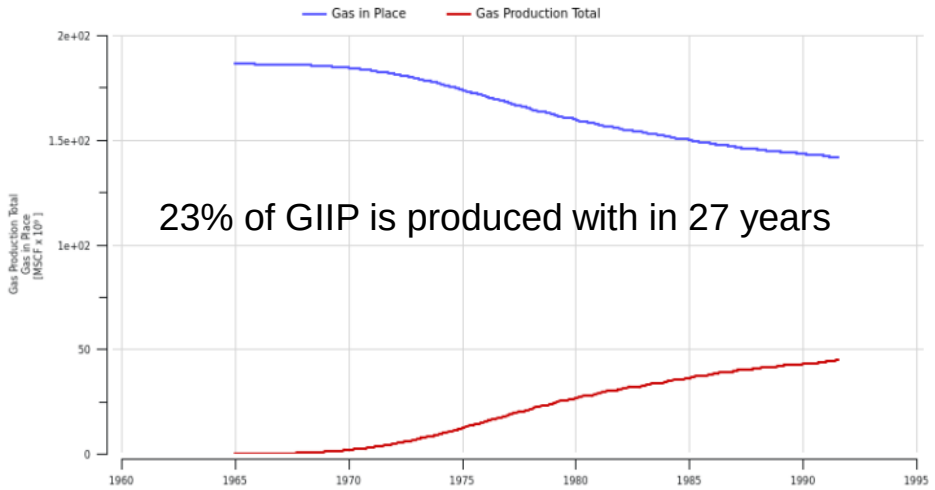
Groningen Model

It is possible to run the model in reference simulator after cleaning.

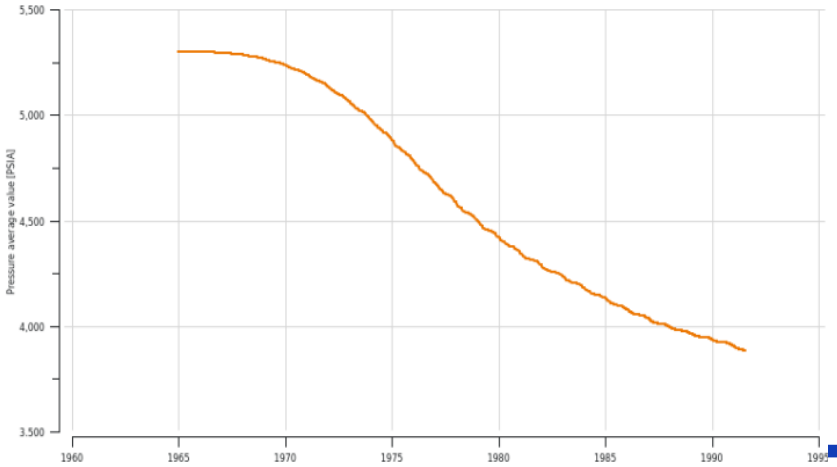
1965-2023, water and gas production rates, water injection rate



Region	Initial pressure (psia)	Gas in place (MSCF)
1	5779	2,05E+10
2	5600	1,80E+09
3	5140	3,72E+06
4	5175	6,92E+09
5	5048	4,19E+09
6	5087	1,92E+10
7	5411	4,94E+10
8	5172	5,38E+10
9	5190	7,70E+09
10	5760	2,61E+10
11	5090	7,13E+10



1965-2023, average reservoir pressure,



Field gas in place: 2.61×10^{11} MSCF
Average field pressure: 5289 psia
Water in place: 2.79×10^{11} STB

Overview of TNO Latest contributions to OPM

Groningen Model

Creating corner-point grid from keywords COORD, ZCORN and others
Initializing Carter Tracey aquifers from AQUCT in /remotefs/ka_uprojects/060/4/47222_unix/Users/Khoshnevis/GRONINGEN-OPM/opm-2025/AQUIFER/AQF_CT_NewFace_AdjYESNO.INC line 16
2 fluid phases are active
Initializing aquifer connections from AQUANCON in /remotefs/ka_uprojects/060/4/47222_unix/Users/Khoshnevis/GRONINGEN-OPM/opm-2025/AQUIFER/AQF_CT_NewFace_AdjYESNO.INC line 390

Warning: Problem with keyword AQUANCON
In /remotefs/ka_uprojects/060/4/47222_unix/Users/Khoshnevis/GRONINGEN-OPM/opm-2025/AQUIFER/AQF_CT_NewFace_AdjYESNO.INC line 390
Connection to inactive cell (131,55,4) is ignored
...
Warning: Problem with keyword AQUANCON
In /remotefs/ka_uprojects/060/4/47222_unix/Users/Khoshnevis/GRONINGEN-OPM/opm-2025/AQUIFER/AQF_CT_NewFace_AdjYESNO.INC line 390
Connection to inactive cell (131,58,4) is ignored

Warning: Message limit reached for message tag: AQUANCON_INACTIVE_CELL

Warning: Problem with keyword AQUANCON
In /remotefs/ka_uprojects/060/4/47222_unix/Users/Khoshnevis/GRONINGEN-OPM/opm-2025/AQUIFER/AQF_CT_NewFace_AdjYESNO.INC line 390
20613 connections to inactive cells are ignored

Loading faults from FAULTS in /remotefs/ka_uprojects/060/4/47222_unix/Users/Khoshnevis/GRONINGEN-OPM/opm-2025/GRID/ECL.flt line 9

Processing dynamic information from
ECLDECKONEDAYNO2.DATA line 366
Initializing report step 0/966 at 1964-12-31 0 DAYS line 366
Processing keyword TUNING at line 377
Reading from: /remotefs/ka_uprojects/060/4/47222_unix/Users/Khoshnevis/GRONINGEN-OPM/opm-2025/WELLS/18M_WELLSPEC.INC line 1
Processing keyword WELSPECS at line 1
Reading from: /remotefs/ka_uprojects/060/4/47222_unix/Users/Khoshnevis/GRONINGEN-OPM/opm-2025/WELLS/WLIST.INC line 2
Processing keyword WLIST at line 2
Reading from: /remotefs/ka_uprojects/060/4/47222_unix/Users/Khoshnevis/GRONINGEN-OPM/opm-2025/WELLS/18M_COMPDAT.INC line 1
Processing keyword COMPDAT at line 1
Reading from: /remotefs/ka_uprojects/060/4/47222_unix/Users/Khoshnevis/GRONINGEN-OPM/opm-2025/WELLS/WCON.INC line 3
Processing keyword WCONHIST at line 3
Processing keyword WCONINJH at line 369
Processing keyword WELTARG at line 379
Complete report step 1 (1 DAYS) at 1965-01-01 (0 DAYS)

OPM Groningen model Error!

Reading from: /remotefs/ka_uprojects/060/4/47222_unix/Users/Khoshnevis/GRONINGEN-OPM/opm-2025/WELLS/SCHED_CRAT.INC line 2
Initializing report step 2/966 at 1965-01-01 (0 DAYS) line 2
Processing keyword COMPDAT at line 7
Processing keyword COMPDAT at line 13
Processing keyword COMPDAT at line 48
Processing keyword COMPDAT at line 83
Processing keyword COMPDAT at line 113
Processing keyword COMPDAT at line 141
Processing keyword COMPDAT at line 175
Processing keyword COMPDAT at line 192
Processing keyword COMPDAT at line 211
Processing keyword COMPDAT at line 250
Processing keyword COMPDAT at line 285
Complete report step 2 (1 DAYS) at 1965-01-02 (1 DAYS)

Initializing report step 3/966 at 1965-01-02 (1 DAYS) line 297
Processing keyword WCONHIST at line 302
Processing keyword WCONINJH at line 667
Complete report step 3 (29 DAYS) at 1965-01-31 (2 DAYS)

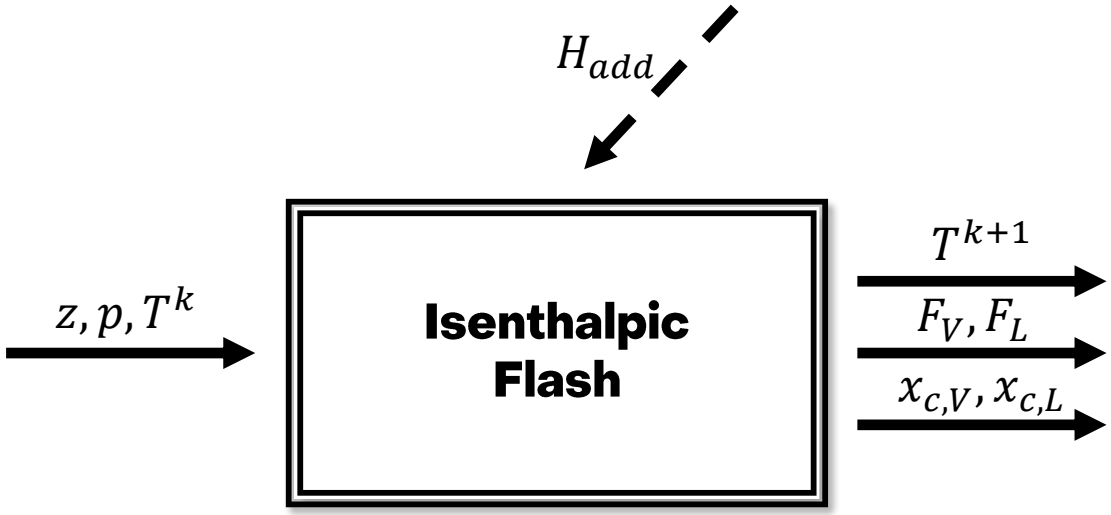
Initializing report step 4/966 at 1965-01-31 (2 DAYS) line 678
Processing keyword COMPDAT at line 683
Processing keyword COMPDAT at line 693
Complete report step 4 (1 DAYS) at 1965-02-01 (31 DAYS)

Initializing report step 5/966 at 1965-02-01 (31 DAYS) line 717
Processing keyword WCONHIST at line 722
Processing keyword WCONINJH at line 1087
Complete report step 5 (28 DAYS) at 1965-03-01 (32 DAYS)

Processing grid
flow: /tmp/ra-team-reservoir/spack-stage/spack-stage-opm-grid-2024.04-lteo3vg6wg7phdpwhqlcg6tnw7br2k6u/spack-src/opm/grid/cpgrid/EntityRep.hpp:121: void Dune::cpgrid::EntityRep<codim>::setValue(int, bool) [with int codim = 0]: Assertion `index_arg >= 0' failed.
/cm/local/apps/slurm/var/spool/job1803115/slurm_script: line 8: 1059927 Aborted (core dumped) flow ECLDECKONEDAYNO2.DATA

Overview of TNO Latest contributions to OPM

Isenthalpic Flash



$$H_{spec} = H_{in} + H_{add}$$

$z, p, H_{spec} \rightarrow$ Remain Constant

Why Isenthalpic Flash?

Accurately models temperature-varying environments:

Essential when:

- Fluids exhibit narrow boiling point
- Even small temperature changes cause significant phase transitions, such as Enhanced Oil Recovery (EOR), Carbon Capture and Storage (CCS)
- Temperature is a secondary variable

Isenthalpic Flash Complexity

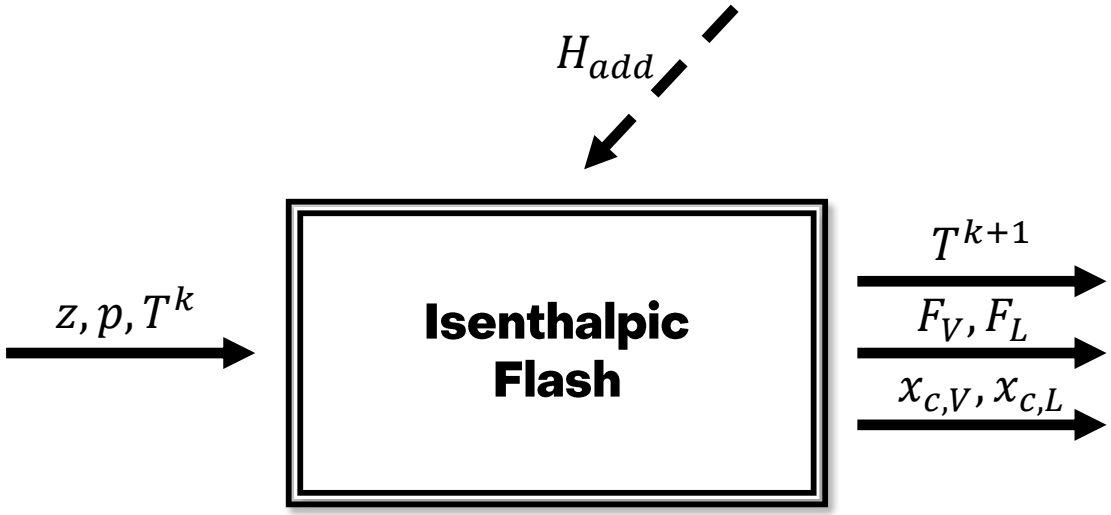
A saddle-point problem

🔽 Minimizes Gibbs free energy

🔼 Maximizes entropy

Overview of TNO Latest contributions to OPM

Isenthalpic Flash



$$H_{spec} = H_{in} + H_{add}$$

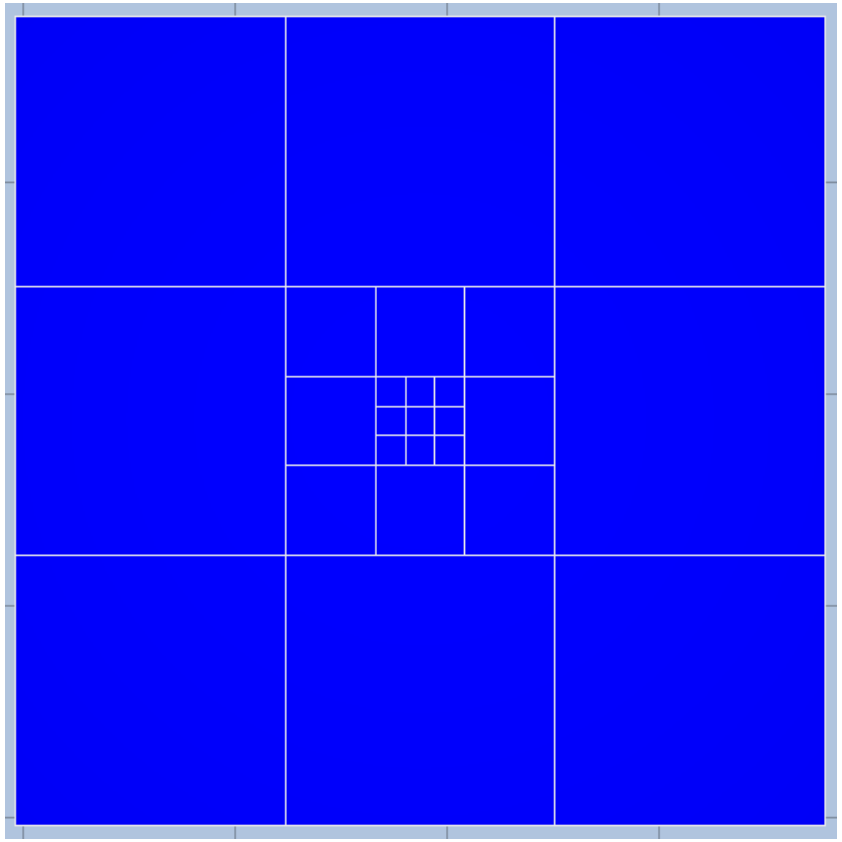
$z, p, H_{spec} \rightarrow$ Remain Constant

What have we done so far?

- TNO, in collaboration with SINTEF, has conducted a thorough review to enable the integration of PH-Flash into the OPM framework.
- Performed a comprehensive literature review to formulate a robust and efficient numerical algorithm.
- Analyzed the existing flash algorithms in OPM to identify integration points and necessary adaptations.
- Developed a detailed pseudocode, outlining the required modifications for implementing the initial PH-Flash prototype within OPM.

Overview of TNO Latest contributions to OPM

Integrating LGR into Simulator framework



Specific presentation on this topic tomorrow

Overview of TNO Latest contributions to OPM

Artur Castiel
Eduardo Barros, Negar Khoshnevis, Paul Egberts, Peter Verveer

May 26, 2025