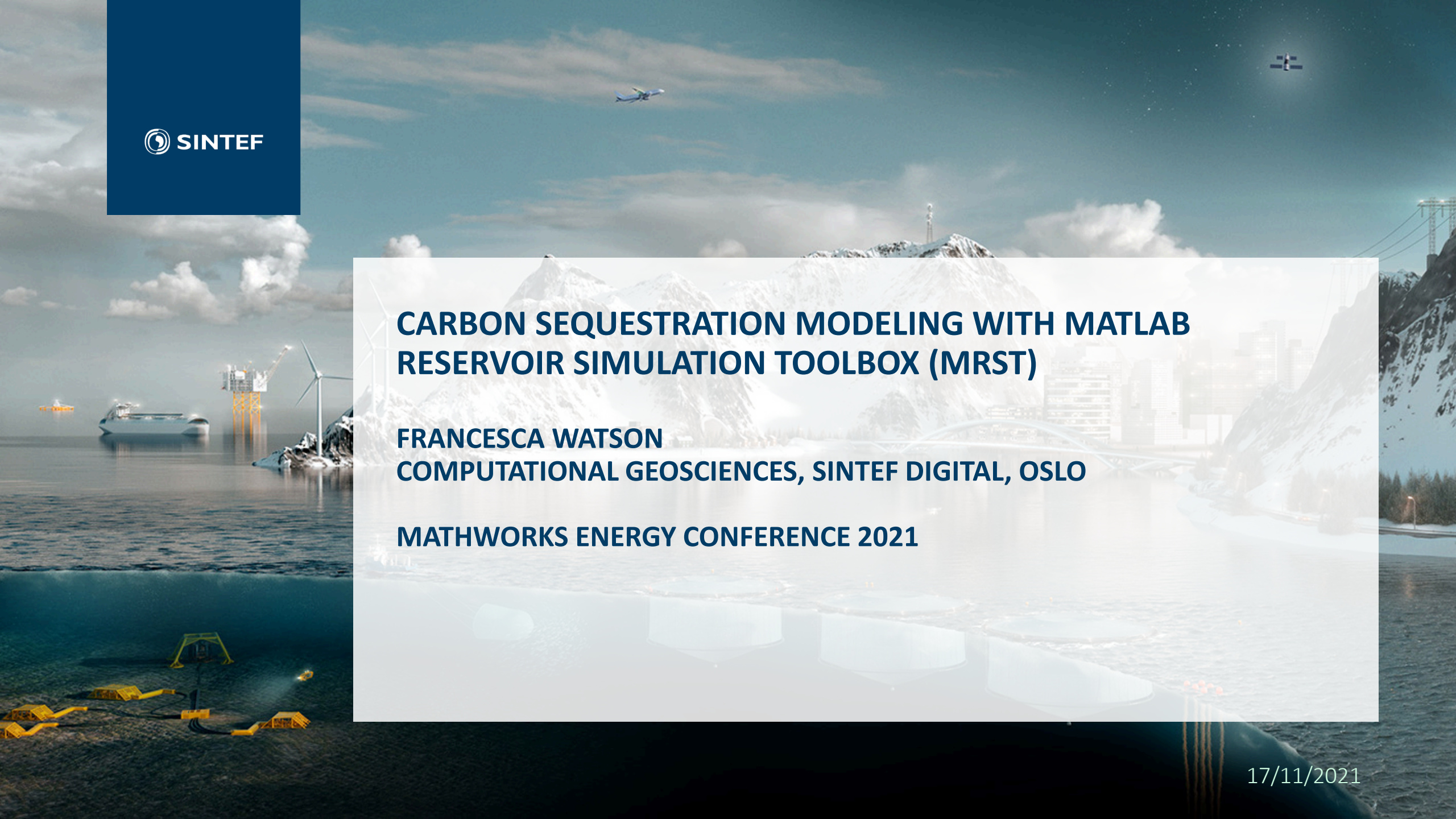

CARBON SEQUESTRATION MODELING WITH MATLAB RESERVOIR SIMULATION TOOLBOX (MRST)

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Overview

- Introduction to MRST
- Introduction to co2lab
- MATLAB Carbon Sequestration Reference application

MATLAB Reservoir Simulation Toolbox (MRST)

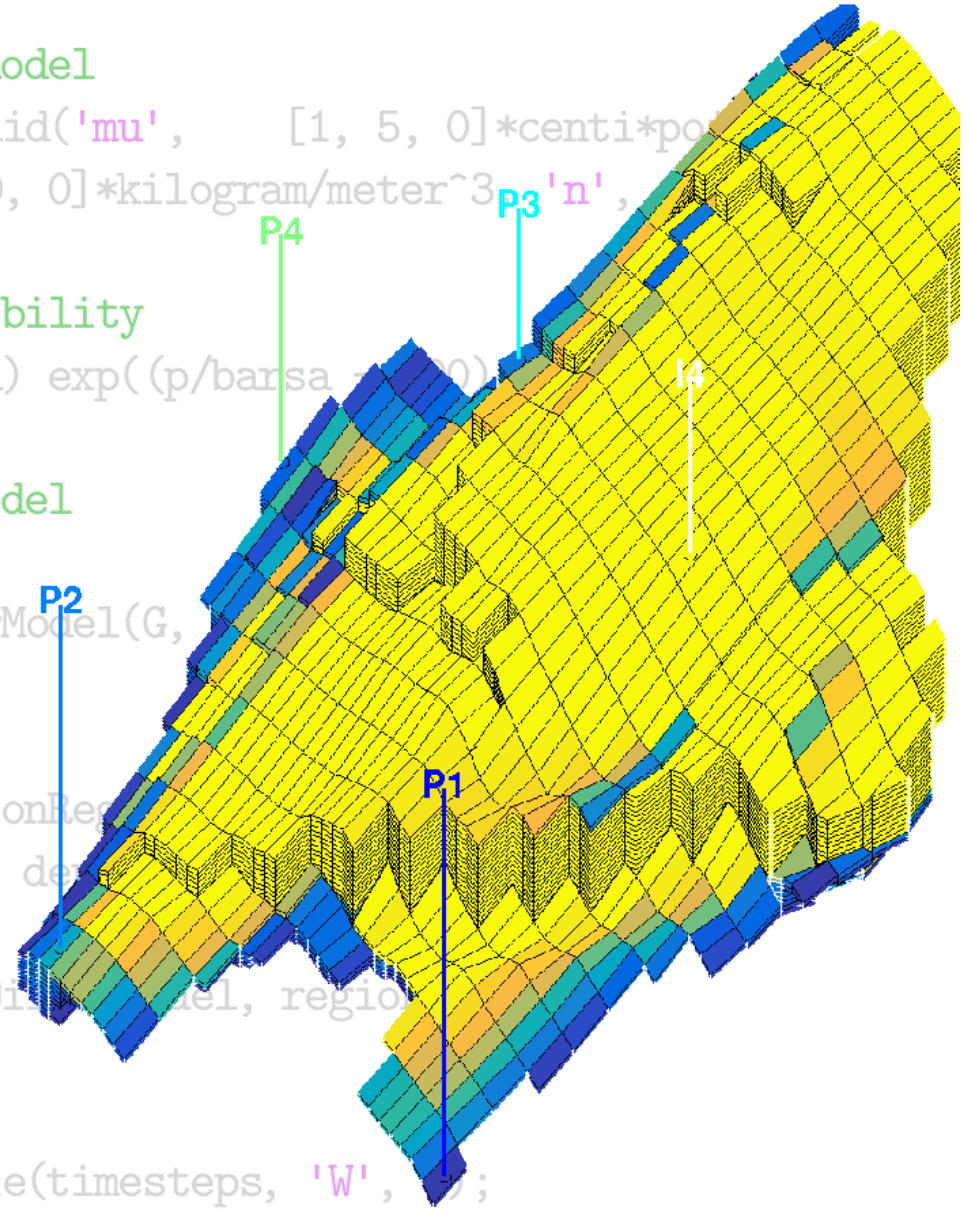
Transforming research on reservoir modelling

- Open-source tools for reservoir simulation

- Unique prototyping platform
- Standard industry data formats
- Includes full simulators
- State-of-the-art methods
- Fully differentiable
- C/C++ acceleration

- Used all over the world
- 25.000+ unique downloads
- 200 master/PhD theses
- 450 external scientific papers
- Two open access textbooks

```
% Three-phase template model
fluid = initSimpleADIFluid('mu',    [1, 5, 0]*centi*po
    'rho',    [1000, 700, 0]*kilogram/meter^3,'n',

% Constant oil compressibility
fluid.bO = @(p, varargin) exp((p/barsa

% Construct reservoir model
gravity reset on
model = TwoPhaseOilWaterModel(G,

%% Define initial state
region = getInitializationRe
        'datum_depth', de

state0 = initStateBlackOi

% Define schedule
schedule = simpleSchedule(timesteps, 'W',
```

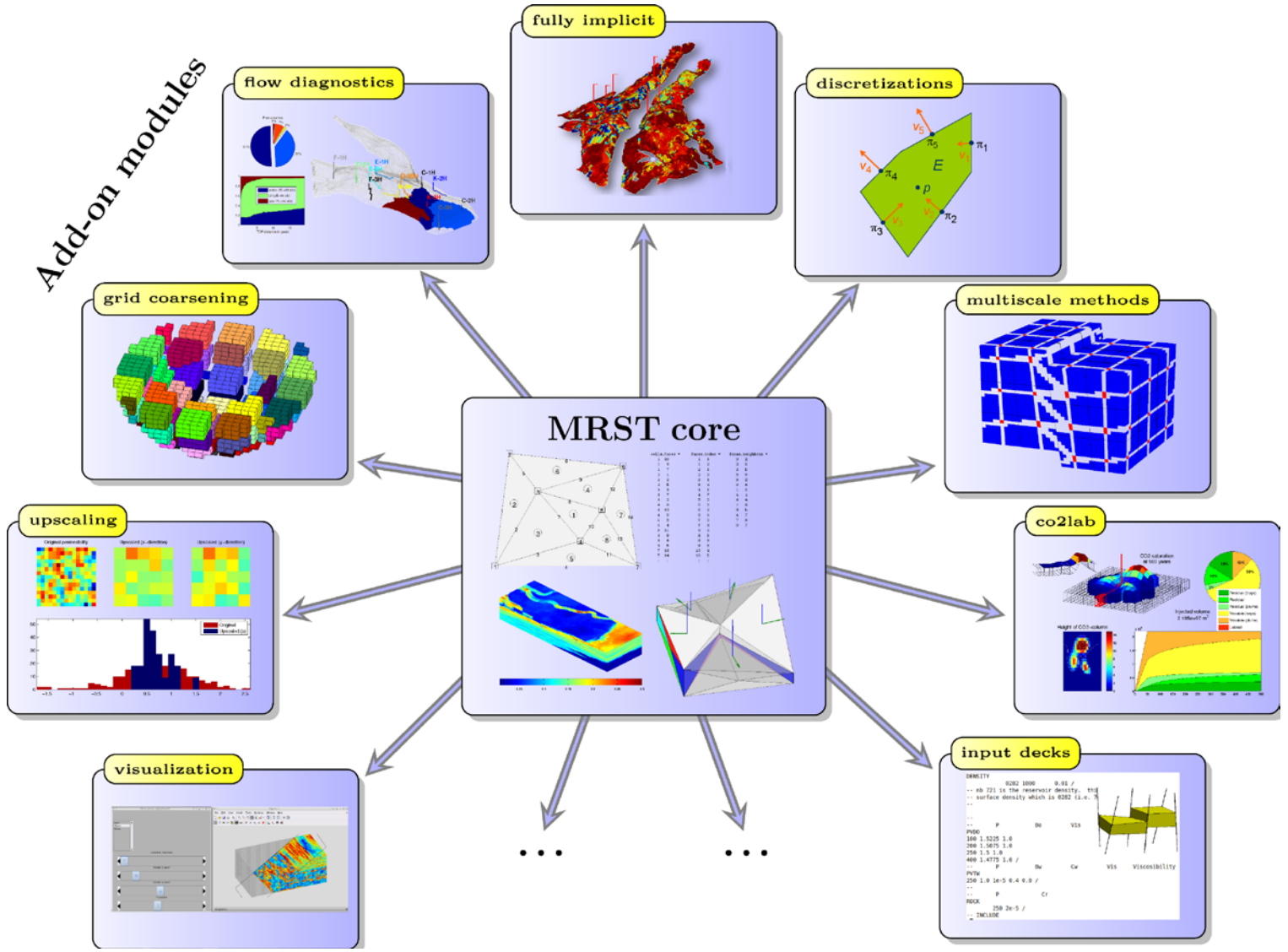


http://www.mrst.no

MATLAB Reservoir Simulation Toolbox (MRST)

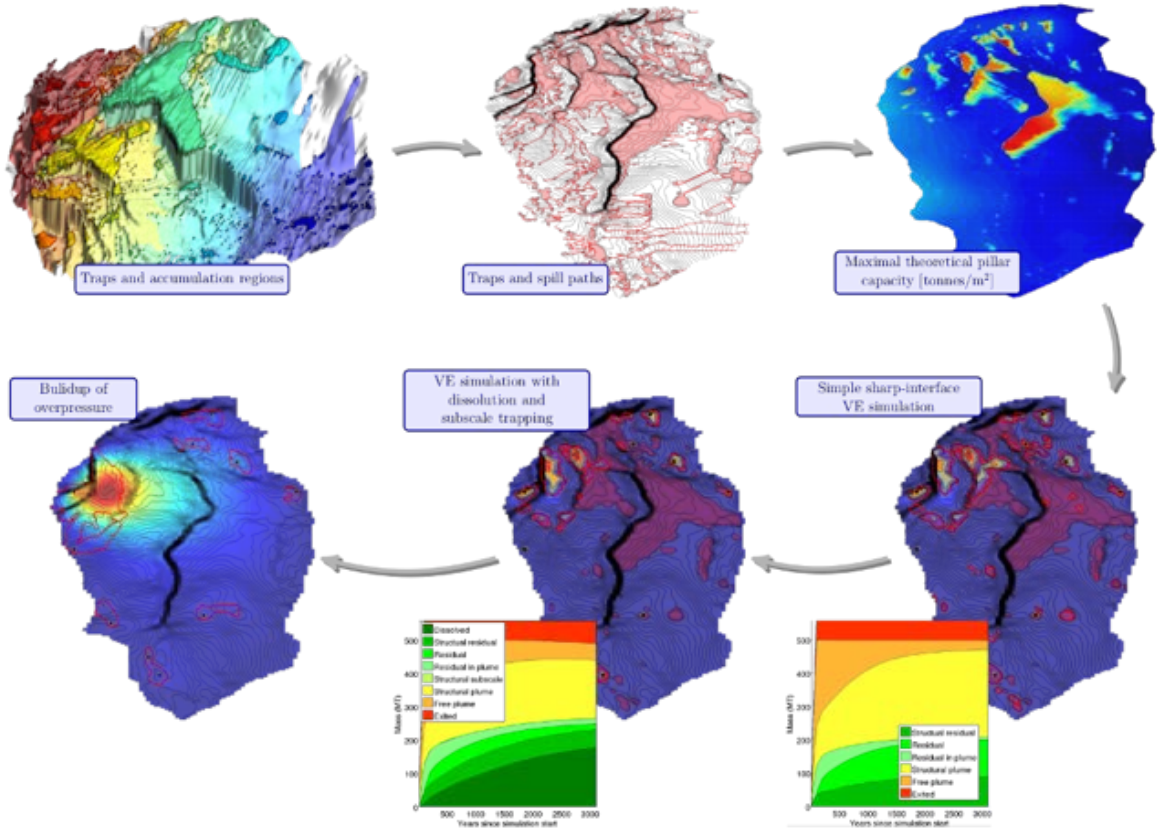
Transforming research on reservoir modelling

- Modular design:
  - small core
  - semi-independent modules
  - in-source documentation like in MATLAB
  - code examples and / or tutorials for each module
  - 60 modules in mrst2021b
- Community code:
  - external modules contributed by users from different institutions



http://www.mrst.no

MRST co2lab

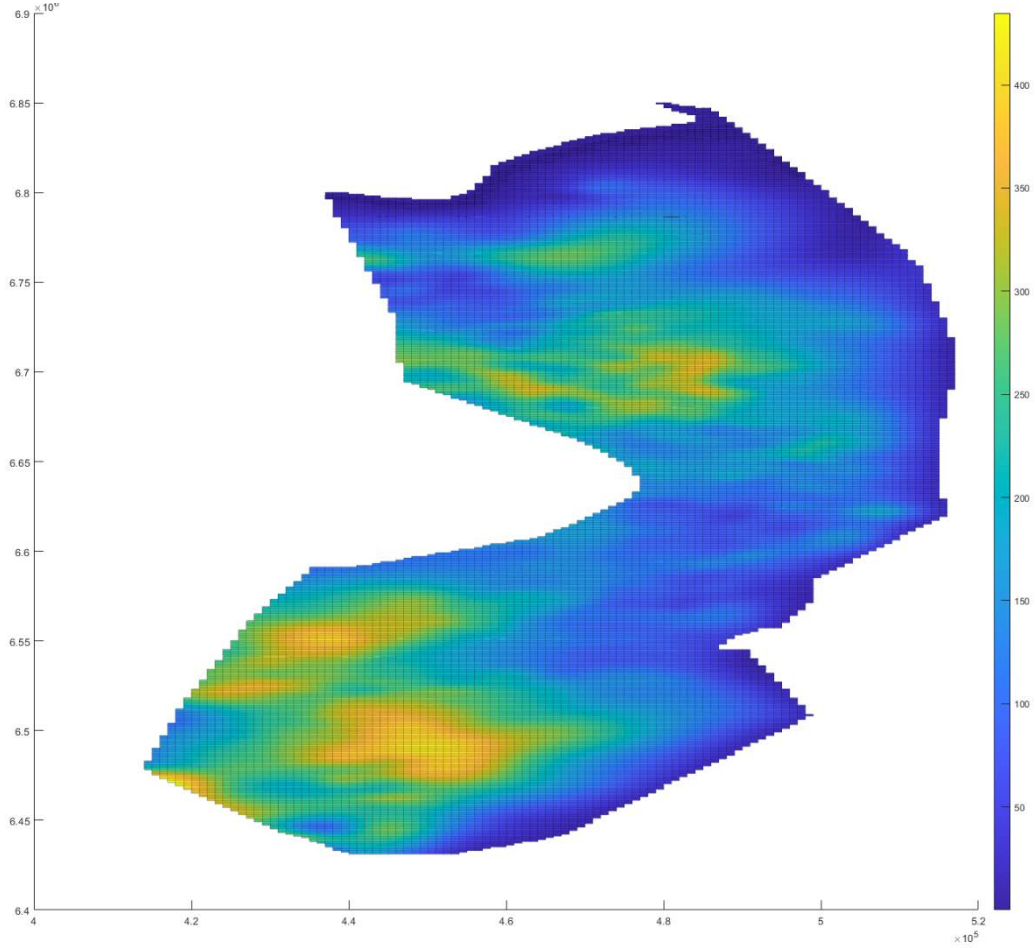


- Rapid simulation technology to study long-term behaviour of stored CO2 - Vertical equilibrium modelling.
- Easy to use, intuitive toolchain.
- Backed by decades of academic research and development in CO2 storage modelling.
- Interactively explore geological formations from the Norwegian Continental Shelf
- Visualize migration paths
- Compute trapping capacities for structural, residual, and solubility trapping.
- Analyze pressure build-up and plume migration
- Optimize the placement of injection points and injection schedules.

https://www.sintef.no/projectweb/mrst/modules/co2lab/

Download free MATLAB Carbon Sequestration Model

- ✓ Work with carbon storage in large-scale aquifers
- ✓ Go from regional-scale estimates to detailed characterization using interactive user interfaces
- ✓ Perform static capacity estimates, basic analysis of CO2 trapping mechanisms and interactive simulation of CO2 injection into a reservoir
- ✓ Vary simulation parameters such as well locations, injection rates, and boundary conditions using GUIs
- ✓ Set up a detailed simulation of a particular CO2 injection site



https://www.mathworks.com/campaigns/offerings/matlab-carbon-sequestration-reference-application.html

SINTEF

Technology for a better society