SLIM

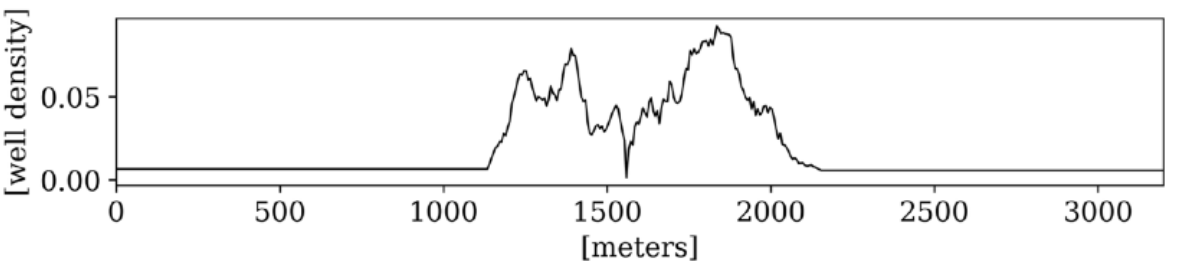
CO2 storage project life cycle

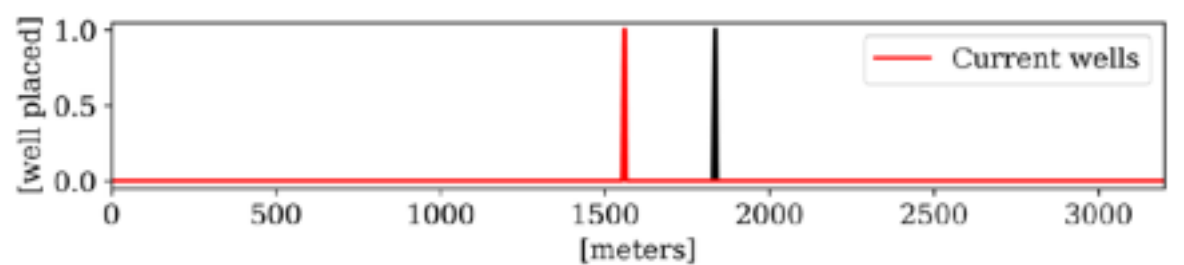
Drill well using optimal well density

Collect field data $\mathbf{y}_{t+1}^{\mathrm{o}}$ w/ optimal well

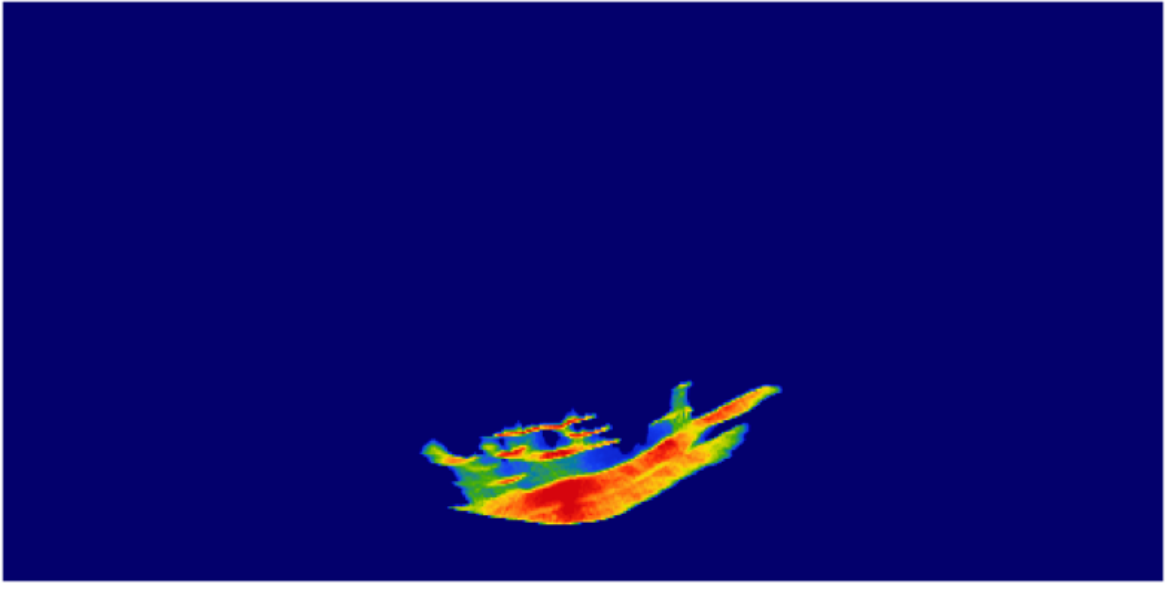
Fluid flow simulations

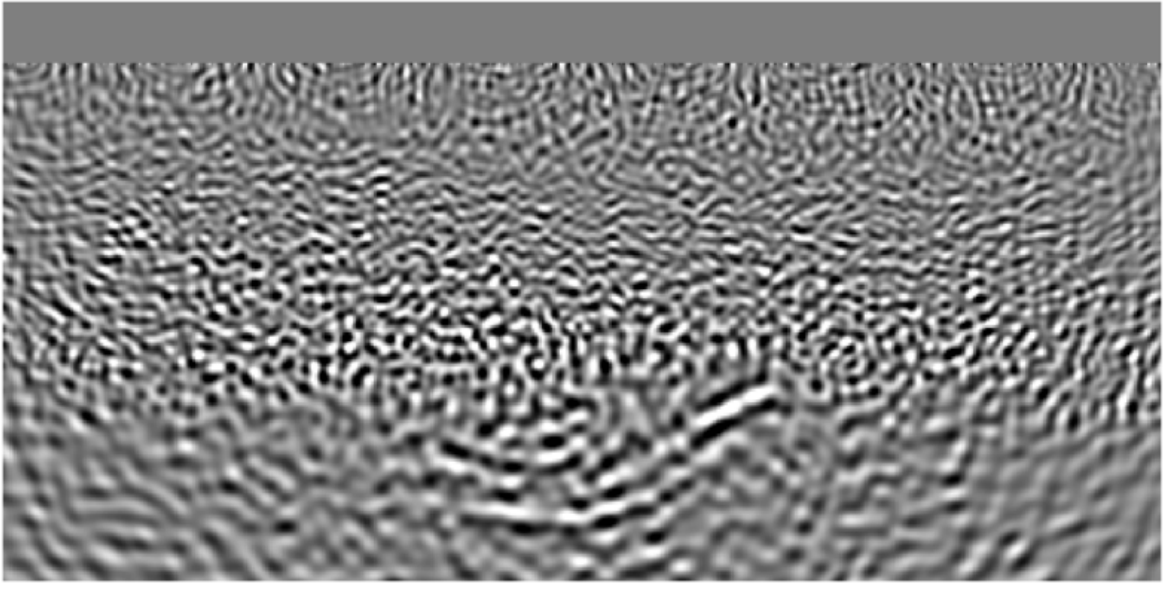
Synthetic observations

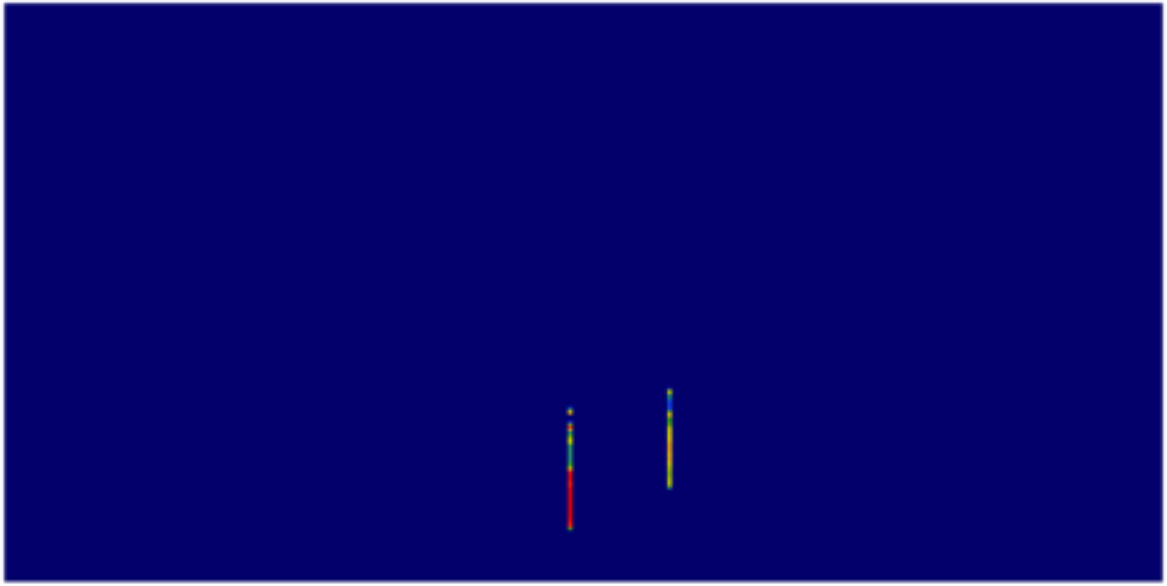

[well density]
0.05
0.00
0
500
1000
1500
2000
2500
3000
[meters]

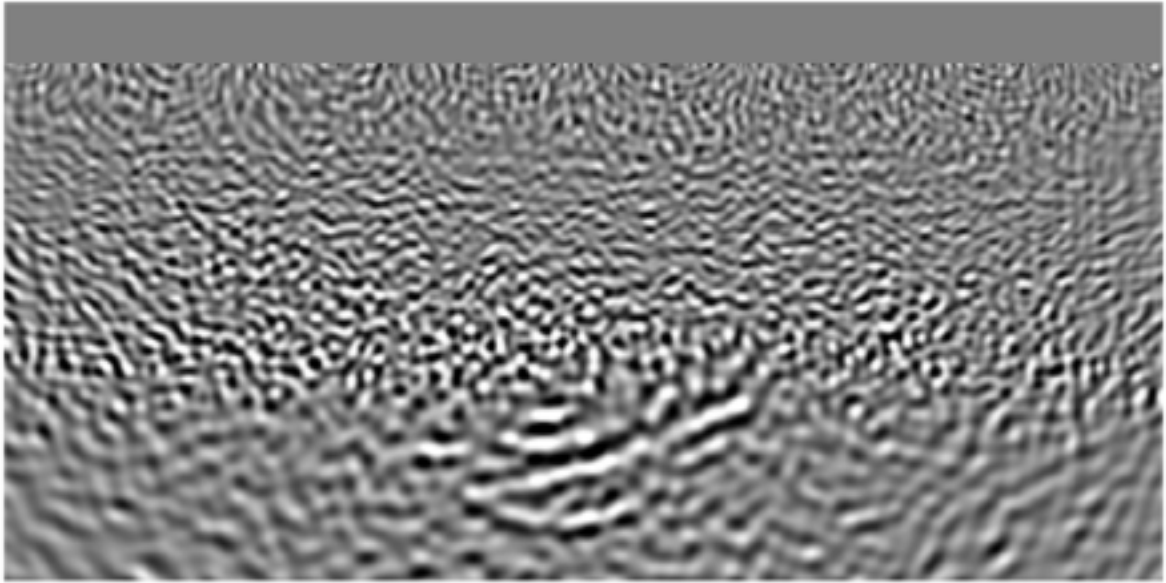

[well placed]
1.0
0.5
0.0
0
500
1000
1500
2000
2500
3000
[meters]
Current wells

Field observation







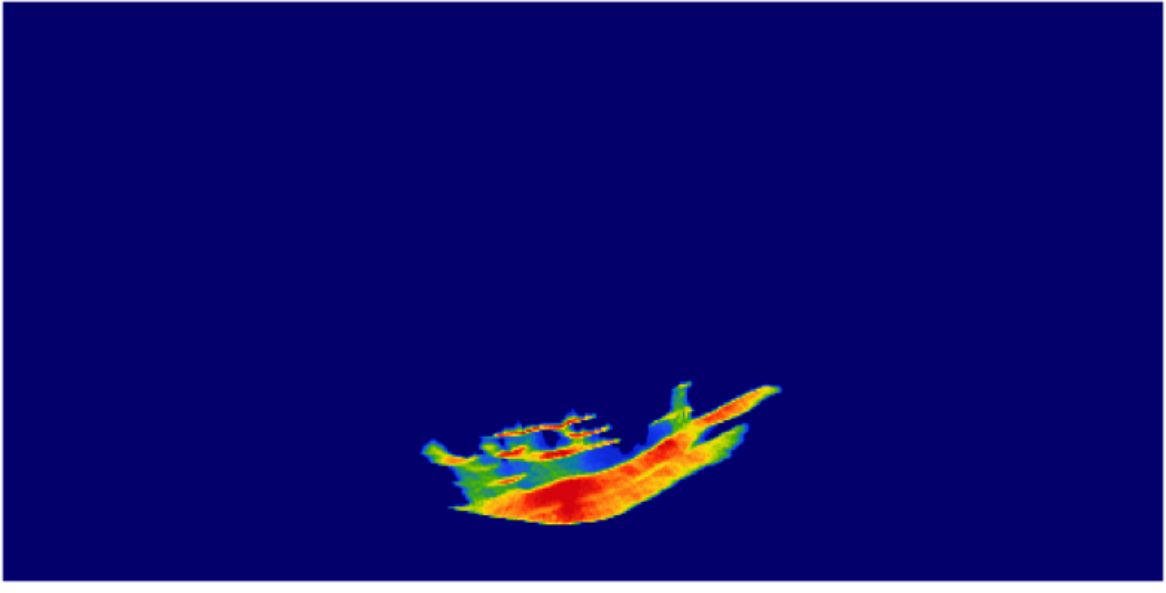


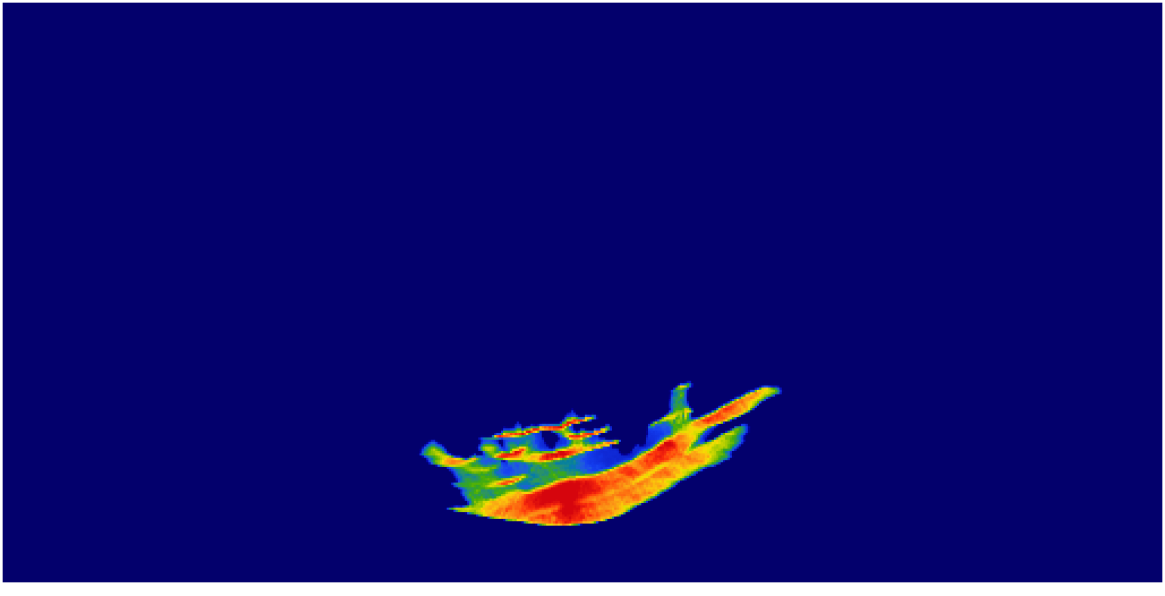
Prior samples $p(\mathbf{x}_0)$

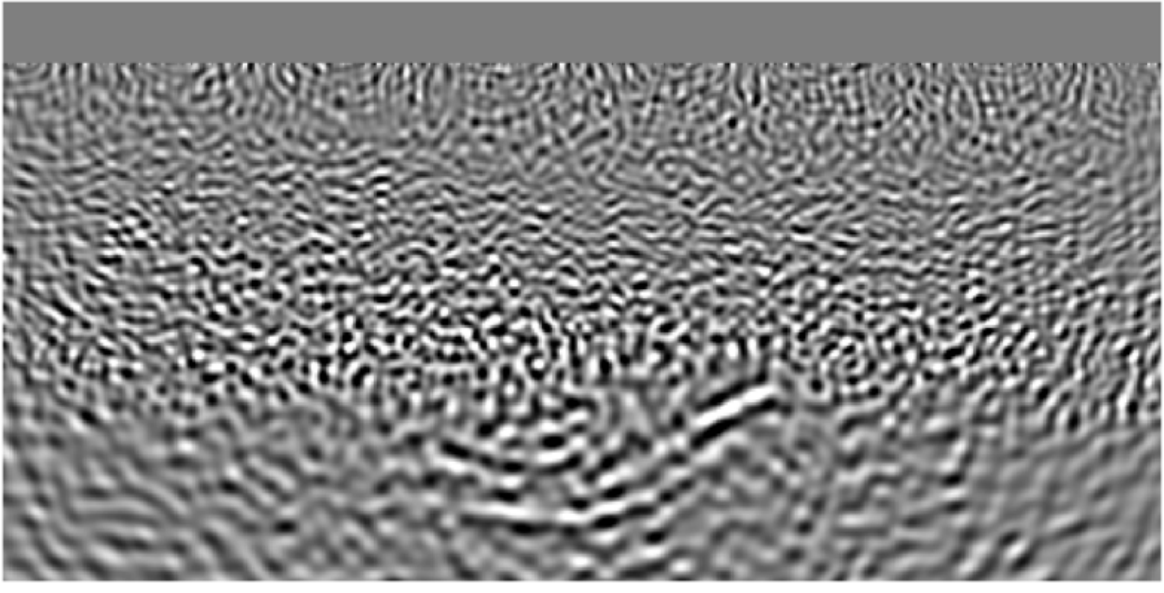
Forecasted plumes $p(\mathbf{x}_{k+1} \mid \mathbf{x}_k)$

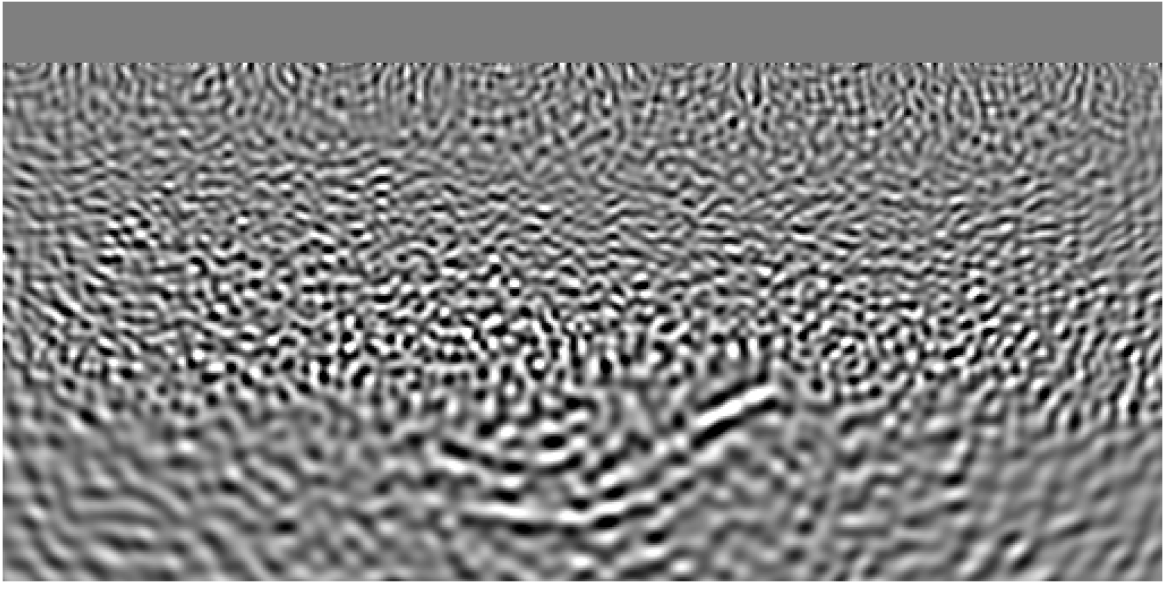
Train inference network and
well design using pairs $p(\mathbf{x}_{k+1}, \mathbf{y}_{k+1})$

Outputs: posterior sampler $p_{\hat{\theta}}(\mathbf{x}_{k+1} \mid \mathbf{y}_{k+1})$ and optimal well density



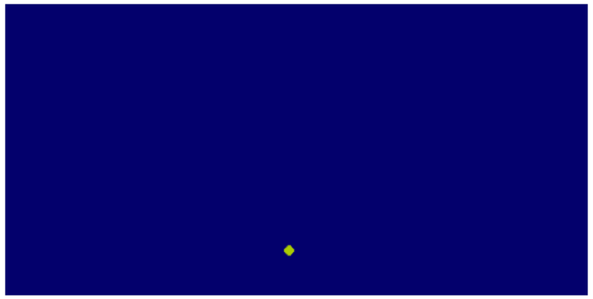






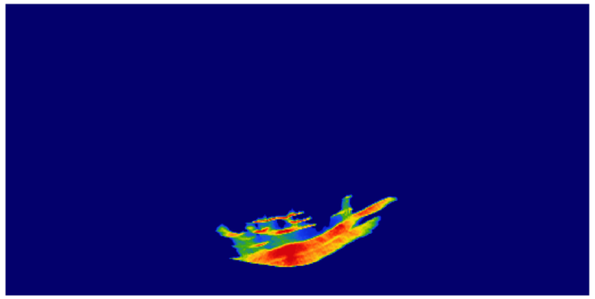
CO2 storage project life cycle

Prior samples $p(\mathbf{x}_0)$



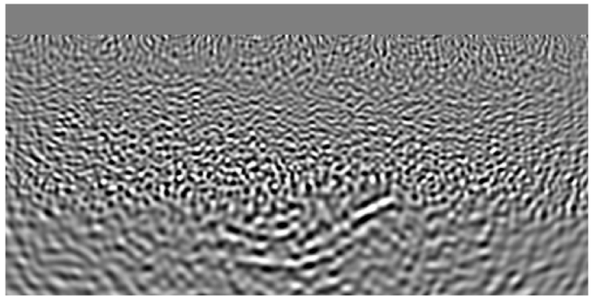
Fluid flow simulations

Forecasted plumes $p(\mathbf{x}_{k+1} \,|\, \mathbf{x}_k)$

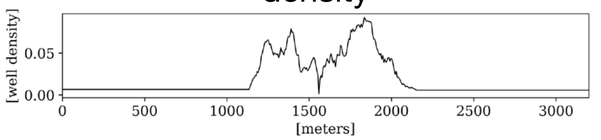


Synthetic observations

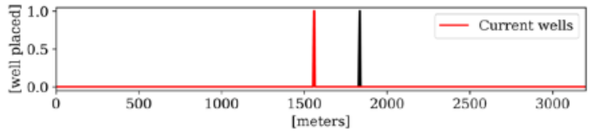
Train inference network and well design using pairs $p(\mathbf{x}_{k+1}, \mathbf{y}_{k+1})$



Outputs: posterior sampler $p_{\hat{\theta}}(\mathbf{x}_{k+1} \,|\, \mathbf{y}_{k+1})$ and optimal well density

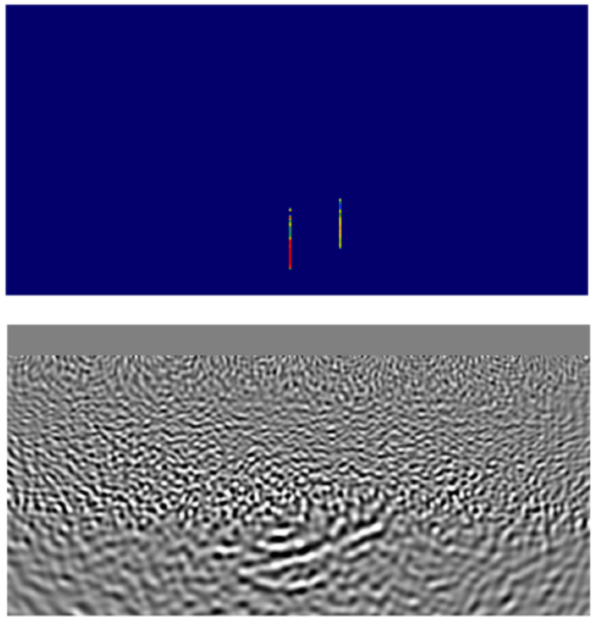


Drill well using optimal well density



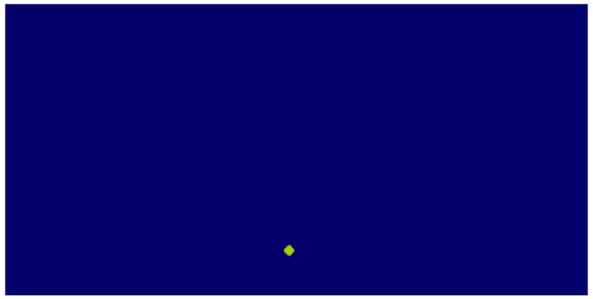
Field observation

Collect field data $\mathbf{y}^{\mathrm{o}}_{t+1}$ w/ optimal well



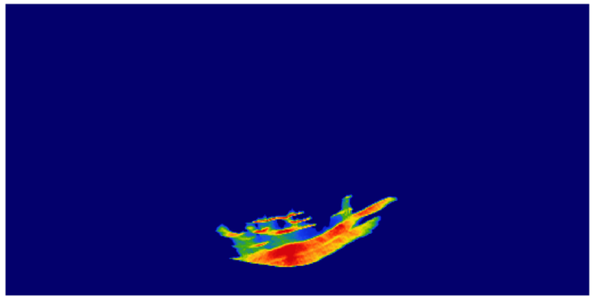
CO2 storage project life cycle

Prior samples $p(\mathbf{x}_0)$



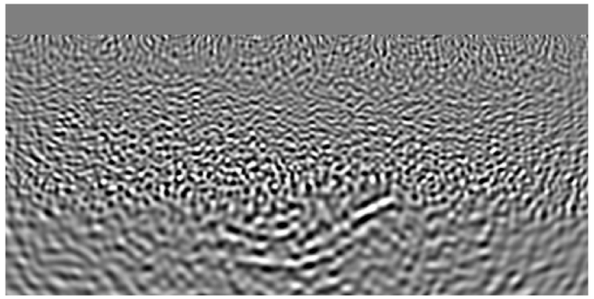
Fluid flow simulations

Forecasted plumes $p(\mathbf{x}_{k+1} \,|\, \mathbf{x}_k)$

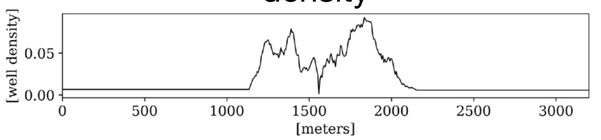


Synthetic observations

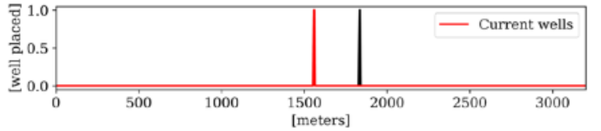
Train inference network and well design using pairs $p(\mathbf{x}_{k+1}, \mathbf{y}_{k+1})$



Outputs: posterior sampler $p_{\hat{\theta}}(\mathbf{x}_{k+1} \,|\, \mathbf{y}_{k+1})$ and optimal well density

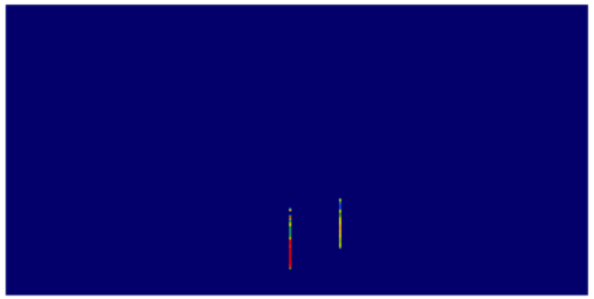


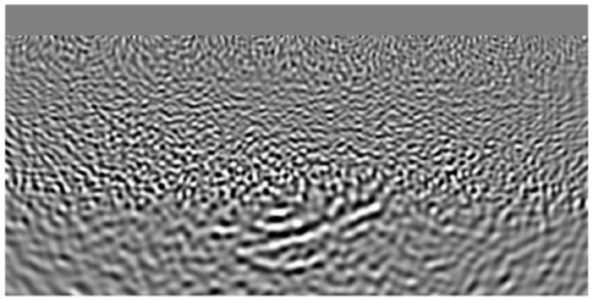
Drill well using optimal well density



Field observation

Collect field data $\mathbf{y}^{\mathrm{o}}_{t+1}$ w/ optimal well





Posterior inference

Inference from field data $p_{\hat{\theta}}(\mathbf{x}_{t+1} \,|\, \mathbf{y}^{\mathrm{o}}_{t+1})$