

Welcome!

The program will begin soon.
You will not hear audio until we begin.

SPE Reservoir Technologies of the 21st century Core Analysis Panel Session

Old Challenges and New Opportunities

SPE Webinars are Sponsored by:

SPE
SPE Foundation

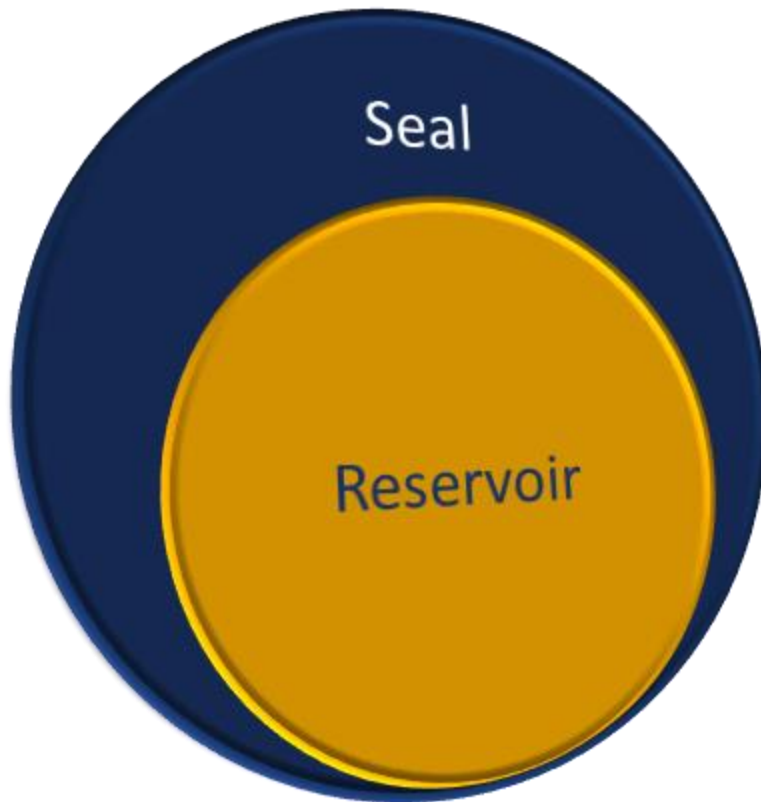
TOPIC 1

New energy CCUS and Hydrogen challenges and development

Jules Reed
Denis Klemin

CCUS and Hydrogen

New energy CCUS + H2 challenges and development



Seal Unit

- Seal capacity
 - Strength / Threshold
- Seal integrity
 - Yield point - Failure stress
- Future properties - CO₂ impact (time-based)
 - Diffusion rates

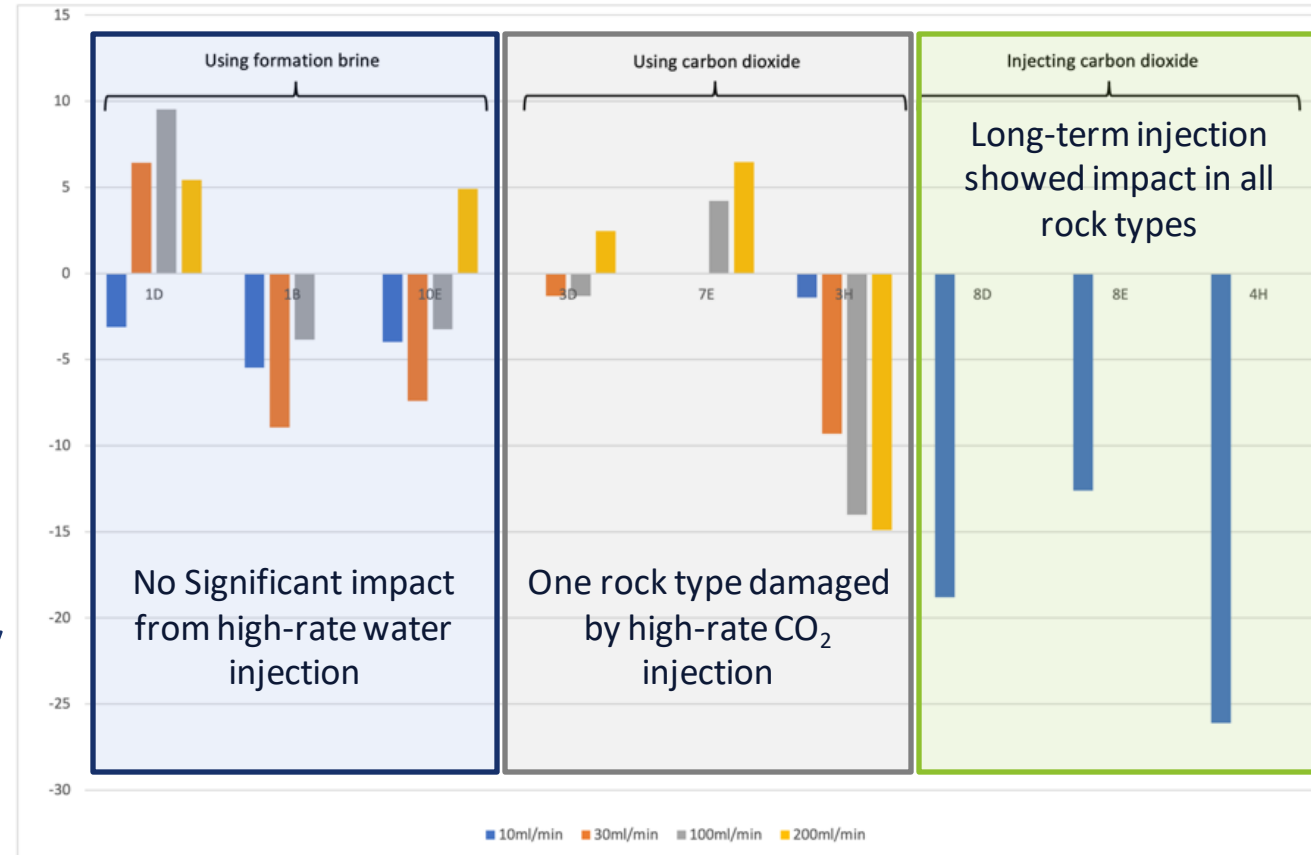
Reservoir

- Current properties
 - Storage capacity
 - Injection capacity
 - Petrophysical characterisation
 - Petrographic characterisation
 - Geomechanical properties
- Future properties - CO₂ impact (time-based)

New energy CCUS + H2 challenges and development



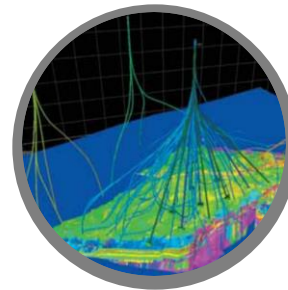
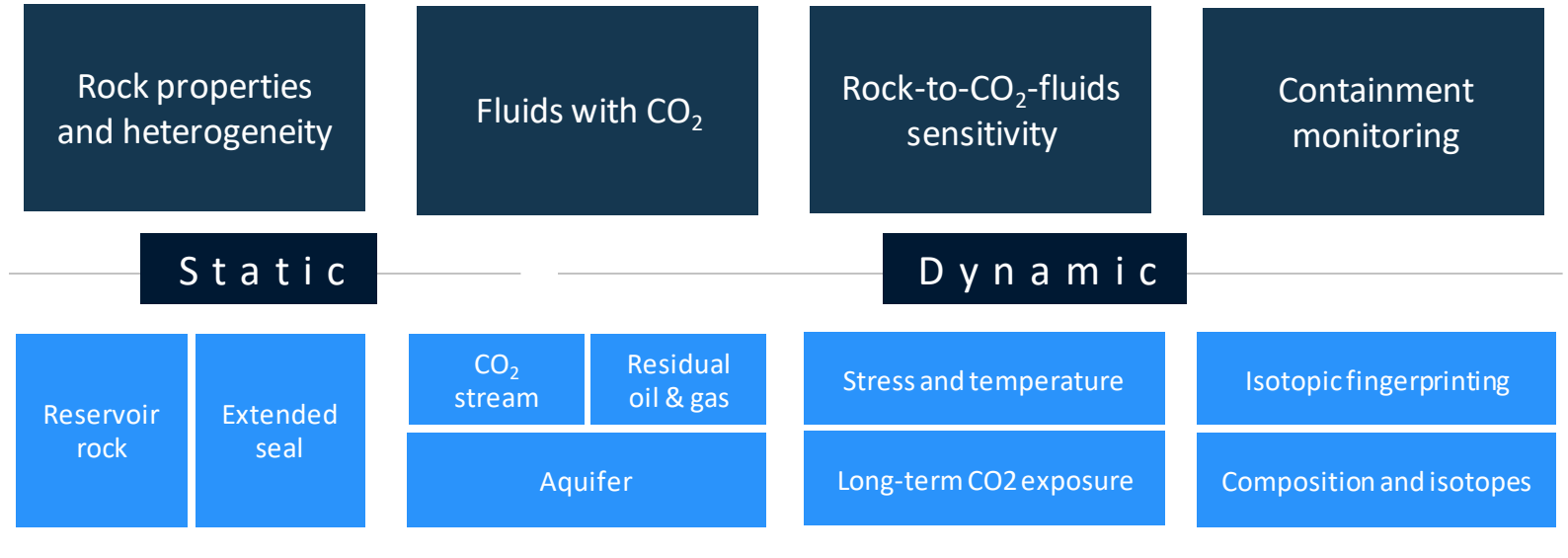
- Fluid behaviour & Interaction
- Environmental Conditions
- Regulatory Requirements
- Industry Standards
- Laboratory capability/capacity



New energy CCUS + H2 challenges and development



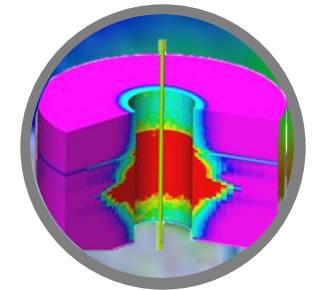
- Select and evaluate CC(U)S candidate
- Ensure compliance
- Characterize CO₂ impact
- Investigate flow assurance and recovery potential
- Prepare for extended timeline
- Monitor



Storage characterization



Caprock integrity and injection rates



Containment and conformance

SPE Reservoir Technologies of the 21st century Core Analysis Panel Session

TOPIC 1 - CCUS and Hydrogen challenges and development

TOPIC 2 - Heterogeneities: Characterization, scale-up and modelling of core analysis data.

TOPIC 3 - Quality control and Data representativeness. Program Design and Optimization

TOPIC 4 - DRA and Digital data acquisition/digitalization

TOPIC 2

Heterogeneities: Characterization, scale-up and modelling of core analysis data.

Mehdi Matt Honarpour

How to Measure & Model Different Scales of Heterogeneities in Multiphase Flow Modeling

Why Should We Perform Geological Characterization on Cores?

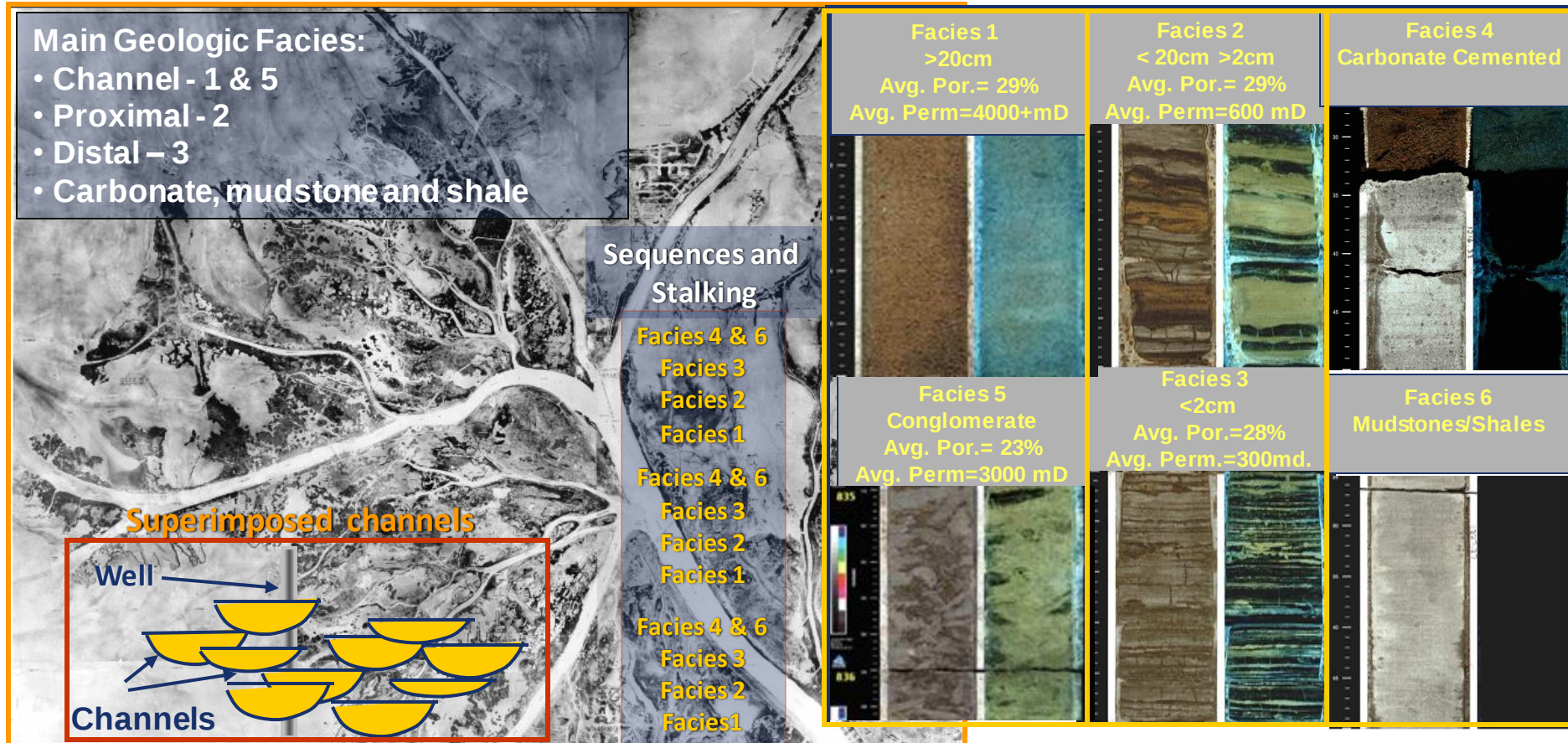


Geological characteristics determine depositional environment, facies, and heterogeneities –
Mississippi Channel Environment, U.S.A.



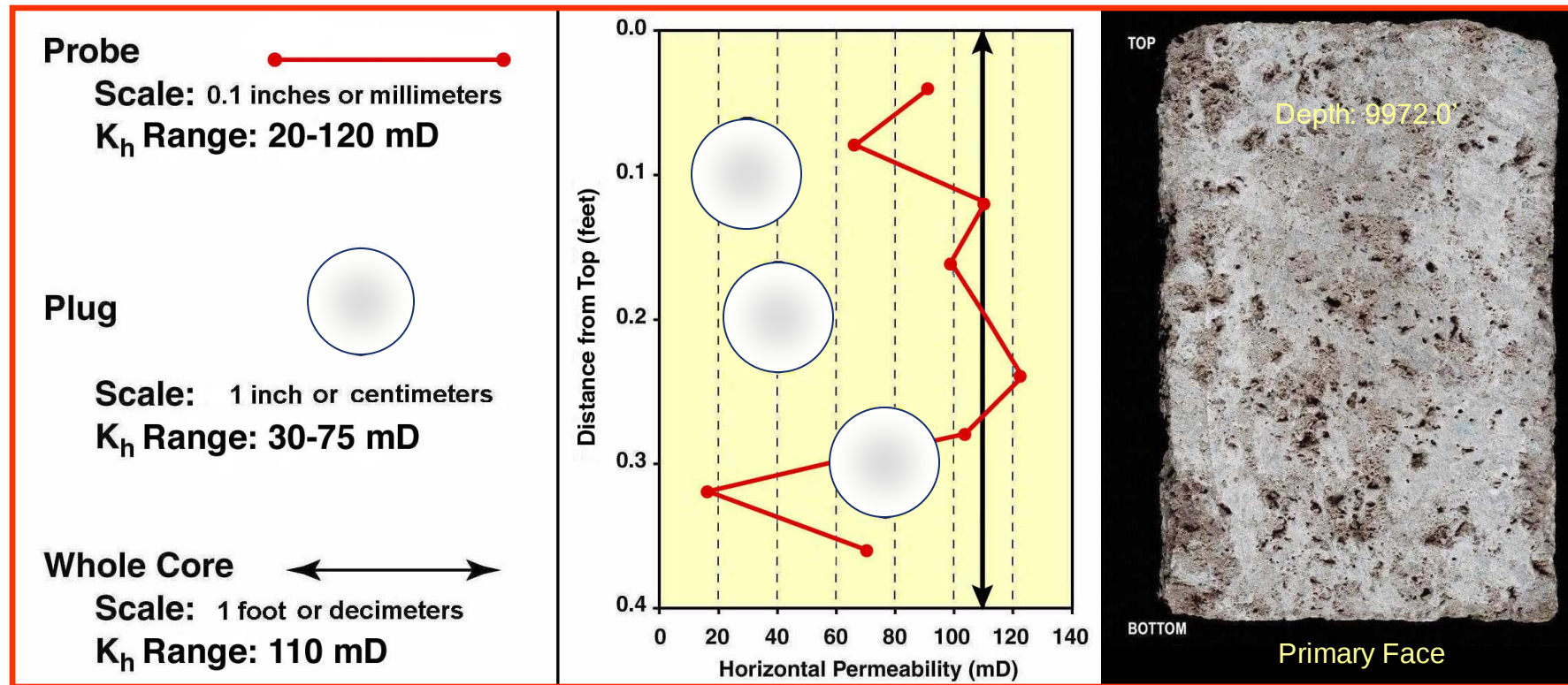
More Complexity with Stacked Channels

How do we integrate cores, logs and well tests for reservoirs internal plumbing?



Full Diameter Core Analysis for Heterogeneous Rocks - Effect of Measurement Scale

Averaged plug permeability may not agree with data from full diameter core in carbonate Fields – Challenges of Upscaling



SPE Reservoir Technologies of the 21st century Core Analysis Panel Session

TOPIC 1 - CCUS and Hydrogen challenges and development

TOPIC 2 - Heterogeneities: Characterization, scale-up and modelling of core analysis data

TOPIC 3 - Quality control and Data representativeness. Program Design and Optimization

TOPIC 4 - DRA and Digital data acquisition/digitalization

TOPIC 3

Quality control and Data representativeness Program Design and Optimization

S. Mark Ma

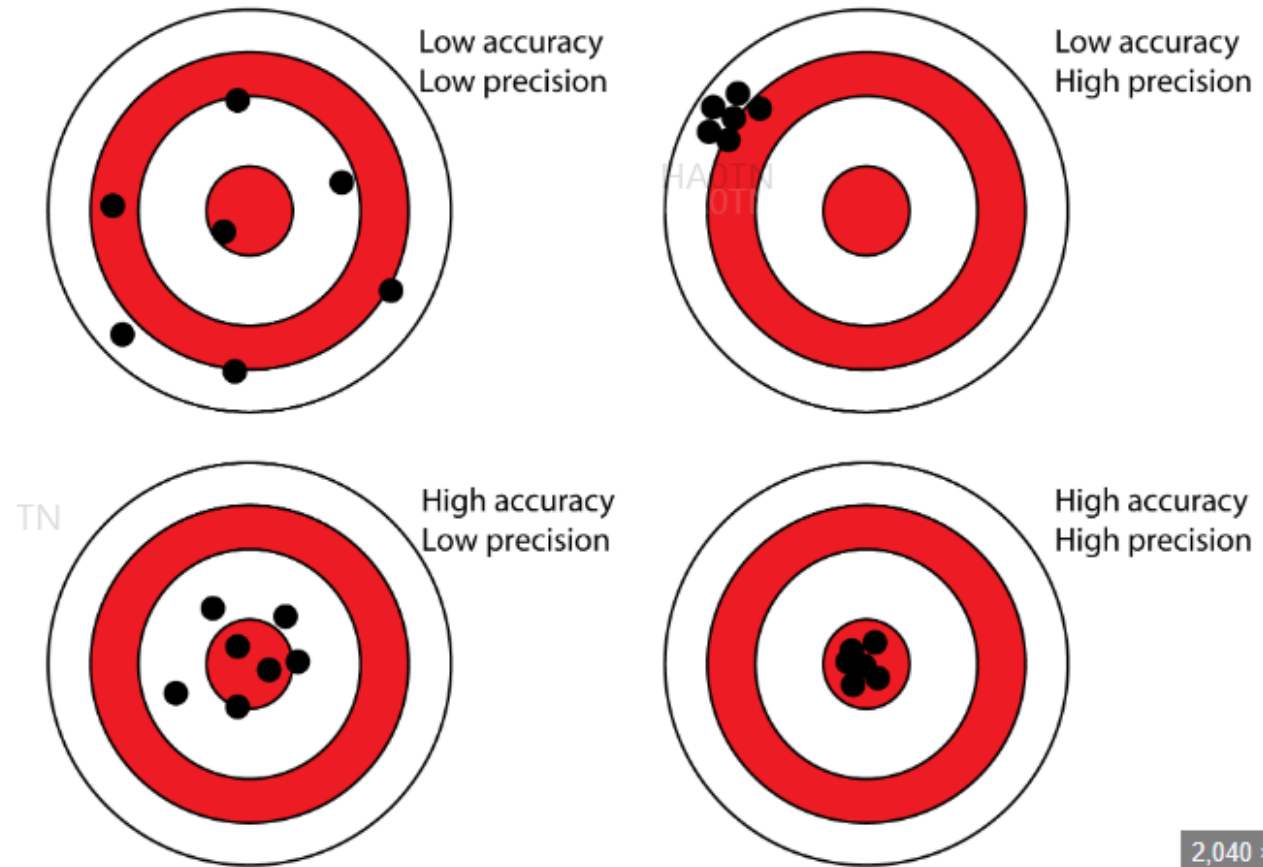


Accuracy vs precision vs representativeness

Accuracy vs precision

Accuracy and precision are both ways to measure results.

- **Accuracy** measures how close results are to the true or known value.
- **Precision** measures how close results are to one another.



Accuracy vs representativeness



Example of obtaining cost effective and yet representative core data



FIT-FOR-PURPOSE CORING FLUIDS

Main coring objective	Recommended coring fluid
Rock geological description and analysis	Any fluid that is least expensive and available
Clean rock conventional core analysis	WBM
Shaly rock conventional core analysis	OBM
Quantification of connate water	OBM
Quantification of remaining oil	WBM
SCAL involves water and oil	WBM with no-chemicals that are known to change solid surface property

[Core analysis with emphasis on carbonate rocks — quality assurance and control for accuracy and representativeness | Interpretation | GeoScienceWorld](#)



SPE Reservoir Technologies of the 21st century Core Analysis Panel Session

TOPIC 1 - CCUS and Hydrogen challenges and development

TOPIC 2 - Heterogeneities: Characterization, scale-up and modelling of core analysis data

TOPIC 3 - Quality control and Data representativeness. Program Design and Optimization

TOPIC 4 - DRA and Digital data acquisition/digitalization

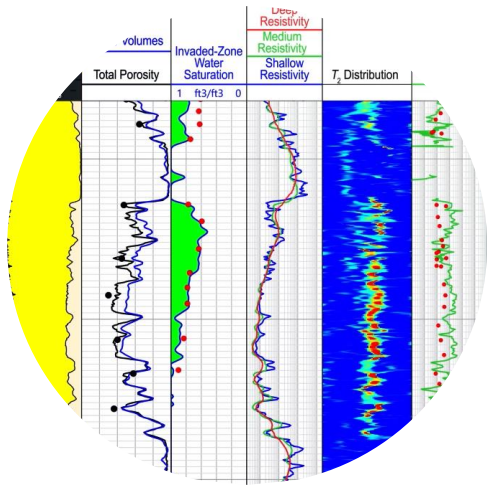
TOPIC 4

DRA and Digital data acquisition/digitalization

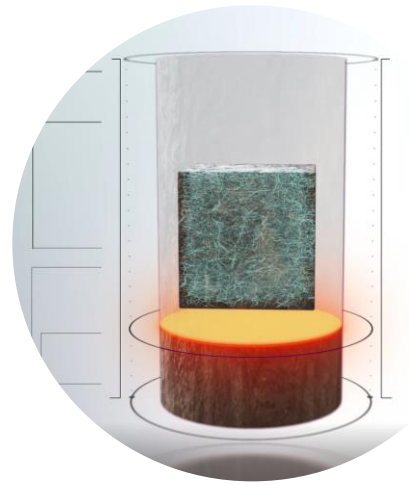
Denis Klemin

DRA acquisition/digitalization

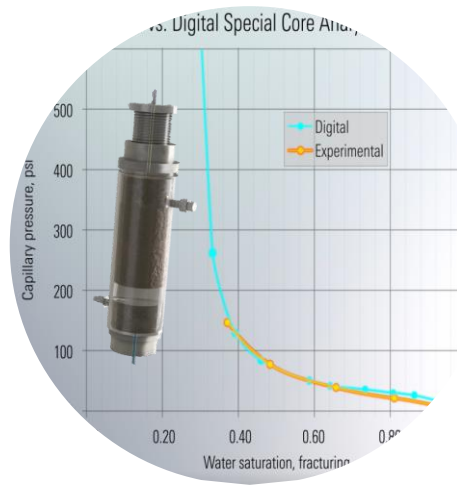
DRA and digital data acquisition/digitalization



From Well to
Core



Multiscale
Imaging &
Pore-Scale
Simulation



Validation and
Verification with
Laboratory Test
Data



Upscaling

SPE Reservoir Technologies of the 21st century Core Analysis Panel Session

TOPIC 1 - CCUS and Hydrogen challenges and development

TOPIC 2 - Heterogeneities: Characterization, scale-up and modelling of core analysis data

TOPIC 3 - Quality control and Data representativeness. Program Design and Optimization

TOPIC 4 - DRA and Digital data acquisition/digitalization

SPE Reservoir Technologies of the 21st century Core Analysis Panel Session

Q/A

SPE Webinars are Sponsored by:

SPE
SPE Foundation