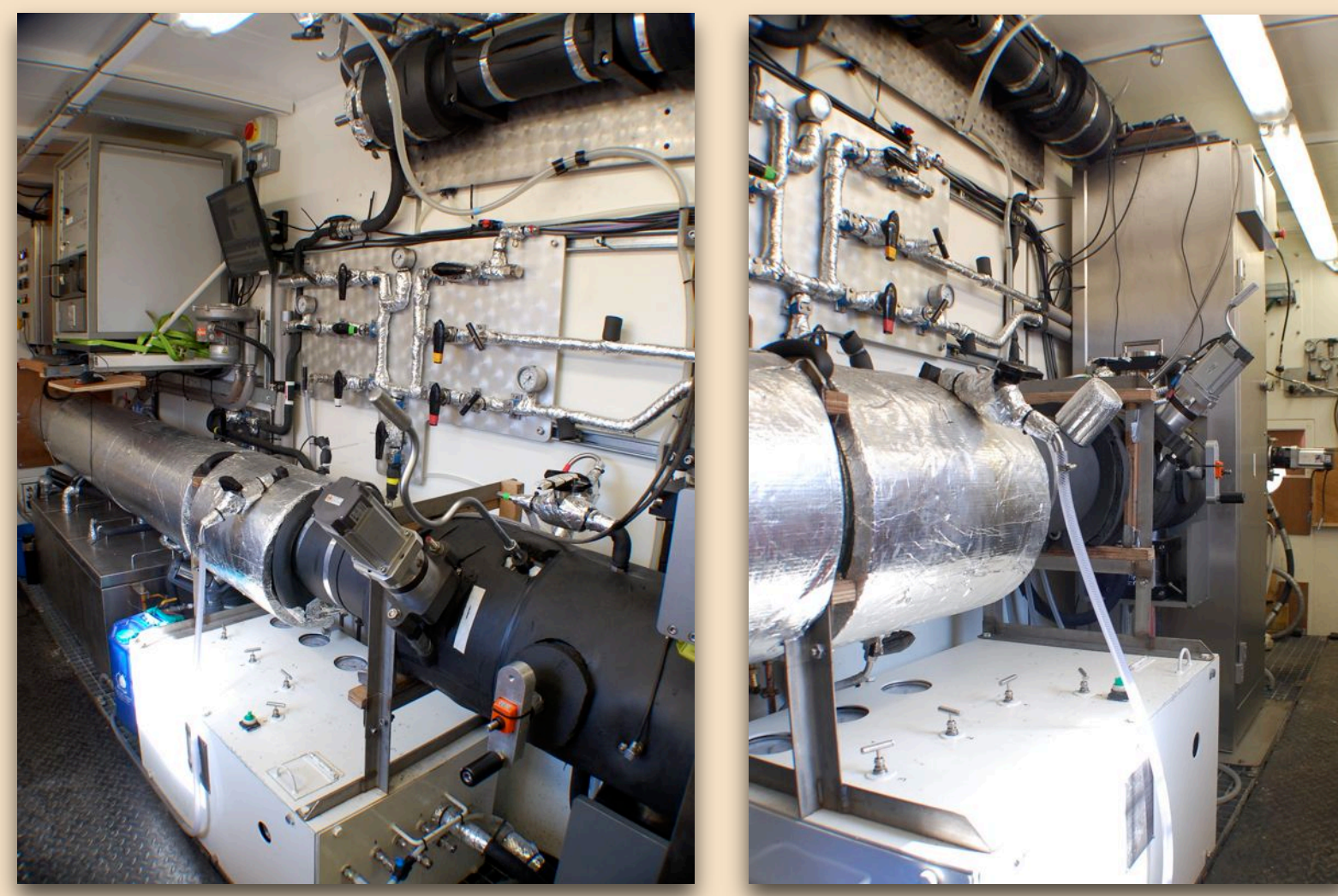


PCATS in Brief

PCATS provides essential pressure core handling and analysis infrastructure. In situ pressures are maintained while cores are transferred from coring tools, analyzed in detail, cut into subsamples, and transferred into test chambers for advanced laboratory testing.

- **Pressure & temperature rating:** 350 bar working, 4-20°C
- **Core size:** up to 3.5 m in length, 63 mm in diameter including liner
- **Geophysical testing:** Gamma density, P-wave velocity
- **X-ray imaging:** Linear scans, rotational movies, X-ray tomography (CT)
- **Core motion:** Linear precision ± 0.1 mm; angular precision ± 0.1°
- **Core cutting:** 5 cm to 3.5 m lengths
- **Dimensions:** 3 x 20 ft ISO shipping containers, with integral labs & storage



Interior view of PCATS control laboratory. Main body of PCATS is insulated. Pressure, temperature, & motion control visible to left & analysis systems right.

Compatible coring tools & test equipment

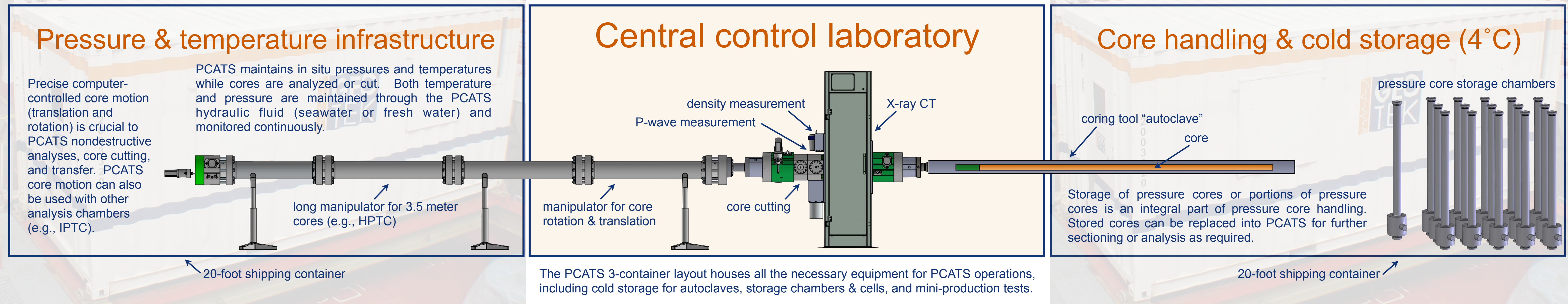
- **FPC** Fugro Pressure Corer (FPC & PCATS, left)
- **FRPC** Fugro Rotary Pressure Corer
- **HPTC** High Pressure Temperature Corer



- **IPTC** Instrumented Pressure Testing Chamber (right)
- **GHOBS** Gas Hydrate Ocean Bottom Simulator
- **DeepIsoBug** high pressure microbiology
- **PCATS Triaxial** see below!

PCATS: Pressure Core Analysis and Transfer System

Peter Schultheiss, Melanie Holland, John Roberts, Matthew Druce, Quentin Huggett, Philip Fox
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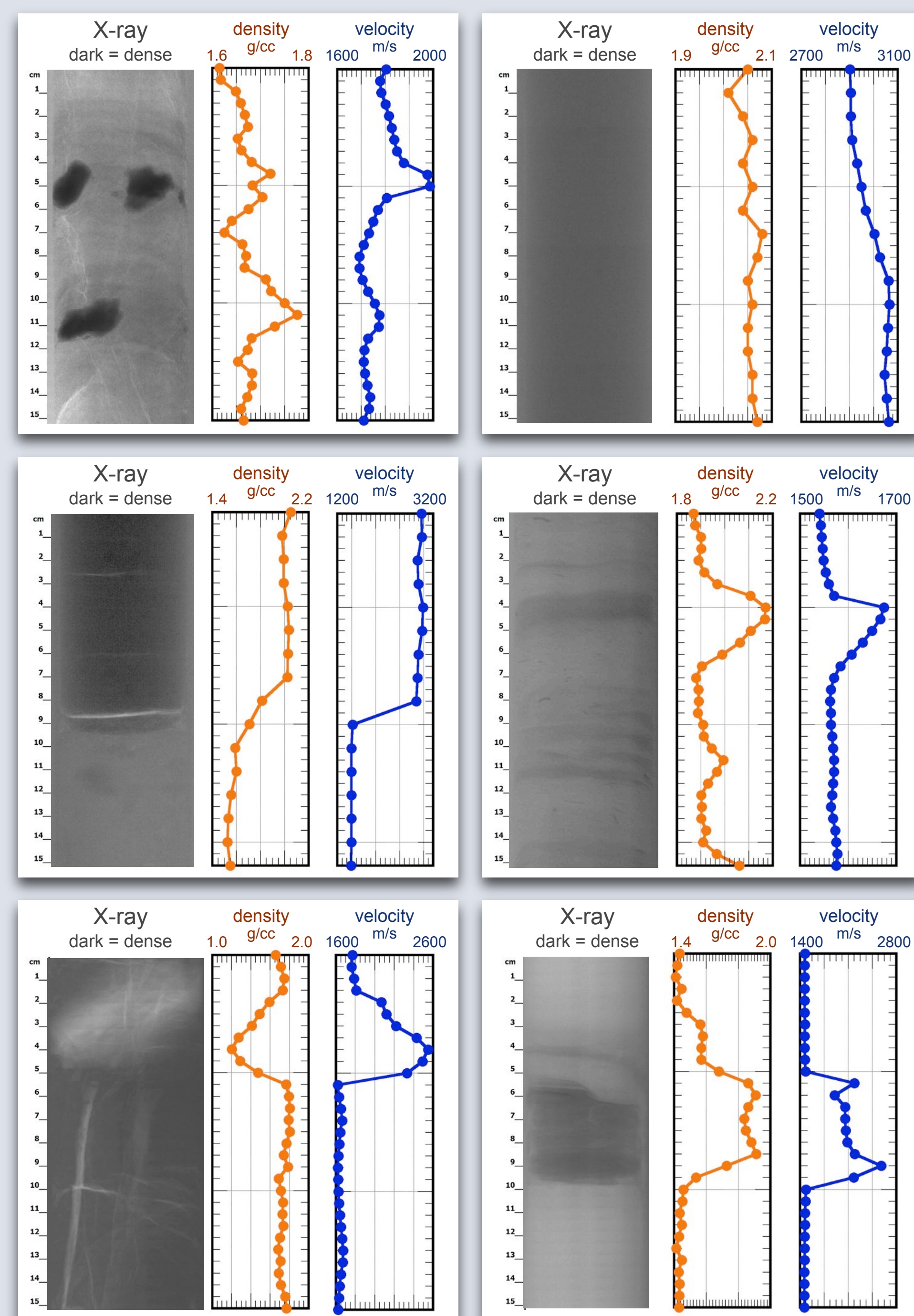


PCATS Data

PCATS provides nondestructive geophysical data on pressure cores, both for intrinsic core properties as well as background data prior to subsampling. Gas hydrate quantification is achieved with PCATS by depressurizing sections of core.

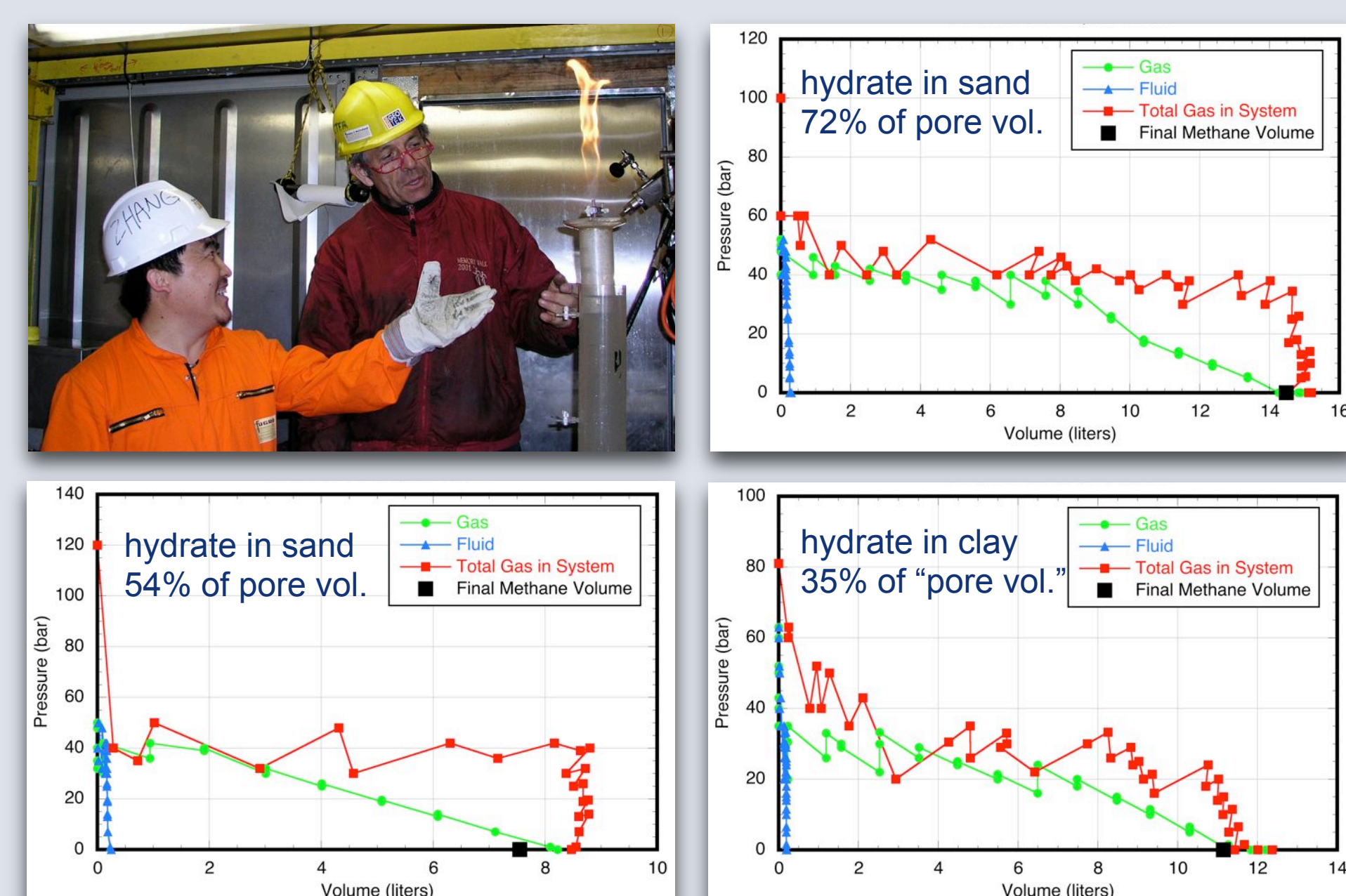
Linear scan

Immediate linear X-ray, gamma density, and P-wave velocity scans show the contents of a pressure core. Core can be rotated and scanned at any angle. Core scans can distinguish hydrate occurrence type, e.g. hydrate-cemented sand, massive gas hydrate.



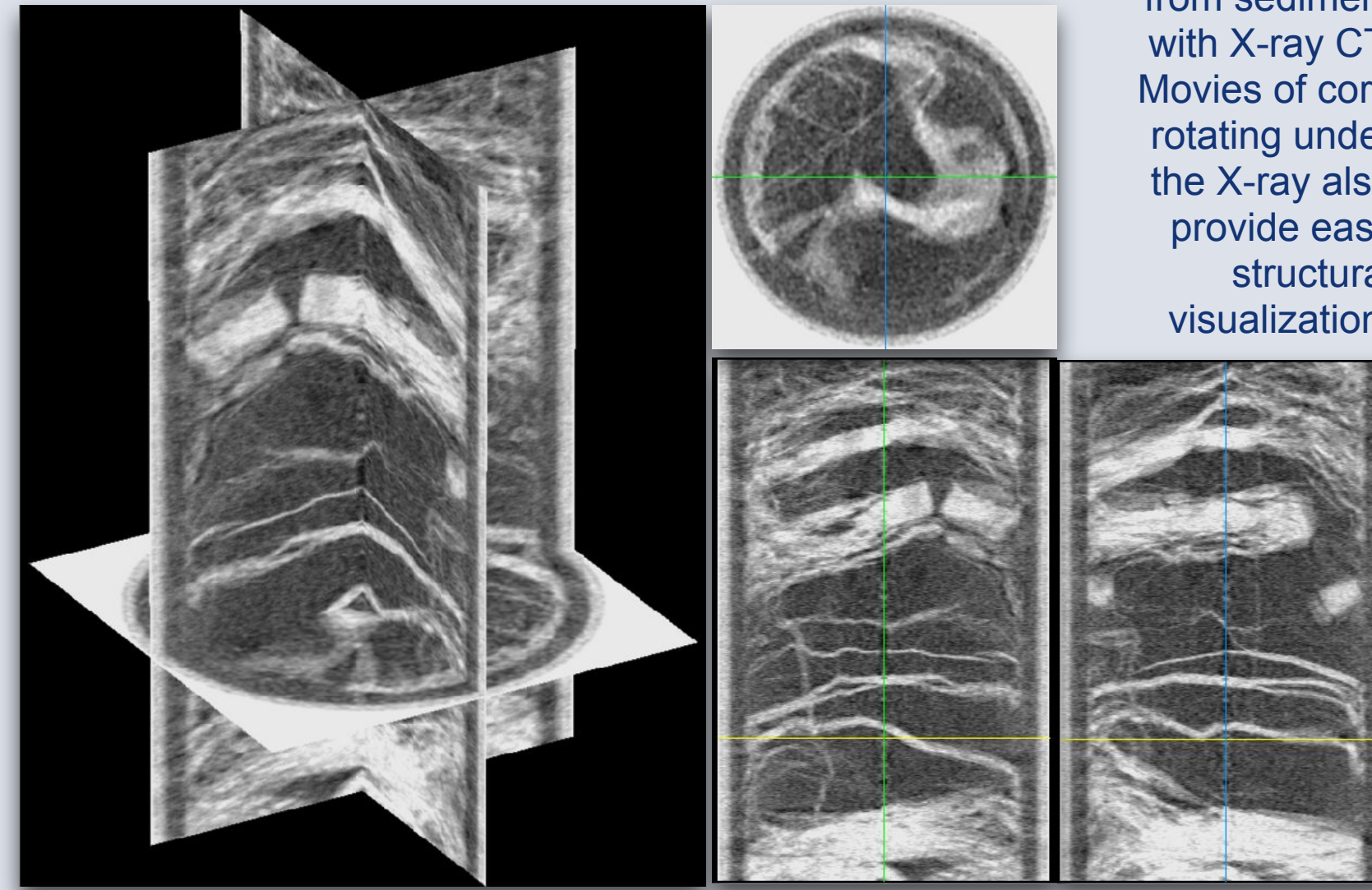
Mini-production tests

Gas release from pressure cores allows complete quantification of gas hydrate – or confirmation that gas hydrate is absent. This slow depressurization of cores, potentially with simultaneous physical testing, demonstrates the response of the reservoir material.



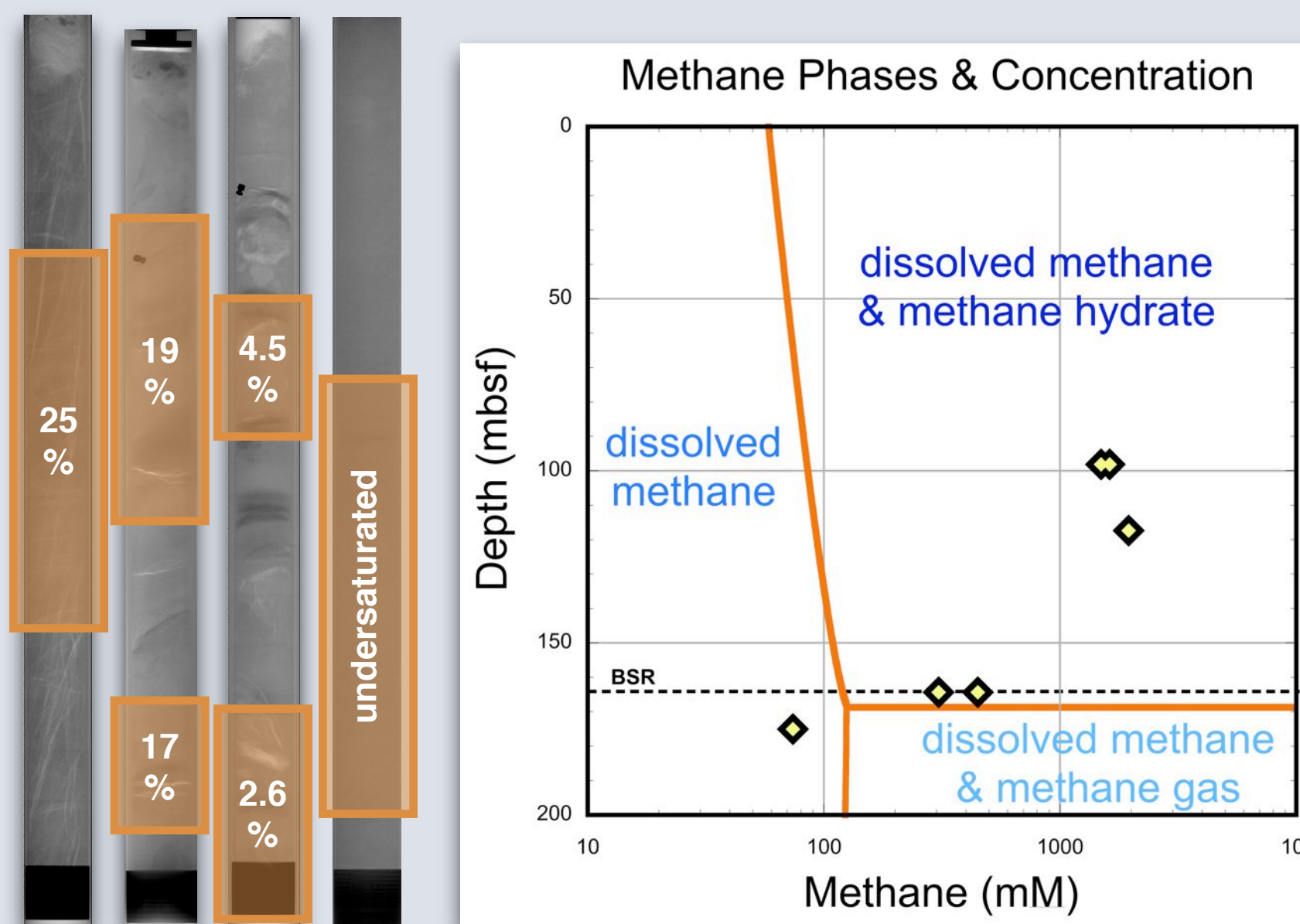
X-ray tomography

The three-dimensional structure of cores under pressure can be viewed using PCATS X-ray computed tomography (CT). Gas hydrate can be distinguished from sediment with X-ray CT. Movies of core rotating under the X-ray also provide easy structural visualization.



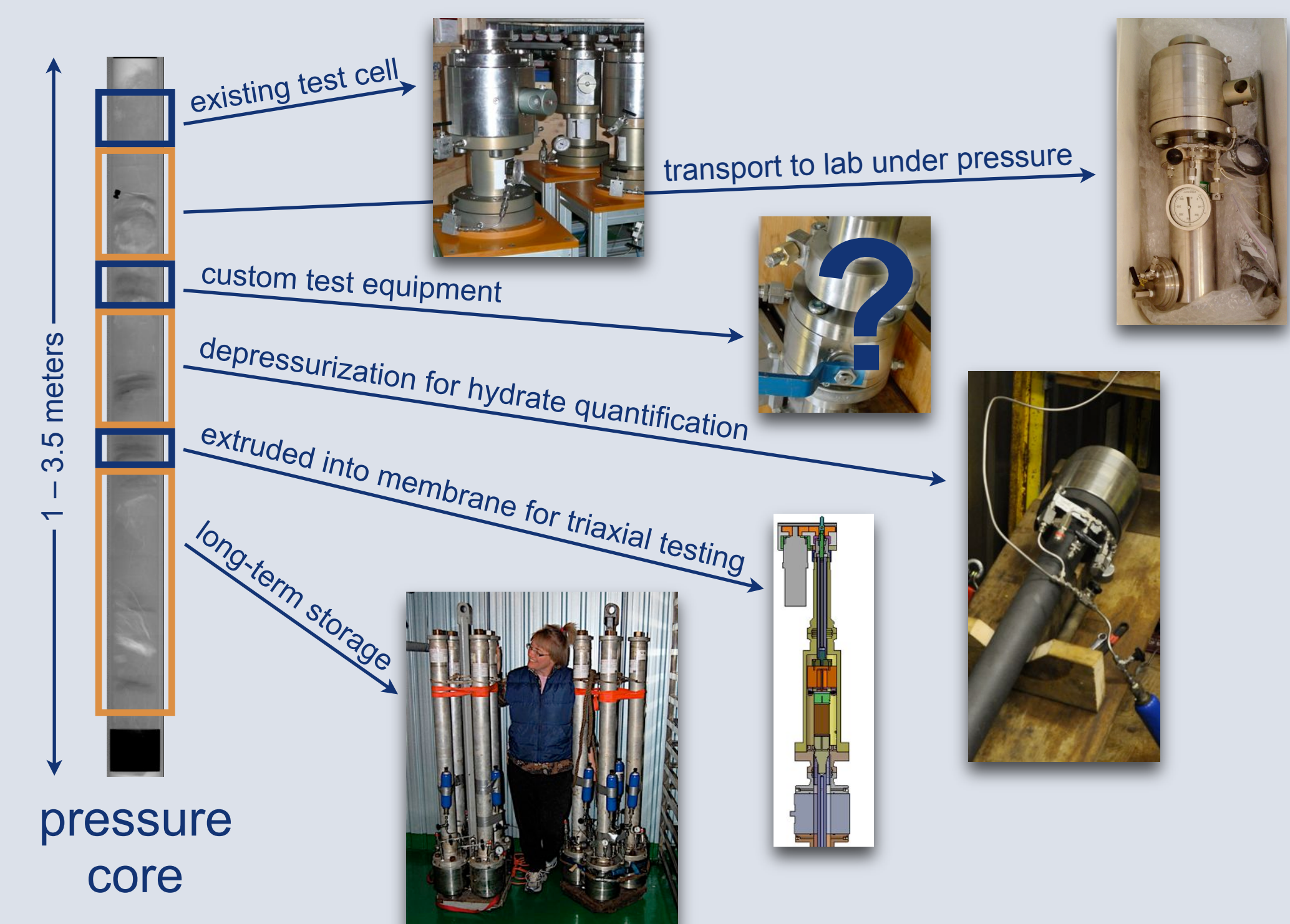
Gas hydrate concentration

Gas hydrate concentration from pressure cores (mini-production test data) is the "gold standard" for comparison with downhole resistivity logs or chloride anomalies. Each pressure core can provide several data points by cutting the core into sections and depressurizing each of them individually.



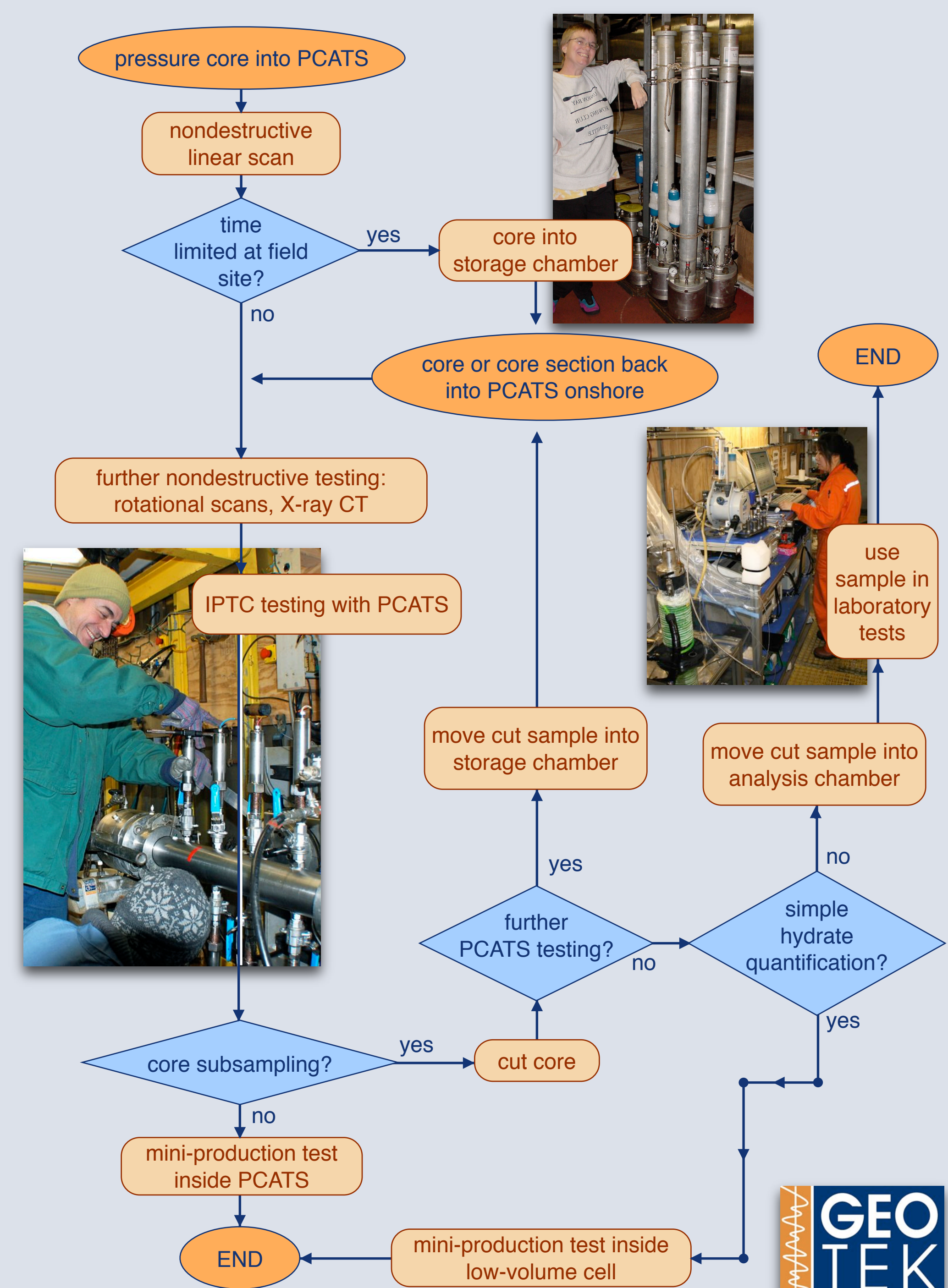
PCATS Samples

PCATS cuts plastic-lined cores into as many sections as required. Sections as small as 5cm can be cut and transferred into storage or testing apparatus. Sample chambers are sealed with large diameter ball valves; specifications for mating chambers to PCATS are available.



Sampling logistics

Working with pressure cores takes time. However, cores can always be stored under pressure, cut or uncut, and can be moved back into PCATS for further analysis or cutting.



PCATS Triaxial

PCATS Triaxial is a complete system for performing advanced mechanical tests on sediment samples that have never been depressurized.

Core samples from PCATS are transferred and extruded into a rubber membrane between two end platens enabling triaxial stresses to be applied.

PCATS Triaxial can be configured as either a standard triaxial cell or as a resonant column cell to provide the most versatile testing programs to be designed for each precious sample.

PCATS Triaxial is currently being developed in a joint project with Southampton University.

- Triaxial testing
- Permeability measurement
- Resonant column testing
 - torsion
 - flexure
- Mechanical characterization during production experiments

