

European Petrophysics Consortium

The **European Petrophysics Consortium (EPC)** consists of three European universities, Leicester (UK), Montpellier (France) and Aachen (Germany), which undertake petrophysics research combining borehole geophysics, laboratory experiments and geology. The Consortium is managed from a central office located at the University of Leicester.



Petrophysics Staff Scientist Johanna Lofi (right) and EPC logging engineers V. Hebert and S. Barry during Exp. 313.

The EPC team provides high-level scientific and technical support to the International Ocean Discovery Program (IODP) and the European Consortium for Ocean Research Drilling (ECORD) across a range of highly diverse environments drilled by the *JOIDES Resolution* non-riser and mission-specific platforms (MSPs).

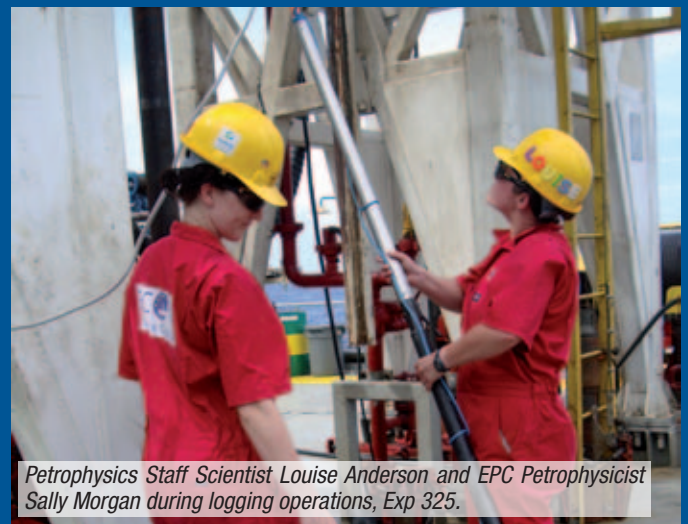


A. Fehr and J. Inwood work on the logging tools during sea trials for the JOIDES Resolution, Exp 320T.

The EPC is responsible for the acquisition of downhole logging data and core petrophysical measurements and data interpretation for all MSP expeditions, and the development of associated research programmes. The Consortium also links into the International Logging Consortium to make its combined petrophysical expertise available to all scientists in IODP.

The EPC provides:

- Petrophysics Staff Scientists and Petrophysicists;
- Expertise for development of tailored downhole logging and core petrophysics programmes;
- Dedicated equipment to acquire downhole logging data, including a suite of slimline geophysical borehole tools (now including Quick-link combinable tools);



Petrophysics Staff Scientist Louise Anderson and EPC Petrophysicist Sally Morgan during logging operations, Exp 325.

- Dedicated equipment for core logging and discrete measurements, including Geotek Multi-Sensor Core Loggers (standard and XYZ and a custom-built fast track magnetic susceptibility logger), a Geotek P-Wave Frame and a Thermal Conductivity Probe;
- Data calibration and quality control;
- Evaluation and interpretation of downhole log and core petrophysical data.

Scientific achievements

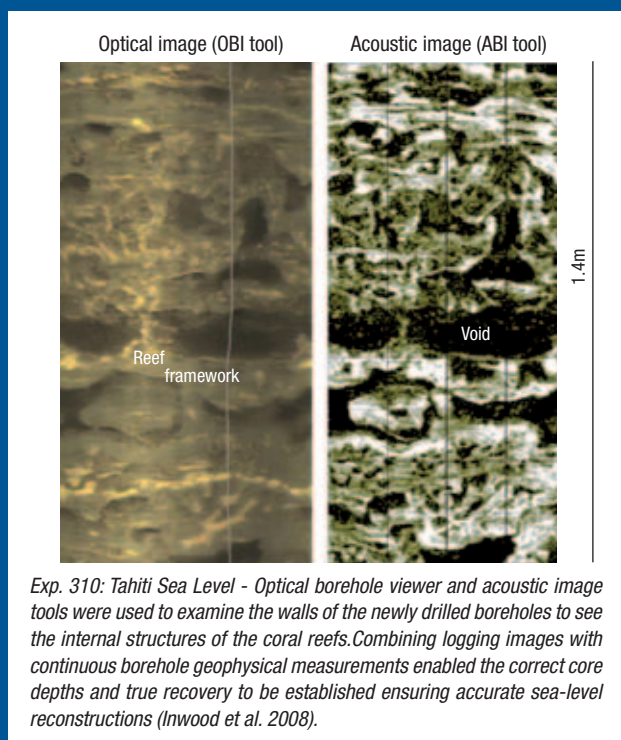
The EPC has over 25 years of experience in downhole logging and core petrophysics. The Consortium members from Leicester, Montpellier and Aachen have produced over 250 publications in major peer-reviewed journals and more than 50 EPC scientists have participated in ODP and IODP expeditions.

EPC uses downhole logging data and core petrophysics data in a wide range of research projects including core-log integration, improving core recovery estimates, examining cyclicity and heterogeneity of properties to calibrate with astronomical patterns and the characterisation of log and physical properties for the evaluation of facies, sediment composition and ocean crust lithostratigraphy.

Recent Mission-Specific Platform Expeditions

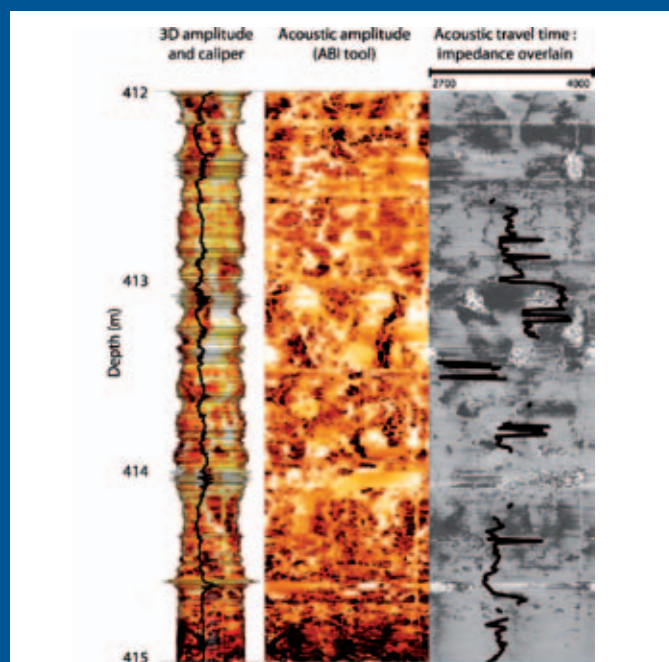
Expedition 310 Tahiti Sea-Level (2005) and Expedition 325 Great Barrier Reef Environmental Changes (2010)

The EPC deployed slimline geophysical logging tools for the first time in IODP/ODP during Expedition 310. For both Expedition 310 and the linked Expedition 325, high-resolution, millimetre-scale, optical and acoustic images of the coral-reef systems provided invaluable insights into the *in-situ* reefal framework (*below*)



Expedition 313 New Jersey Shallow Shelf (2009)

Logging data, integrated with other geological data, have characterised the facies and ‘fingerprinted’ key surfaces and sequences (*below*) in the siliciclastic successions cored during Expedition 313 New Jersey Shallow Shelf. In collaboration with the University of Alberta, EPC was involved with Vertical Seismic Profiling experiments.



Exp 313: New Jersey Shallow Shelf - High resolution 360° acoustic images of the borehole wall capture fine detail of shelly sediments and sandy intervals in borehole M0028. The 3D image (left) combines the acoustic amplitude image and the acoustic caliper. The unrolled acoustic amplitude (centre) and travel time (right) images are shown alongside with impedance calculated from core density and sonic measurements overlain on the acoustic travel time image. Sonic (from wireline measurements and core) and density logs (from core) used to calculate impedance contrasts across all three sites have enabled sequence boundaries to be identified (Miller et al. 2013).

Exp 347 Baltic Sea Paleoenvironment (2013)

Downhole logging was completed in 8 holes using Weatherford Wireline’s Compact tools, including a Micro Image tool. “Standard” and “Fast-Track” (magnetic susceptibility) Geotek Multi Sensor Core Logger (MSCL) systems logged 1.6 km of core whilst offshore.

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For further reading

- For all expeditions, Petrophysics and Logging reports are in the Proceedings of the IODP at <http://www.iodp.org/scientific-publications>
- Miller K., Browning J.V., Mountain G., Bassetti M.A., Monteverde D., Inwood J., Lofi J. & Proust J.N., 2013. Sequence boundaries are impedance contrasts: core-seismic-log integration of Oligocene-Miocene sequences, New Jersey shallow shelf. *Geosphere*, 9, 1257-1285, doi:10.1130/GES00858.1
- Inwood, J., Brewer, T. S., Braaksma, H. and Pezard, P. 2008. Integration of core, logging and drilling data in modern reefal carbonates to improve core location and recovery estimates (IODP Expedition 310). *Journal of the Geological Society of London* 165, 585-596.
- Goldberg, D., Brewer, T.S. and Kuramoto, S. 2004. Logging for the integrated Ocean Drilling Program. *Petrophysics*, 45, 386-390.