



The Legacy of Logging: Highlights of Downhole Measurements and Their Use in Scientific Ocean Drilling

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Since the earliest scientific ocean drilling, downhole logging has played an important role in helping the International Ocean Discovery Program (IODP-II) and its predecessors (Deep Sea Drilling Project (DSDP), Ocean Drilling Program (ODP) and Integrated Ocean Drilling Program (IODP-I)) address high level scientific questions. While the program largely centers on the acquisition of physical core material, downhole logging allows the collection of continuous, in situ physical properties datasets that both complement and validate corresponding core-based measurements. In cases where core recovery is discontinuous, downhole measurements provide the only means to assemble a complete record, providing a basis for inference of any missing lithostratigraphy. Measurements acquired downhole are taken under in situ temperature and pressure conditions and consequently provide better estimates of true formation properties than the associated core measurements acquired under surface conditions. In addition, downhole logging data provide an essential dataset that is intermediate in scale, bridging the gap between mm-scale measurements on cores and 10s meters to km-scale regional seismic datasets.

This presentation will feature downhole logging highlights from the scientific ocean drilling archive of the last 50 years, not only demonstrating the different conveyancing methods used across the IODP platforms, but also the many and varied applications of the in situ measurements acquired. These will include examples of: novel uses of standard oilfield logging technologies; engineering developments driven by scientific needs; and milestone projects.