

Advanced Piston Corer Methane

Scientific Application

The Advance Piston Corer Methane (APCM) tool continuously monitors temperature, pressure, and conductivity changes in the core liner during coring, wireline retrieval, and handling to quantify changes that occur in gas-rich cores. By comparing data plots from successive cores, stratigraphic variations and relative amounts of gas stored in sediments can be determined at individual sites and variations between sites can be assessed. Models indicate that the data also

provide information on the presence of gas hydrate in the sediment that may disassociate before core retrieval.

Tool Operations

Temperature, pressure, and conductivity sensors are embedded within the piston head on the standard ODP Advanced Piston Corer (APC) (Fig. 1, Fig. 2). During the APC coring stroke, the piston head acts as a plunger to evacuate water from the inner core barrel, which allows the core to enter.

Design Features

Wireline Deployment

The APCM is deployed at the beginning of APC coring and removed when coring is suspended. A 100-hr long-life battery allows continuous 1-Hz recording of data for the duration of the APC coring sequence.

Benefit: Allows scientists to calculate the amounts of gas stored in sediments.

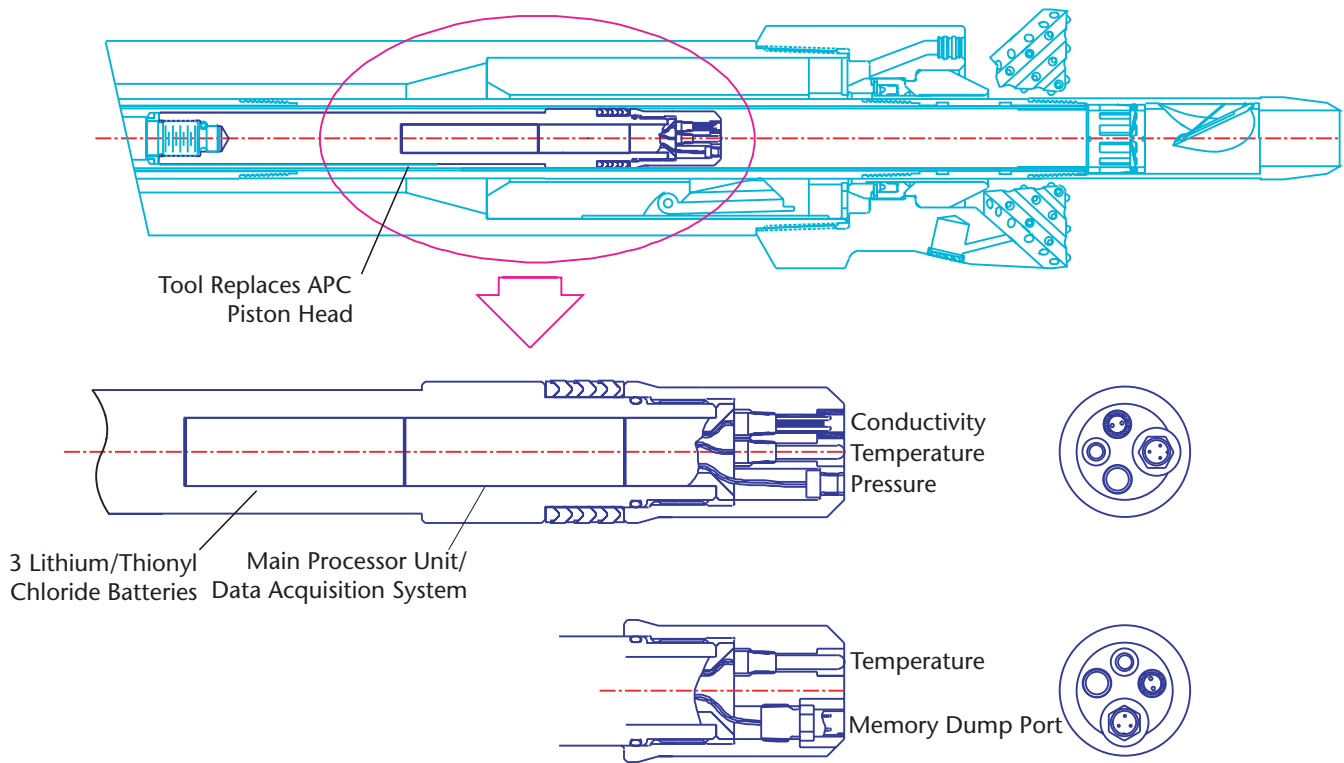


Figure 1. Top schematic shows the APCM inside the APC bottom-hole assembly. The bottom two drawings show the APCM head in more detail along with a schematic of the top of the sensor head.

APCM Specifications

General

Replaces APC piston and snubber in APC assembly

Three sensors: temperature, pressure, and conductivity

Temperature sensor accuracy: $\pm 0.05^{\circ}\text{C}$

Pressure transducer operating range: 0-10,000 psi; $\pm 0.15\%$ full scale

Conductivity sensor: 3-pin Bulk-head Connector (detects gas phase in headspace)

Sample rate: 1 Hz

Electronics

ODP/MBARI design

Motorola 68338 processor

DOS-like operating system

48 MB of flash memory

Two double-C, lithium/thionyl chloride batteries in series—lasts ~100 hr

Typical Operating Range

Very soft to firm sediments (any time the APC is deployed).

Limitations

The APCM can be used any time the APC is deployed.

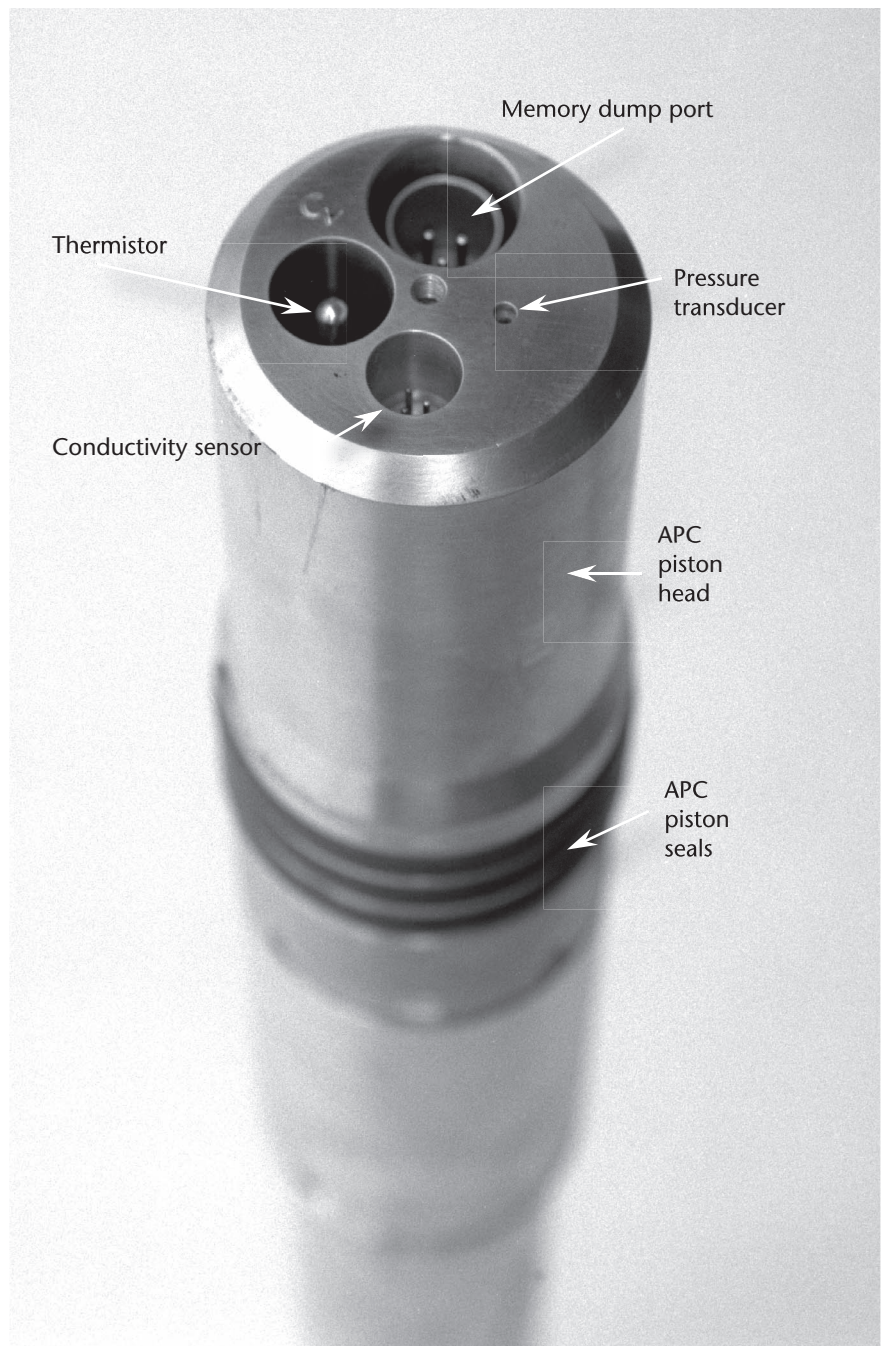


Figure 2. Sensor head with memory dump port and temperature, pressure, and conductivity sensors.