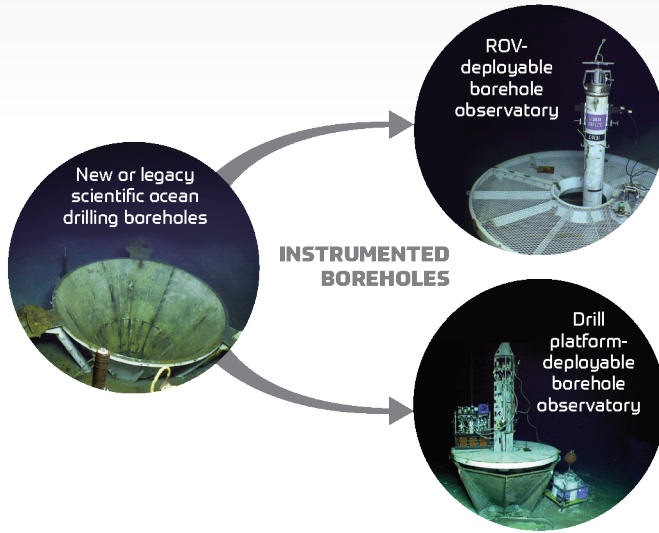
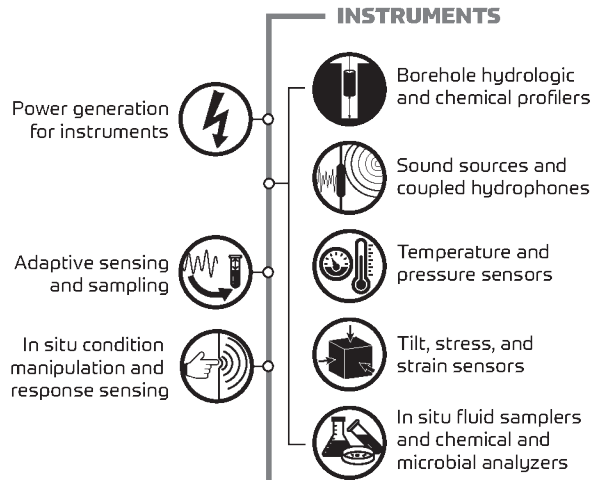
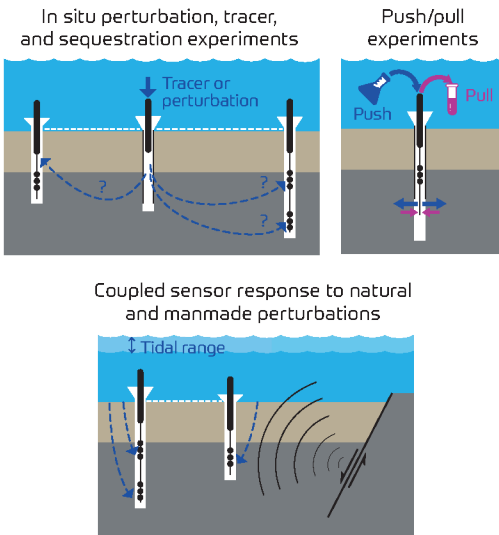


# In Situ Investigations of Subseafloor Hydrogeology and Biogeochemical Cycling



The flux of dissolved elements associated with hydrothermal flow that cools the oceanic crust and the processes and timing associated with this exchange are poorly constrained. Experiments that utilize boreholes—after a drilling expedition is over—have begun to examine the exchange of elements between circulating seawater and the host rock and the resultant fluxes between these two reservoirs. Exchange processes can be abiotic or biotic, the latter influenced by endemic subseafloor microbial communities. Future studies using instrumented boreholes will expand our understanding of exchange processes through novel adaptive sampling, sensors, and experiments within one or multiple boreholes connected for real-time sensor data return and instrument adjustment.

## EXAMPLE CAPABILITIES



Schematic of a cabled array of borehole observatories and seafloor instruments that provide the capability to monitor in situ hydrogeologic and biogeochemical conditions and conduct in situ experiments. Photos: (left) DSDP Hole 395A. (right top) IODP Hole U1383C, a CORK instrumented with two packages. (right bottom) IODP Hole U1383B, instrumented with a CORK-Lite. *Original illustration by Rosalind Coggon, Geoff Wheat, and Geo Prose*

