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SPOTLIGHT 4. JOIDES Resolution

The riserless *JOIDES Resolution* (JR) is currently one of three scientific drilling platforms used by the International Ocean Discovery Program (IODP). It was the sole drilling vessel for the Ocean Drilling Program (ODP) and was later used, along with the Japanese drilling vessel *Chikyu* and other mission-specific drilling platforms, throughout the Integrated Ocean Drilling Program.

The JR was first launched in 1978 as Sedco/BP 471, a petroleum exploration vessel, and then converted for scientific ocean drilling to begin operations for ODP in January 1985. The ship was modernized during 2007–2008 and returned to active service in February 2009 following extensive renovation of laboratory facilities and quarters. The *JOIDES Resolution* Science Operator at Texas A&M University operates the JR on behalf of the US National Science Foundation as a research facility for IODP.

JOIDES RESOLUTION STATISTICS

	Ocean Drilling Program (1985–2003)	Integrated Ocean Drilling Program (2003–2013)	International Ocean Discovery Program (2013–Present*)	Totals
Expeditions	111	31	22	164
Operational Days	6,591	1,836	947	9,374
Distance Traveled (nmi)	355,781	126,889	62,054	544,724
Sites	669	145	106	920
Holes	1,797	439	304	2,540
Cores	35,772	8,491	8,125	52,388
Core Recovery (m)	222,704	57,289	62,054	342,047
Shallowest Water (m)	38	96	87	
Deepest Water (m)	5,980	4,479	4,858	
Deepest Hole (m)	2,111	1,928	1,806	
Northernmost Site	80.5°N	67°N	32.4°N	
Southernmost Site	70.8°S	66.4°S	76.6°S	
Most Sediment Recovered on a Single Expedition (m)	8,003	6,135	6,956	
Most Basement Recovered on a Single Expedition (m)	866	799	469	

* stats through May 2018 (Expedition 376)

The JR employs continuous wireline coring and logging techniques to recover cores and geophysical data from beneath the seafloor. The ship operates in water depths between 76 m and nominally 5,800 m, and drilling has penetrated a maximum depth of just over 2,100 m beneath the seafloor. The longest drill string deployment was 6,919 m in 5,724 m water depth. To date, the JR has recovered more than 342 km of core (see table).

The JR is outfitted with analytical equipment, software, and databases, with an emphasis on instrumentation that captures safety data and ephemeral properties and allows intelligent drilling decisions at sea along with characterization of the core for future investigators. The laboratory space includes facilities for visually describing core at macro- and microscales; microscopes for petrological sediment analysis and biostratigraphic assessment; instrumentation for measuring physical properties, paleomagnetism, and the geochemistry of pore waters, sediment, and rocks; and equipment for cutting and sectioning samples from rock and sediment cores. The downhole measurements laboratory provides an area for obtaining in situ records of sub-seafloor formation properties that range from borehole well logs to formation temperature and pressure.

ODP (1985–2003) included 111 expeditions with the JR operating at 669 sites. During the Integrated Ocean Drilling Program (2003–2013), there were 35 expeditions and drilling at 145 sites. To date, IODP (which began in 2014) has logged 22 expeditions with 106 sites drilled, and 12 expeditions have already been scheduled into 2021. In addition to conducting scientific coring and logging operations, long-term borehole monitoring began with the installation of a broadband seismometer in Hole 794D in 1989. Subsequently, more than 30 long-term borehole observatories, ranging from simple to complex, have been installed.

– Mitch Malone and Brad Clement

