

A New Vessel for U.S. Scientific Ocean Drilling

Scientific ocean drilling, where the U.S. has been an international leader for decades, has profoundly transformed our understanding of Earth's systems in the past half a century. Since 1968, the U.S. has operated 90% of the 320 scientific ocean drilling expeditions, recovering 97% of the 484 km of core. As we look to 2050, the pressing challenges of geohazards, energy resources, sea-level rise, and marine ecosystem health present a strategic opportunity for the U.S. to strengthen its global influence through continued investment in ocean drilling science. Without a scientific drilling platform, the U.S. is losing its international leadership role in ocean and subseafloor exploration to [China](#) and the ongoing European Union-Japan consortium for scientific ocean drilling, the [International Ocean Drilling Programme](#) (IODP³). A U.S.-owned and operated scientific ocean drilling platform would recover critical archives of past ocean and (sub)seafloor processes, climate-ocean interactions, and marine ecosystem dynamics that cannot be recovered in any other way.

The proposed U.S.-owned and operated drilling platform will

- drive economic growth;
- advance national security and economic competitiveness;
- revitalize domestic shipbuilding and maritime workforce development;
- enable and advance groundbreaking scientific discoveries ensuring the nation remains at the forefront of ocean sciences; and
- drive cutting-edge research and technological advancements.

Recovery of high quality cores, integrated measurements, and strategic planning for long-range goals are not possible without a dedicated vessel designed specifically for scientific drilling. In 2024, NSF AC-GEO formed a subcommittee to define the infrastructure requirements for a new U.S. scientific ocean drilling platform. The committee built their recommendations upon the [2050 Science Framework](#), the National Academies of Sciences, Engineering, and Medicine's 2025-2035 [Decadal Survey of Ocean Sciences](#) (NASEM report) recommendations, and U.S. community defined [Science Mission Requirements \(SMRs\)](#), and worked with the Science and Technology Policy Institute (STPI) to assess the costs and capabilities necessary to meet the scientific priorities of the U.S.

The identified infrastructure requirements and the justifications to meet the science goals are

- Vessel capacity to drill in 6000+ m water depth and to carry up to 10,000 m of drill string.
 - Access to global ocean, notably the poorly sampled deep ocean, and integration with existing deep ocean facilities (e.g., [National Deep Submergence Facility](#)) to advance capabilities and understanding. At least 90 percent of scientific ocean drilling objectives will not be met if the U.S. is dependent only on the U.S. Academic Research Fleet's capabilities (NASEM report). Mission specific platform operations expand capabilities beyond the academic fleet but are limited to ≤2500 m water depth (<19% of the seafloor) (Fig. 1) and do not provide global ocean access as past US drilling vessels or the proposed vessel.
- Operation in year-round, medium first-year ice (Polar Class 5 vessel).
 - Access to poorly sampled and highly dynamic high-latitude environments, eliminates need for additional support vessels and associated increased costs, and complements other high-latitude facilities (e.g., New Antarctic Research Vessel).

- Modern mud and heave compensation systems.
 - Enhances quality of recovered cores and in situ measurements and allows installation of long-term borehole monitoring systems and operation in more variable sea-state conditions decreasing operational downtime.
- Fixed and modular laboratory space (up to 10 containers equivalent).
 - Appropriate space for safety and decision-making analyses for every project and flexible space for expedition-specific needs (e.g., specialized microbiological sampling, remotely operated vehicle support).

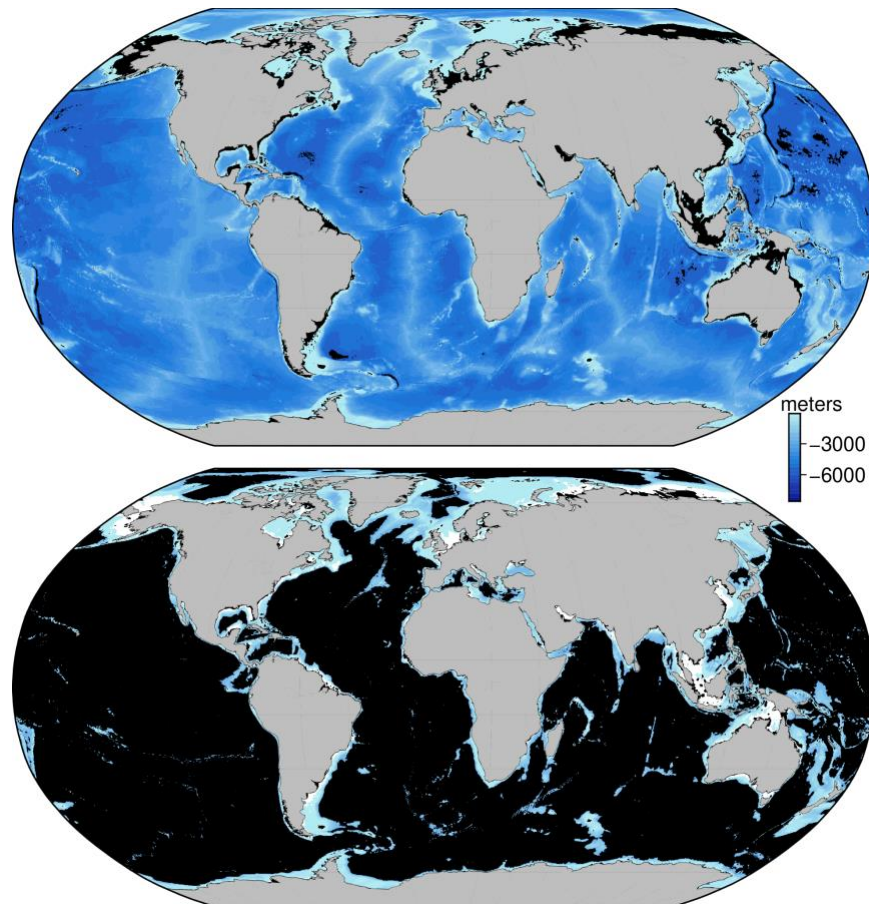


Figure 1. The top panel shows the areas of the seafloor in blue that were accessible by the *JOIDES Resolution*, which would be similar for the new vessel, whereas the bottom panel shows the area of the seafloor that is 2500 m deep or less - the limit for geotechnical vessels. Figure by R. Parnell-Turner.