# Scientists reveal we have explored less than 0.01% of the deep ocean



### Unraveling the Depths: The Untold Mysteries of Earth's Oceans

From ancient shipwrecks to exceptional marine life, Earth's oceans are a realm of enigma. Despite decades of exploration, a recent study published in *Science Advances* reveals that we still lack knowledge about 99.999 per cent of the deep ocean. This revelation comes after more than 44,000 dives since 1958, which have visually surveyed an area equivalent to merely one-tenth the size of Belgium. To put this into perspective, it’s comparable to attempting to understand all terrestrial ecosystems by examining a region no larger than Houston, Texas.

The deep ocean, defined as waters deeper than 200 metres, constitutes a staggering 66 per cent of the Earth's surface. However, researchers from the Ocean Discovery League argue that our grasp of its mysteries is extremely limited. Dr Ian Miller, chief science and innovation officer at the National Geographic Society, underscores the enormity of the challenge: “There is so much of our ocean that remains a mystery.” This statement invites reflection on the vast unexplored territories that lie beneath the waves.

#### The Layers of Oceanic Life

The ocean's division into distinct zones adds complexity to the narrative of exploration. The epipelagic zone, reaching depths of 200 metres, represents the only area where sunlight penetrates, allowing photosynthetic organisms like plankton to thrive. These creatures are vital, producing approximately 50 per cent of the planet's oxygen and forming the foundation of the marine food web. However, they inhabit a mere sliver of the entire ocean; in reality, up to 50 per cent of the Earth's surface is covered by waters that plunge far deeper.

Below this sunlit layer lies the mesopelagic zone, or twilight zone, which spans from 200 to 1,000 metres. Studies suggest it might contain ten times more biomass than all other ocean zones combined. Yet, despite these potentially rich ecosystems, our knowledge about life in these depths, particularly in areas like the abyssal plains, remains woefully small.

Researchers have recently reported astonishing finds, including new species such as a sea toad and the so-called “flying spaghetti monster.” However, the grim reality is that humanity has visually explored an area of the deep ocean that is merely the size of Rhode Island. Given the limitations of available data, even optimistic estimates suggest that less than 0.01 per cent of the deep ocean has been observed.

#### Historical Blind Spots and Exploration Disparities

The history of ocean exploration reveals an alarming trend: a majority of documented observations have become outdated. It is estimated that nearly 30 per cent of all observations were compiled before 1980 and consist mainly of low-quality images. Furthermore, a significant portion of this data remains inaccessible due to obsolete storage methods and a lack of digitisation.

The geographical focus of these explorations has also been decidedly narrow, with the vast majority occurring within proximal regions to the US, Japan, and New Zealand. A staggering 97 per cent of deep-sea expeditions since the 1950s have originated from researchers in just a handful of countries, often concentrated around familiar features such as the Nazca Ridge. This penchant for certain habitats leaves vast, lesser-known regions largely ignored, suggesting a trove of undiscovered biodiversity awaiting exploration.

#### Challenging Discoveries and Future Implications

The potential discoveries hidden in the unexplored depths could offer varied benefits, from climate regulation to new pharmaceutical sources. Recently, a finding that metals found at depths of 3,900 metres produce "dark oxygen" challenges previously held assumptions about oxygen production solely attributed to photosynthetic organisms. This discovery not only reshapes our understanding of life's beginnings on Earth but also raises urgent questions regarding the impact of emerging threats like deep-sea mining.

Lead researcher Dr Katy Croff Bell stresses the urgency: “As we face accelerated threats to the deep ocean—from climate change to potential mining and resource exploitation—this limited exploration of such a vast region becomes a critical problem for both science and policy.”

With only a fraction of the deep ocean explored, the need for comprehensive understanding cannot be overstated. Advanced technology and international collaboration are indispensable if humankind is to navigate the complexities of marine life and the ecosystems that regulate our planet. As preparations continue for the UN Decade of Ocean Science for Sustainable Development (2021–2030), the hope remains that a concerted effort can unearth the secrets of the deep, ensuring their preservation for future generations.

In a world where the ocean's depths remain largely uncharted, the potential for new discoveries is both daunting and exhilarating. As we strive to explore these final frontiers, one thing is clear: the marine realm continues to hold countless mysteries, waiting patiently for the light of inquiry to illuminate them.

## Reference Map:

* Paragraph 1 – [[1]](https://www.dailymail.co.uk/sciencetech/article-14686885/Interactive-graphic-deep-ocean-exploration.html?ns_mchannel=rss&ns_campaign=1490&ito=1490), [[2]](https://www.nsf.gov/science-matters/exploring-undiscovered-country-deep-ocean)
* Paragraph 2 – [[3]](https://boem.gov/newsroom/ocean-science-news/boldly-explore-where-no-one-has-explored), [[1]](https://www.dailymail.co.uk/sciencetech/article-14686885/Interactive-graphic-deep-ocean-exploration.html?ns_mchannel=rss&ns_campaign=1490&ito=1490)
* Paragraph 3 – [[1]](https://www.dailymail.co.uk/sciencetech/article-14686885/Interactive-graphic-deep-ocean-exploration.html?ns_mchannel=rss&ns_campaign=1490&ito=1490), [[2]](https://www.nsf.gov/science-matters/exploring-undiscovered-country-deep-ocean)
* Paragraph 4 – [[3]](https://boem.gov/newsroom/ocean-science-news/boldly-explore-where-no-one-has-explored), [[4]](https://oceandecade.org/news/decade-actions-explore-the-deep/)
* Paragraph 5 – [[1]](https://www.dailymail.co.uk/sciencetech/article-14686885/Interactive-graphic-deep-ocean-exploration.html?ns_mchannel=rss&ns_campaign=1490&ito=1490), [[6]](https://www.livescience.com/30890-ocean-deep-mysteries-exploration.html), [[7]](https://www.livescience.com/14493-ocean-exploration-deep-sea-diving.html)

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## Bibliography

1. <https://www.dailymail.co.uk/sciencetech/article-14686885/Interactive-graphic-deep-ocean-exploration.html?ns_mchannel=rss&ns_campaign=1490&ito=1490> - Please view link - unable to able to access data
2. <https://www.nsf.gov/science-matters/exploring-undiscovered-country-deep-ocean> - The National Science Foundation highlights that oceans cover 71% of Earth's surface, yet less than 5% of the deep ocean has been explored and charted. The deep ocean, averaging 3.7 kilometers in depth, presents challenges such as intense pressures, cold temperatures, and darkness, making exploration difficult. Specialized equipment is essential for deep-sea research, which is crucial for understanding marine ecosystems and informing policy decisions. The NSF supports submersible missions to uncover these oceanic mysteries.
3. <https://boem.gov/newsroom/ocean-science-news/boldly-explore-where-no-one-has-explored> - The Bureau of Ocean Energy Management (BOEM) emphasizes the vast unexplored regions of the ocean, noting that over 80% of the global ocean and 50% of the U.S. ocean remain unmapped and unexplored. Challenges include intense pressures, zero visibility, and extreme cold temperatures. Despite these obstacles, BOEM is committed to exploring uncharted U.S. ocean areas using advanced technology and collaboration with federal agencies like NOAA to enhance our understanding and conservation of marine environments.
4. <https://oceandecade.org/news/decade-actions-explore-the-deep/> - The UN Decade of Ocean Science for Sustainable Development (2021-2030) has endorsed four transformative programs to explore the deep ocean. These initiatives aim to observe volcanic and tectonic activities, understand the Twilight Zone (200m to 1000m depth), and address the challenges of deep-sea exploration. The programs seek to uncover the untapped resources of the deep ocean while safeguarding its biodiversity for future generations, highlighting the importance of international collaboration in ocean exploration.
5. <https://www.livescience.com/planet-earth/rivers-oceans/we-know-far-more-about-the-deep-ocean-than-the-moon-or-mars-says-explorer-jon-copley> - Explorer Jon Copley discusses the misconception that we know more about the moon or Mars than the deep ocean. While detailed mapping of the ocean floor is limited, our understanding of deep-sea ecosystems, species interactions, and environmental responses has advanced significantly. Copley emphasizes the importance of dispelling myths and highlights the need for continued exploration to fully comprehend the complexities of the deep ocean.
6. <https://www.livescience.com/30890-ocean-deep-mysteries-exploration.html> - Live Science explores the vast mysteries of the deep sea, noting that while the Census of Marine Life uncovered over 1,200 new species, it also highlighted the extensive unknowns. Experts like Edith Widder and Mike Vecchione suggest that many large animals remain undiscovered, and the deep ocean's complexities continue to challenge scientists. The article underscores the need for ongoing exploration to uncover the secrets of this final frontier.
7. <https://www.livescience.com/14493-ocean-exploration-deep-sea-diving.html> - Live Science discusses the vast unexplored regions of the ocean, noting that as of 2000, NOAA estimated that 95% of the world's oceans and 99% of the ocean floor remain unexplored. The article highlights the challenges of deep-sea exploration, including technological limitations and the need for specialized equipment, and emphasizes the importance of continued research to understand marine ecosystems and inform conservation efforts.