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Deepwater Observations at the Sites of Hydrocarbon Drilling

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Abstract

For more than a decade, the SERPENT Project has been underway. Over 120 visits to oil rigs, drill ships, and survey vessels run by sixteen oil companies have been made by scientists from universities and research institutions during this time to collaborate with the industry's Remotely Operated Vehicles (ROV). Visitors have traveled to water depths of 100 meters to almost 3000 meters in Europe, North and South America, Africa, and Australasia. More than 40 peer-reviewed publications have been directly produced by the project, and numerous other publications have made use of data from its online image and video archive, which has over 2600 entries.

Keywords: Oceanography; Oarfish; Hydrocarbon

Introduction

Chance encounters with large, mysterious marine organisms are increased by the vast number of industry ROVs operating worldwide. The SERPENT video observations comprise the first in situ observations of pelagic species like oarfish (Regalecus glesne) and the deepest known records of species previously thought to be epipelagic, such as scalloped hammerhead (Sphyrna lewini) and southern sunfish (Mola ramsayi). Improvements to distribution records and behavior descriptions of poorly understood species are made possible by these observations. Researches on the chemistry of natural products, functional studies, and taxonomic descriptions have all made use of specimen collection. Studying recovery from drilling has been made possible by the assessment of anthropogenic effects at the local scale through the use of in situ observations, sample collection during drilling operations, and follow-up visits [1-3].

Methodology

The SERPENT approach will be used to address future challenges such as reporting on unique faunal observations made by industry ROV operators, studying recovery from deep-water drilling activity further, and conducting in-situ studies to better understand possible future decommissioning of obsolete hydrocarbon infrastructure. Important services and, increasingly, resources are offered by the world's deep seas. Anthropogenic disruption from industrial exploitation and climate change is a threat to them. For instance, deep-sea hydrocarbon production and exploration are now widespread. In spite of this, there is little research and a dearth of deep-sea research programs across many institutions and nations. In situ observational studies become more constrained as depth increases beyond the reach of divers, even at relatively shallow water depths. There aren't many deep-sea research programs currently in existence because multidisciplinary open ocean research needs specialized equipment like ships, ROVs, and autonomous underwater vehicles (AUVs), in addition to substantial funding [4,5].

The hydrocarbon sector has the financial means to invest in the extensive offshore surveys and the infrastructure needed to operate in water depths of more than 3000 meters. Every day, the industry uses hundreds of deep-water ROVs all over the world. These vehicles may also be kept on standby for extended periods of time during regular operations. The goal of the SERPENT Project (Scientific and Environmental ROV Partnership using Existing Industrial Technology) is to work with hydrocarbon companies to utilize the offshore infrastructure for scientific data collection. Specifically, this will involve having access to ROVs during standby time. Formed to enable field trips to oil rigs in the North East Atlantic in cooperation with BP, Transocean, and Subsea 7 [6-8].

Since then, the SERPENT Project has collaborated with multiple rig operators and ROV contractors worldwide in addition to 16 oil companies. With an emphasis on the Gulf of Mexico, SERPENT hubs independently operate in Australia, New Zealand, and Southeast Asia (SEA SERPENT) as well as the United States (Gulf SERPENT). The SERPENT Project is headquartered at the National Oceanography Centre in Southampton. In situ observations near drilling rigs, whether from scientist visits or remotely operated vehicle operator observations make up a significant portion of the data collection process for the SERPENT Project? It is true that most accidental meetings with large marine creatures take place outside of SERPENT visits. The majority of deep-sea species still have much to learn; in particular, little is known about their behaviour, distribution, and intra-and intraspecific interactions [9-10].

Results

The use of SEREPENT activities on drillships and oil rigs is subject to several important restrictions. The ROV's exploratory range is limited by the length of its tether, which links it to a depressor weight, cage/garage, or "top hat" tether management system. This is because the ROV is launched from a stationary vessel. As a result, the well's radius is roughly 100-500 meters for all observations.

Discussion

Benefits of the SERPENT Project extend beyond science. Knowledge sharing between industry and science is a major advantage. The desire of hydrocarbon exploration companies to evaluate their offshore impacts and gather additional data about the environment they operate in is a major driving force behind much of SERPENT activity. Effective environmental management requires this information, and

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data from SERPENT has led to modifications in drilling practices, such as avoiding cold-seep habitats.

Conclusion

There weren't many projects offering ROV video footage and imagery when the SERPENT Project started in 2002. There are currently more initiatives underway to explore the deep sea and produce high-quality photo and video content. A feature that is unlikely to be available through the SERPENT Project is publicly accessible live ROV video feeds with real-time commentary from experts. Examples of such projects are the Ocean Exploration Trust's E/V Nautilus and NOAA's Okeanos Explorer.

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