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Commentary

An Overview of Oceanography and its Earth Science

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DESCRIPTION

Oceanography is the scientific study of the oceans. It is also known as oceanology and ocean science. It is an important Earth science that covers a wide range of topics such as ecosystem dynamics, ocean currents, waves, and geophysical fluid dynamics, plate tectonics and sea floor geology, and fluxes of various chemical substances and physical properties within and across ocean boundaries. An oceanographer is a type of scientist who specialises in ocean research. Because the oceans are a vast environment, the science of oceanography must be equally vast. Oceanographers study every aspect of the ocean, such as the chemistry of ocean water, the geology of the ocean, the physical movements of ocean water, and even the life that lives in the ocean. As humans have spread to almost every corner of the globe, our impact on the oceans is putting a strain on their ability to function normally. Healthy oceans are critical to the survival of the planet. Oceanographers are among the most important climate researchers working to reduce the effects of climate change, overpopulation, and overfishing.

The 1872-1876 Challenger expedition was a watershed moment in the history of oceanography. This expedition, as the first true oceanographic cruise, laid the groundwork for an entire academic and research discipline. In response to a Royal Society recommendation, the British Government announced in 1871 an expedition to explore the world's oceans and conduct appropriate scientific research. The Challenger expedition was led by Charles Wyville Thompson and Sir John Murray. The Royal Navy leased Challenger, which was modified for scientific work and outfitted with separate laboratories for natural history and chemistry. Under Thomson's scientific supervision, Challenger surveyed and explored for nearly 70,000 nautical miles (130,000 km). During her journey around the world, she took 492 deep sea soundings, 133 bottom dredges, and 151 open seas. 263 serial water temperature observations were made using water trawls. Around 4,700 new marine life species have been discovered. The end result was the report of the scientific results of the exploring voyage of H.M.S. Challenger from 1873 to 1876. Murray, who oversaw the report's publication, called it "the greatest advance in our knowledge of our planet since the celebrated discoveries of the fifteenth and sixteenth centuries." He later established the academic discipline of oceanography at the University of Edinburgh, which remained the centre of oceanographic research well into the twentieth century. Murray was the first to map sedimentary deposits in the oceans and study marine trenches, particularly the mid-atlantic ridge. He was the first to correctly understand the nature of coral reef development and attempted to map the world's ocean currents based on salinity and temperature observations.

Oceans cover approximately 71% of the Earth's surface. While the average depth of the oceans is around 3800 metres, the deepest parts are nearly 11000 metres. The total volume of the marine environment is 300 times larger for life than the combined volume of land and freshwater. The earliest organisms are thought to have evolved in the ancient oceans, long before any forms of life appeared on land. Ocean biology is dominated by organisms that are fundamentally different from organisms on land, and ocean time scales differ greatly from those of the atmosphere. We cannot make assumptions about ocean life for these reasons based on our understanding of land and atmospheric models one of the main reasons for the continued study of biological oceanography is the diversity of life in the ocean. Because there is such a wide range of diversity, there is a need for a wide range of equipment and tools used to study diversity. Because ocean organisms are much more inaccessible and difficult to observe (in comparison to terrestrial organisms), knowledge growth is slower and there is a constant need for further exploration and study.

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