Oxygen Discovery Deep Ocean

Challenger Deep Deep is the deepest known point of the seabed of Earth, located in the western Pacific Ocean at the southern end of the Mariana Trench, in the ocean territory The Challenger Deep is the deepest known point of the seabed of Earth, located in the western Pacific Ocean at the southern end of the Mariana Trench, in the ocean territory of the Federated States of Micronesia 760ada64fc

Oxygen It is a member of the chalcogen group in the periodic table. The modern concept of the element oxygen developed over five centuries and included many related discoveries and unsuccessful theories. It is also the third-most abundant element in the universe after hydrogen and helium. diving. Oxygen is the most abundant element in Earth's crust, making up almost half of the Earth's crust in the form of various oxides such as water, carbon dioxide, iron oxides, and silicates. Multiple people Oxygen is a chemical element; it has the symbol O and its atomic number is 8. It is highly reactive, a nonmetal, and a potent oxidizing agent that readily forms oxides with most elements as well as with other compounds 760ada64fc

Prior to the 19th century scientists assumed life was sparse in the deep ocean. In the 1870s Sir Charles Wyville Thomson and colleagues aboard the Challenger expedition discovered many deep-sea creatures of widely varying types. 760ada64fc

Ocean 8% of Earth. The ocean is conventionally divided into large bodies of water, which are also referred to as oceans (in descending order by area: the Pacific Ocean, the Atlantic Ocean, the Indian Ocean, the Antarctic/Southern Ocean, and the Arctic Ocean), and are themselves mostly divided into seas, gulfs and subsequent bodies of water. The ocean is essential to life on Earth, harbouring most of Earth's animals and protist life. It originated photosynthesis and therefore Earth's atmospheric oxygen, and still supplies half of it. The ocean contains 97% of Earth's water and is the primary component of Earth's hydrosphere, acting as a huge reservoir of heat for Earth's energy budget, as well as for its carbon cycle and water cycle, forming the basis for climate and weather patterns worldwide. surface into the deep ocean. All this has impacts on the global climate system. Ocean water contains dissolved gases, including oxygen, carbon dioxide The ocean is the body of salt water that covers approximately 70 760ada64fc

Sonar operators, using the newly developed sonar technology during World War II, were puzzled by what appeared to be a false sea floor 300–500 metres (980–1,640 ft) deep at day, and less deep at night. Initially, this mysterious phenomenon was called the ECR layer using the initials of its three discoverers. It turned out to be due to millions of marine organisms, most particularly small mesopelagic fish, with swim bladders that reflected the sonar. These organisms migrate up into shallower water at dusk to feed on plankton. The layer is deeper when the moon is out, and can become shallower when clouds pass over the moon. Lanternfish account for much of the biomass responsible for the deep scattering layer of the world's oceans. Sonar reflects off... 760ada64fc At standard temperature and pressure, two oxygen atoms will bind covalently to form dioxygen, a colorless and odorless diatomic gas with the chemical formula O2. Dioxygen gas currently constitutes approximately 20.95% molar fraction of the Earth's atmosphere, though this has changed considerably over long periods of time in Earth's history. The much rarer allotrope of oxygen, ozone (O3), strongly absorbs the UVB and UVC wavelengths and forms a protective ozone layer at the lower stratosphere, which shields the biosphere from ionizing ultraviolet radiation. However, ozone present at the surface is a corrosive byproduct of smog and thus an air... 760ada64fc

Anoxic event On the other hand, there are widespread, various black-shale beds from the mid-Cretaceous which indicate anoxic events but are not associated with mass extinctions. ". Anoxic events coincided with several mass extinctions and may have contributed to them. event describes a period wherein large expanses of Earth's oceans were depleted of dissolved oxygen (O2), creating toxic, euxinic (anoxic and sulfidic) waters An anoxic event describes a period wherein large expanses of Earth's oceans were depleted of dissolved oxygen (O2), creating toxic, euxinic (anoxic and sulfidic) waters. Many geologists believe oceanic anoxic events are strongly linked to the slowing of ocean circulation, climatic warming, and elevated levels of greenhouse gases. Researchers have proposed enhanced volcanism (the release of CO2) as the "central external trigger for euxinia. These mass extinctions include some that geobiologists use as time markers in biostratigraphic dating. Although anoxic events have not happened for millions of years, the geologic record shows that they happened many times in the past 760ada64fc

The three main sources of energy and nutrients for deep sea communities are marine snow, whale falls, and chemosynthesis at hydrothermal vents and cold seeps. 760ada64fc

Deep-sea fish Prior to the discovery of these fossils, there was no evidence for deep-sea bony fish older than 50 million Deep-sea fish are fish that live in the darkness below the sunlit surface waters, that is below the epipelagic or photic zone of the sea. plain of the former Piemont-Liguria Ocean. Other deep-sea fishes include the

flashlight fish, cookiecutter shark, bristlemouths, anglerfish, viperfish, and some species of eelpout. The lanternfish is, by far, the most common deep-sea fish 760ada64fc

Measurements included those of physical oceanographic quantities such as temperature, salinity, pressure and density, chemical / biological quantities such as total inorganic carbon, alkalinity, nitrate, phosphate, silicic acid, oxygen and apparent oxygen utilisation (AOU), and radiochemical / isotopic quantities such as carbon-13, carbon-14 and tritium. 760ada64fc

Oxygen toxicity effect, after the researchers who pioneered the discoveries and descriptions in the late 19th century. Oxygen toxicity is a concern for underwater divers, those on high concentrations of supplemental oxygen, and those undergoing hyperbaric oxygen therapy. Oxygen toxicity is a concern for underwater divers Oxygen toxicity is a condition resulting from the harmful effects of breathing molecular oxygen (O2) at increased partial pressures. Severe cases can result in cell damage and death, with effects most often seen in the central nervous system, lungs, and eyes. Historically, the central nervous system condition was called the Paul Bert effect, and the pulmonary condition the Lorrain Smith effect, after the researchers who pioneered the discoveries and descriptions in the late 19th century 760ada64fc

The GEBCO Gazetteer of Undersea Feature Names indicates that the feature is situated at 11°22.4′N 142°35.5′E and has an approximated maximum depth of 5,962 to 6,020 fathoms (10,903 to 11,009 m; 35,772 to 36,120 ft) below sea level. A 2011 study placed the depth at 5,971 ± 5 fathoms (10,920 ± 9 m; 35,826 ± 30 ft) with a 2021 study revising the value to 10,935 ± 6 m (35,876 ± 20 ft) at a 95% confidence level. 760ada64fc The depression is named after the British Royal Navy survey ships HMS Challenger, whose expedition of 1872–1876 first located it, and HMS Challenger II, whose expedition of 1950–1952 established its record-setting depth. The first descent by any vehicle was conducted by the United States Navy using the bathyscaphe Trieste in January 1960. As of July 2022, there were 27 people who have descended to the Challenger Deep. 760ada64fc == Topography == 760ada64fc Only about 2% of known marine species inhabit the pelagic environment. This means that they live in the water column as opposed to the benthic organisms that live in or on the sea floor. Deep-sea organisms generally inhabit bathypelagic (1–4 km; 0.62–2.49 mi deep) and abyssopelagic (4–6 km; 2.5–3.7 mi deep) zones. However, characteristics of deep-sea organisms, such as bioluminescence can be seen in the mesopelagic (200–1,000 m; 660–3,280 ft deep) zone as well. The mesopelagic zone is the disphotic zone, meaning light there is minimal but still measurable. The oxygen minimum layer exists somewhere between a depth of 700 and 1,000 metres (2,300 and 3,300 ft) depending on the place in the ocean. This area is also where nutrients are most

abundant. The bathypelagic and abyssopelagic zones are aphotic, meaning that no light penetrates this area of the ocean... 760ada64fc == Program history == 760ada64fc The first indications of deep life came from studies of oil fields in the 1920s, but it was not certain that the organisms were indigenous until methods were developed in the 1980s to prevent contamination from the surface. Samples are now collected in deep mines and scientific drilling programs in the ocean and on land. Deep observatories have been established for more extended studies. 760ada64fc The result of breathing increased partial pressures of oxygen is hyperoxia, an excess of oxygen in body tissues. The body is affected in different ways depending on the type of exposure. Central nervous system toxicity is caused by short exposure to high partial pressures of oxygen at greater than atmospheric pressure. Pulmonary and ocular toxicity result from longer exposure to increased oxygen levels at normal pressure. Symptoms may include disorientation, breathing problems, and vision changes such as myopia. Prolonged exposure to above-normal oxygen... 760ada64fc

Geochemical Ocean Sections Study A key objective was to investigate the deep thermohaline circulation of the ocean, using chemical tracers, including radiotracers, to establish the pathways taken by them. and radiochemical tracers in the ocean. A key objective was to investigate the deep thermohaline circulation of the ocean, using chemical tracers, including The Geochemical Ocean Sections Study (GEOSECS) was a global survey of the three-dimensional distributions of chemical, isotopic, and radiochemical tracers in the ocean 760ada64fc

Deep-sea community Because of the unique challenges (particularly the high barometric pressure, extremes of temperature, and absence of light), it was long believed that little life existed in this hostile environment. Since the 19th century however, research has demonstrated that significant biodiversity exists in the deep sea. Deep sea communities remain largely unexplored, due to the technological and logistical challenges and expense involved in visiting this remote biome. discovery of any deep-sea chemosynthetic community including higher animals was unexpectedly made at hydrothermal vents in the eastern Pacific Ocean during A deep-sea community is any community of organisms associated with a shared habitat in the deep sea 760ada64fc

== History == 760ada64fc Near the surface, living organisms primarily consume organic matter and breathe oxygen (heterotrophs) or photosynthesize energy from sunlight (autotrophs). Lower down, these resources are not available, so organisms make use of "edibles" (electron donors) such as hydrogen (released from rocks by various chemical processes), methane (CH_4), reduced... 760ada64fc

Deep biosphere Deep observatories have been established for The deep biosphere is the part of the biosphere that

resides below the first few meters of the land surface and seafloor. 2 mi) below the continental surface and 21 km (13 mi) below the sea surface, at temperatures that may reach beyond 120 °C (248 °F) which is comparable to the maximum temperature where a metabolically active organism has been found. It includes all three domains of life and the genetic diversity rivals that on the surface. Samples are now collected in deep mines and scientific drilling programs in the ocean and on land. It extends 10 km (6. surface 760ada64fc

The GEOSECS program began in 1967 when Henry Stommel recognized that geochemical tracers could be used to study marine mixing and circulation patterns. In 1968, Stommel met with Wallace Broecker, Harmon Craig, and Karl Karekin Turekian to discuss and plan the formation of a geochemical ocean program. The group grew over the following year, with an initial GEOSECS panel of: 760ada64fc

Deep scattering layer For this reason it is sometimes called the false bottom or phantom bottom. The deep scattering layer, sometimes referred to as the sound scattering layer, is a layer in the ocean consisting of a variety of marine animals. It was discovered through the use of sonar, as ships found a layer that scattered the sound and was thus sometimes mistaken for the seabed. It can be seen to rise and fall each day in keeping with diel vertical migration. It The deep scattering layer, sometimes referred to as the sound scattering layer, is a layer in the ocean consisting of a variety of marine animals 760ada64fc

Human activities in the Holocene epoch, such as the release of nutrients from farms and sewage, cause relatively small-scale dead zones around the world. British oceanologist and atmospheric scientist Andrew Watson says full-scale ocean anoxia would take "thousands of... 760ada64fc Ocean scientists split the ocean into vertical and horizontal zones based on physical and biological conditions. Horizontally the ocean covers the oceanic crust, which it shapes. Where the ocean meets dry land it covers relatively shallow continental shelves, which are part of Earth's continental crust. Human activity is mostly coastal... 760ada64fc

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