

Hydrothermal Vent Glossary IV

ABE (autonomous benthic explorer):

An untethered submersible, equipped with cameras and sensors, that navigates by sound beacons for long periods of time, “sleeping” on the ocean floor between pre-programmed duties until signaled to ascend for recovery.

Abyss:

The bottom of the deep ocean below the continental shelf, usually deeper than 6,000 ft (1,755 m) where temperature averages 32-36°f (0-2°c) and salinity is about 35%.

Abyssal Plain:

The nearly flat portion of deep-ocean floor. About 75% of the deep ocean is abyssal plain.

Ambient:

Surrounding.

Anaerobic:

Able to live where there is no free oxygen or air. Obligate anaerobes are unable to live in even small concentrations of oxygen, while facultative anaerobes can live in low or normal concentrations of oxygen as well as where there is none.

Archaea (pronounced "are-kay"):

One-celled, microscopic organisms without a nucleus. Half to two-thirds of their genes are unlike anything else on earth.; they are ancient, first appearing 3 to 4 billion years ago, and tend to favor extreme environments such as hydrothermal vents.

AUV (autonomous underwater vehicle):

Unmanned, battery-operated craft.

Barite:

A white, unusually heavy mineral composed mainly of barium sulfate.

Basalt:

A type of tough volcanic rock that makes up most of the ocean's basins, mid-ocean ridges, and plates.

Bathymetry:

Depth measurement to determine the contours of the ocean.

Benthic:

Region of the ocean pertaining to the ocean bottom.

Biocommunity:

A biological community.

Biological Oceanographer:

Scientist who studies the ocean's plants and animals and their relationship to their environment.

Bioluminescence:

The production of nonthermal light by creatures' converting chemical energy to light energy to lure prey, attract a mate, or assist in keeping like species together. An estimated 75 percent of benthic creatures glow.

Biomass:

The total sum of plants and animals in a given area at a given time, expressed as weight of organisms per unit area or as the volume per unit volume.

Bioremediation:

Correction by biological means.

Biosphere:

The part of the planet that contains living organisms.

Black Smokers:

Roaring jets of super-hot water, usually above 662°F (350°C), that look black due to the presence of iron sulfides (chemical compound). Discharge velocity has been measured at a powerful 6 ft./sec (2m/sec.).

Chemical Oceanographer:

Scientist who studies the chemicals in the ocean, to include mapping the oxygen, minerals and pollution in seawater.

Chemosynthesis:

The production of organic material by energy from chemical reactions rather than light. Hydrogen sulfide is to chemosynthesis what sunlight is to photosynthesis. The oxidation of hydrogen sulfide to sulfate furnishes vent bacteria with the energy needed to produce organic matter. Compare to photosynthesis.

Chimney:

A geological formation that may take various shapes and sizes that forms over a hydrothermal vent by mineral precipitated out of hydrothermal vent water by the colder surrounding seawater.

Continental Rise:

The gently inclined region of ocean floor between the base of the continental slope and the abyssal plain.

Continental Slope:

The steep incline between the continental shelf and the abyssal zone.

East Pacific Rise:

A mountain chain, characterized by volcanic activity and vents, that runs primarily north-south in the Pacific and rises 1-1.5 miles (1.6-2.4 km) above the ocean floor at a width of 1-2 miles (1.6-3.2 km) at an average depth of 1.7 miles (2.7 km). It abuts the North American Plate at the Gulf of California.

Ecosystem:

A community of different but interdependent species and their non-living environment.

Enzymes:

Catalysts for thousands of chemical reactions in cells.

Eurythermal Enzymes:

Organic catalysts that function over a wide range of temperatures.

Extremophiles:

Creatures that live comfortably in environments formerly considered lethal, such as those that are very hot or lack oxygen.

Extremozymes:

Organic catalysts from extremophiles that, unlike most known enzymes, are stable at high temperatures.

Fauna:

Animals.

Floc (flocculant):

Bacteria so dense that they resemble a wooly mass.

Food Chain:

A hierarchy of food relationships from the simplest to the most complex.

Geochemist:

A scientist who studies the chemical composition of the earth's crust and the chemical changes that occur there.

Geophysicist:

A scientist who studies the physics of the earth, to include earthquakes, volcanoes, geomagnetism and the forces that deform the earth's crust and mantle.

Geyser:

A spring from which columns of hot water gush. On land, geysers discharge steam as well as hot water into the air; deep under the ocean, pressure keeps water from turning into steam and the discharge is into the surrounding seawater.

Granite:

A common, hard, coarse-grained rock that makes up most of the continental plates.

Helium-3:

An non-radioactive isotope of helium formed by the decay of tritium. It is a characteristic marker of vents that can be measured far from the vents themselves.

Hemoglobin:

A red, respiratory pigment that carries oxygen and removes wastes.

Hydrogen Sulfide:

The most prevalent chemical dissolved in the sea water of vents. It smells like rotten eggs and is produced when seawater reacts with sulfate in the volcanic rock below the ocean floor.

Hydrothermal Circulation:

The exchange of seawater that seeps through fissures in the ocean's crust; becomes heated, losing and gaining metals in the process and reemerges through hydrothermal vents in the ocean's floor.

Hydrothermal Vent:

An opening in the seafloor through which super-heated water and other materials are discharged into the surrounding seawater.

Hyperthermophiles:

Lovers of extreme heat.

Isotope:

One of two or more species of the same element that differ in their mass numbers because of differing numbers of neutrons in their nuclei.

Juan de Fuca (plate and ridge):

A tectonic plate off the Washington Oregon border of the Western United States and a 400 mile (643 km) ridge of mountains running north-south along a rift in the ocean's crust. It was named for a Spanish sailor said to have sailed these waters in 1592.

Magma:

Molten, mobile, rock material, deep under the earth's crust, about 2200°f (1204°c) made up of silicates, water and gases in solution.

Magma Chambers:

Reservoirs of magma in the earth's crust that may be as shallow as 3.7 – 4.3 miles (6-7 km) below the earth's crust.

Mantle:

The zone within the earth from below the crust to the core made up of semi-molten rock upon which the earth's tectonic plates rest.

Marine Biologist:

Scientist who studies the flora and fauna of the ocean environment.

Marine Geologist:

Scientist who studies the history and properties of the ocean floor.

Megaplume:

Column of hot water containing minerals, microbes and dissolved gases that rises and drifts in the ocean currents for miles. It is often associated with volcanic activity and vent formation.

Microbe:

Microscopic organisms, such as bacteria.

Microbiologist:

A biologist who studies microscopic organisms such as bacteria, archaea and viruses.

Mid-ocean Ridge:

A chain of undersea mountains in every ocean that circles the earth like the seam of a baseball for nearly 37,000 miles (59,545 km) and is the site of active seafloor spreading.

Mother Ship:

The research vessel that transports crew and submersible to research sites. The Atlantis, operated by the Wood Hole Oceanographic Institute, is an advanced research vessel that supports both DSV Alvin and remotely operated vehicles such as ABE. It has labs for scientific experiments, a machine shop, advanced navigation systems, on-board sonar that maps a 1.8 mi (2.9 km) width of ocean floor, Doppler radars to measure currents, and a bank of computers.

Nazca Plate:

One of the sections of the earth's crust in the Pacific. It is west of the abutting South American plate.

Neutral Buoyancy:

Suspended, floating in the water.

Oceanography:

The inter-disciplinary, scientific study and exploration of the world's oceans.

Pacific Plate:

One of the major tectonic plates of the earth's crust. It is moving westward at ~ 8 cm/year and abuts, among others, the Nazca plate that is spreading more slowly eastward.

Photosynthesis:

The production of chemical compounds such as sugars from carbon dioxide and water with the aid of light as the energy source. Compare to chemosynthesis.

Physical Oceanographer:

Scientist who studies the ocean's movement and structure, to include current, waves and tides.

Plates:

Huge, mobile rock slabs of varying sizes and thicknesses that form the earth's crust.

Primordial:

Existing at or from the beginning of time.

Rift Valley:

The trough formed between two fault zones.

ROV (remotely operated vehicle):

Unmanned submersible tethered to a mother ship where an operator pilots it using a joy stick based on real-time videos the ROV sends to the mother ship.

Seafloor Spreading Zones:

Areas, usually in the mid-ocean ridge, where magma flows up and hardens to fill the spaces created by the separation of adjacent tectonic plates.

Seamount:

An isolated volcanic peak that rises at least 3280 feet (1000m) from the seafloor.

Slurper:

A device on the manipulator arm of submersibles to collect water samples.

Sonar:

Acronym from SOund NAVigation Ranging. Active sonar that is used to measure ocean depth sends sound to bounce off the ocean floor.

Submersibles:

Small, battery-operated submarines that can withstand the great pressure of the deep ocean; usually dependent on a mother ship for maintenance and transportation to and from the research area.

Symbiosis:

The interdependence of two separate organisms for the benefit of one or both.

Tectonics:

A study of the building and changing of the earth's crust.

Thermophile:

Heat-loving organism.

Tritium:

A radioactive isotope of hydrogen. When it decays, it produces helium-3 as a decay product.