

What are benthic organisms?

Benthic organisms, also called Benthos, are animals and plants that live on, in, or near the bottom of water bodies. The benthic community is made up of invertebrates, fish, algae, and seagrass. Benthic invertebrates are animals without a backbone and include insects, mollusks (snails and mussels), worms, and crustaceans (crabs, shrimps). They are part of many ecosystems worldwide, including lakes, rivers, estuaries, tidal flats, mangrove forests, and coral reefs. In the oceans they occur from the intertidal zone down to the deep sea.

Why are they important?

Benthos is a food source for other organisms, for instance fish, birds and crustaceans. It is also a source of food and income for many people. Benthic animals are important for the decay of organic matter and the release of nutrients. Thus, they are essential part of food webs and promote nutrient cycling. Through feeding and burrowing, they contribute to carbon storage and oxygenation of sediments. Some invertebrates like mussels and barnacles filter suspended particles from the water, thus improving water quality.

Benthic animals in Hainan

Grazing nudibranch



Fiddler crab
Gelasimus vocans



Gastropods at tidal flat



Goose barnacle *Lepas*



Prawns sold at local market



Mussels collected by local people in tidal flat



Soldier crab *Myctiris* burrowing and feeding



Photos: I. Nordhaus



Webpage

<http://ecoloc.zmt-bremen.com>

Sponsored by



Editor

Dr. Inga Nordhaus, Dr. Franziska Günther
Leibniz Centre for Tropical Marine Research
Fahrenheitstr. 6, 28359 Bremen

Benthos classification

Divided by type

- **Phytobenthos** comprises the benthic plants, mainly macroalgae, diatoms, and seaweed.
- **Zoobenthos** comprises benthic animals such as crustaceans, mollusks, worms, and fish.

Divided by size

- **Macrobenthos** such as clams or amphipods is larger than 1 mm.
- **Meiobenthos** such as bristle worms, mud dragons, and copepods is 63 μm to 1 mm in size.
- **Microbenthos** such as diatoms and bacteria is smaller than 63 μm .

Divided by location

- **Endobenthos** lives buried in the sediment like bristle worms.
- **Epibenthos** lives on top of the sediment like sea anemones.
- **Hyperbenthos** lives above the sediment like benthic fish.



Sampling of benthic organisms
Photos: I. Nordhaus

What are the threats?

Benthic communities are strongly affected by environmental conditions, including sediment composition, water quality, salinity, hydrological factors, and by direct human intervention.

The main threats are:

- Waste, pesticides, oil pollution, and fertilizer impairing the water quality
- Overexploitation, overfishing
- Destruction of their habitats
- Changes in the natural hydrologic regime

Benthos as indicator

Because of their low mobility, benthic organisms cannot avoid unfavourable conditions. Therefore, some of them are used as indicators in water quality assessment studies. They respond to pollution with a decrease in density and biomass, reproduction impairment, and pollutants accumulate in their tissues.

Further interesting facts

- The term "benthic" is derived from the Greek " $\beta\acute{\epsilon}\nu\theta\omicron\varsigma$ " meaning "depth".
- Benthic organisms are numerous (up to 20,000 individuals/ m^2).
- Benthic habitats cover 70% of the Earth.

Interesting links

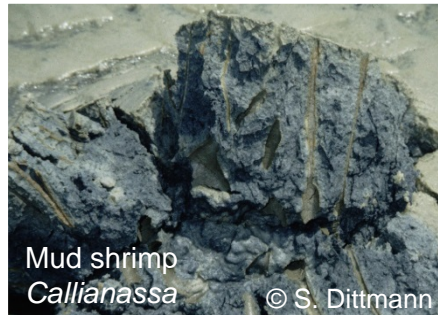
Ecological functions of benthic animals

Water Filtration

- Oysters filter suspended particles from the water, including small algae, sediment and pollutants.
- One mussel filters up to several liters per hour.
- Oyster reefs are important for water purification and shore protection and provide habitat for other organisms.



Oxygenated burrow walls



Casts from crab burrows



Bioturbation

- Burrowing by crustaceans, worms and clams provides oxygenated habitats which increases biodiversity.
- The shape and depth of burrows are species-specific.
- Excessive salt is washed out through the burrows.
- Through digging, nutrients are distributed in the sediment.
- One bristle worm can pump up to 240 ml of water per hour through its burrow.

