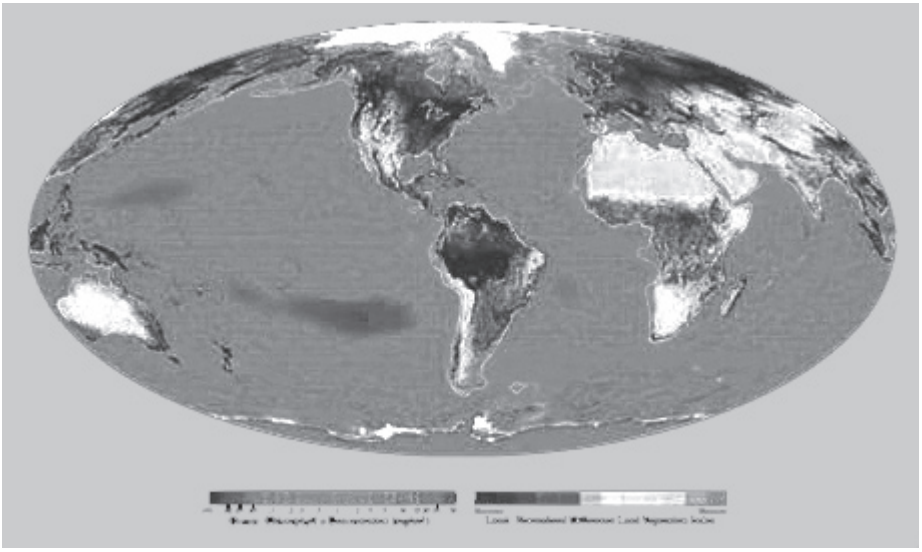
What is the biosphere?



The biosphere, (*from Greek bios = life, sphaira, sphere*) is the layer of the planet Earth where life exists. This layer ranges from heights of up to ten kilometres above sea level, used by some birds in flight, to depths of the ocean such as the Puerto Rico trench, at more than 8 kilometres deep. These are the extremes; however, in general the layer of the Earth containing life is thin: the upper atmosphere has little oxygen and very low temperatures, while ocean depths greater than 1000 m are dark and cold. In fact, it has been said that the biosphere is like the peel in relation to the size of an apple.

The development of the term is attributed to the English geologist Eduard Suess (1831-1914) and the Russian physicist Vladimir I. Vernadsky (1863-1945). The biosphere is one of the four layers that surround the Earth along with the lithosphere (rock), hydrosphere (water) and atmosphere (air) and it is the sum of all the ecosystems.

The biosphere is unique. So far there has been no existence of life elsewhere in the universe. Life on Earth depends on the sun. Energy, provided as sun light, is captured by plants, some bacteria and protists, in the marvellous phenomenon of photosynthesis. The captured energy transforms carbon dioxide into organic compounds such as sugars and produces oxygen. The vast majority of species of animals, fungi, parasitic plants and many bacteria depend directly or indirectly on photosynthesis.

In the late 70's ecosystems were discovered which were relatively independent of the sun. From fissures in the deepest ocean, water of extremely high temperature (400° C) vents out, heated by the magma beneath the Earth's crust. On contact with the cold water dissolved minerals precipitate, forming chimneys that can reach great heights. In the vicinity of hydrothermal vents exists a dense animal community that is dependent on chemosynthetic bacteria. The bacteria use and convert sulphur compounds driven out by the hot water and are preyed upon by a variety of animals including small crustaceans (amphipods and copepods), which in turn are prey for snails, crabs, shrimp, worms, giant tube worms, fish and octopus.

Gaia hypothesis. English chemist James Lovelock (1919 -) proposed the hypothesis that the Earth functions as an interactive system in which living things have an influence on their physical characteristics and vice versa. Gaia, also known as Gea, was the Greek goddess of the Earth and regarded as mother goddess. She was equivalent to the Roman goddess Terra.