

15 Caribbean Sea

Overview

The Caribbean Sea is a semi-enclosed sea located in the Western Hemisphere between North and South America, and which is bounded by Central America to the west. It encompasses an area of 2,515,900 km². It is noted for its many islands, including the Leeward and Windward Islands, Cuba, Puerto Rico, Jamaica and the Cayman Islands.

< <http://www.edc.uri.edu/lme/text/caribbean-sea.htm> >

Location



Basic information

Surface area : 2,515,900 km²

Maximum depth : 7,535 m

Nature

< Background >

The Caribbean Sea is bordered by 36 nations, including continental countries, island nations and dependent territories. Some of these nations have large populations and industries, while others are sparsely populated. At present, the responsibility for the region's marine resources is divided between these 36 nations.

There are numerous banks and breaking shoals in the Caribbean Sea. It is comprised of four deep basins - the Venezuelan Basin in the east, the Colombian Basin in the west, the Cayman Trough and the Yucatan Basin in the northwest.

< <http://www.cep.unep.org/index.html> >

< <http://www.edc.uri.edu/lme/text/caribbean-sea.htm> >

Climate

The climate is generally tropical, but it depends on local variations in mountain altitude, water currents and trade winds. The average annual precipitation is about 254 mm, the range being 25 mm on the island of Bonaire, off the coast of Venezuela, to 8,890 mm in parts of Dominica. The hurricane season is from June to November, but they are most common in September. The annual average is eight such storms. The Caribbean has fewer hurricanes than the western Pacific and the Gulf of Mexico.

< http://www.east-buc.k12.ia.us/00_01/BW/kg/kg.htm >

Topography

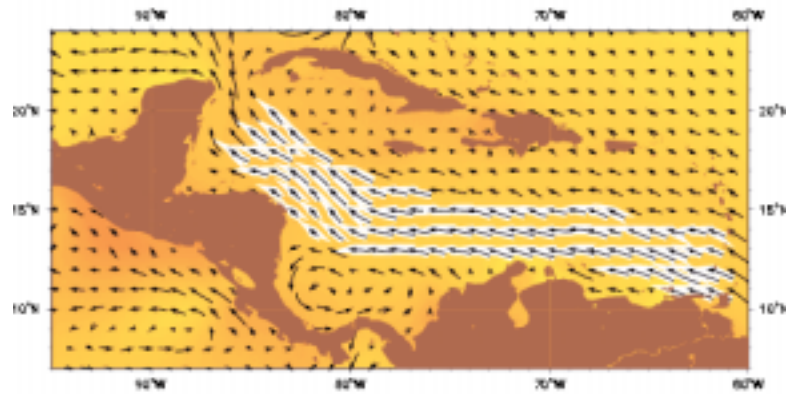
Geologically, the Caribbean Sea consists of two main basins, which are separated by a broad, submarine plateau. With a few exceptions, the entire Caribbean Basin is more than 1,830 m deep. Large areas of the sea exceed 3,660 m in depth; the greatest depth measured thus far is the Cayman Trench, between Jamaica and the Cayman Islands, at 7,535 m.

< <http://www.factmonster.com/ce6/world/A0857182.html> >

Hydrology

In the Caribbean Sea water enters the Sea through the Lesser Antilles, is warmed and exits via the Yucatan Channel, and flows into the Gulf of Mexico. Volcanic activity and earthquakes are common in the Caribbean, as are destructive hurricanes that originate over the sea or in the Atlantic.

The closely-spaced chain of islands, banks and sills of the Antilles Islands Arc separate the Caribbean from the Atlantic Ocean and act as a sieve for the inflow of Atlantic Ocean water. The Caribbean Sea is highly stratified in the upper 1,200 m of the water column, weakly stratified between 1,200 and 2,000 m, and nearly homogeneous below 2,000 m. This water structure is directly related to the sill depths of the Antilles Islands Arc, for they impede the flow of deep water into the Caribbean.



The Caribbean current as represented by the Mariano Global Surface Velocity Analysis.

< <http://oceancurrents.rsmas.miami.edu/caribbean/caribbean-cs.html> >

< Surrounding environment >

Wildlife

The Caribbean coastal zone contains many productive and biologically complex ecosystems. Nearshore marine habitats include coral reefs, seagrass beds, mangroves, coastal lagoons, beaches and benthic mud communities. Of these, the coral reefs are the most visible and well researched.

The Caribbean region contains a rich variety of complex ecosystems with a great abundance of plant and animal species, some of them endemic to the region. Along the coast of Belize is the second-longest barrier reef in the world and the longest one in the northern hemisphere. The number of endemic species is high compared to the total number of species. For example, in Jamaica, the ratio of endemic to total species is 27:256 for breeding birds, 20:24 for lizards, 15:19 for frogs and toads, 82:579 for ferns and 784:3,000 for flowering plants.

The Caribbean region contains diverse and productive coastal and marine habitats. The region represents the greatest concentration of biodiversity in the Atlantic Ocean Basin. Because the nations in this region depend heavily on the health and beauty of the natural world to generate income, the conservation of the region's biodiversity is not only linked to social, cultural and political conditions, but also to the economic realities of the region. Coral reefs, seagrass meadows and mangroves are among the best known marine and coastal ecosystems in the Caribbean region, and are large contributors to the biodiversity of the region.

< <http://www.edc.uri.edu/lme/text/caribbean-sea.htm> >

Corals

The Caribbean Sea ecosystem is showing signs of stress, particularly in the shallow waters containing coral reef systems. There have been unexplained episodes of massive coral bleaching and coral deaths.

Coral reefs are among the most important coastal resources in the Caribbean, and are also among the most productive. There are around 70 species of corals in the Caribbean.

< <http://www.cep.unep.org/index.html> >

< <http://www.edc.uri.edu/lme/text/caribbean-sea.htm> >

History and Culture

< History >

The Caribbean Sea got its name from the original inhabitants of the Caribbean - the Carib people. These indigenous Indians inhabited the region at the time of arrival of the first Spanish explorers.¹⁰

After the Caribbean was visited by Christopher Columbus in 1493, Spain claimed the area, and its ships searched for treasure. With the Spanish discovery of the Pacific Ocean in 1513, the Caribbean became the main route of their expeditions and, later, of convoys. Pirates and warships of rival powers preyed on Spanish ships in the Caribbean. Although Spain controlled most of the sea, Britain, France, the Netherlands and Denmark established colonies on the islands along the eastern fringe. The 1800s brought United States ships into the Caribbean, especially after 1848, when many gold-seekers crossed the sea to reach California via Panama.

After unsuccessful French attempts in the late 1800s to build a canal across Panama, the U.S. assumed control of the project in 1903. The 1914 opening of the Panama Canal paved the way for increased U.S. interest and involvement in this strategic sea, sometimes called the 'American Mediterranean'. Several Caribbean islands have U.S. military bases, many of which were established during World War II as support bases to protect the Panama Canal. The naval base at Guantanamo Bay, Cuba (est. 1899) is the oldest U.S. Caribbean base.

U.S. policy since the Monroe Doctrine of 1823 has been to exclude foreign powers from the Caribbean. However, in 1959, Cuba became the first country to come under strong Soviet influence. U.S. intervention in the affairs of Caribbean countries, such as the Cuban missile crisis of 1962, the landing of U.S. marines at Santo Domingo in 1965 and at Grenada in 1983, and the U.S. invasion of Panama in 1989, reflects the region's importance to the United States.

< <http://www.welcometothecaribbean.com/environment.htm> >

< Culture >

The languages and cultures of the foreign occupiers (Spain, Great Britain, France, the Netherlands and the U.S.) were different, as were the management systems and laws that the different occupiers bequeathed to these territories. Most of these territories are now independent and democratic.

The major ethnic groups of the region - the East Indians, Africans, and Europeans - have maintained their ability to reconnect with their ancestral heritage to varying degrees. European traditions, while they account in many respects for the official articulation of culture, are often supplanted by ethnic identity, especially for the majority of African traditions.

< <http://www.welcometothecaribbean.com/culture.htm> >

Social Environment

< Population >

The total population of the Caribbean Region was approximately 38 million in 2001. Among the most populated Caribbean countries are Cuba, the Dominican Republic and Haiti, whilst those with the smallest populations include Turks and Caicos, Montserrat and the British Virgin Islands.

Many Caribbean countries can be characterized by a very high population density. The population density of the Barbados is 607 people per km² and in many other Caribbean countries the densities are over 200 people per km². The majority of the population in the Caribbean lives on the coast.

< <http://www.unhabitat.org/habrdd/latin.html> >

< Land use >

In the Caribbean, forest covers only 19 per cent of the land, and 27 per cent of the land is used for arable or permanent crops.

In many Caribbean countries, land-use planning and land management is hardly practiced. In some instances, this has led to inappropriate land usage



and increasing land degradation. Such a situation is particularly problematic in the smaller Caribbean islands, characterized by limited land space and conflicting land usage.

< <http://www.unhabitat.org/habrdd/latin.html> >

< **Industry** >

Tourism is a large and fast growing industrial sector in the wider Caribbean region. Regional tourism increased by 6.7 per cent in 1996. The tourism sector accounts for about 25 per cent of the gross domestic product (GDP). The expectation is that tourism will increase its contribution to 36 per cent of the GDP in the next 10 years.

The cruise industry in the Caribbean region is extremely important, as it hosts 50 per cent of the cruising passengers of the world. The growth of this industry was 10.8 per cent in 1996, and it continued to grow at an average of 6.6 per cent until the year 2000.

The manufacturing industry is not very developed in the region, with the exception of Puerto Rico where 41.1 per cent of the GDP is generated by the textile, furniture, foodstuffs, beverage, construction material, chemical, electronics and cigarette industries. In the case of Colombia, 10 per cent of its national industry is located close to the Caribbean Sea.

The agriculture sector accounts for about 25 per cent of the GDP in the region. Sugar production in the region accounts for about 33 per cent of the world's production and 40 per cent of the world's exports. Bananas account for 50 to 60 per cent of total exports of the eastern Caribbean countries, and the region accounts for 3 per cent of the total world's exports. Pesticide use and pest control is a key issue in the region.

The mining sector accounts for 29.3 per cent of the world's production of Bauxite, 22.3 per cent of alumina and 10.1 percent of aluminum. The oil and gas industry is very important in the region.

< <http://www.gpa.unep.org/seas/workshop/carib.htm> >

Environmental Problems

< **Current status** >

Water Quality

Sewage is one of the most significant pollutants affecting the coastal environments of the wider Caribbean region, especially in the developing nations. A recent survey conducted in 11 Caribbean Community (CARICOM) countries by the Pan American Health Organization (PAHO) reported that the percentage of population served by sewage systems varied from 2 to 16 per cent. The inadequate number of sewage treatment plants in operation combined with the poor operating conditions of available treatment plants, are likely to have an adverse effect on the quality of coastal waters.

Nutrient enrichment is also an increasing concern in the region. The main nutrients are nitrogen and phosphorus compounds, and they enter coastal waters from point and non-point sources.

Offshore oil and gas exploitation can be sources of pollution, either in the form of accidental oil spills or from the release of 'produced water' from the oil-bearing strata during oil and gas production. The 'produced water' is discharged into the marine environment, together with waste drilling chemicals and mud. The 'produced water' may contain substances that exert high oxygen demand, together with toxic poly-aromatic hydrocarbons (PAHs), benzene, ethylbenzene, xylene and heavy metals, such as lead, copper, nickel and mercury.

In spite of regulations established in Annex I of MARPOL 73/78, tankers and barges do not always use port facilities for the disposal of bilge, for tank washing and for wastes. A significant amount of oil is discharged into the coastal areas of the wider Caribbean region this way. This deliberate release far exceeds the amount of oil entering the sea from accidental oil spills.

Sediment Quality

Most of the rivers discharge sediment loads ranging from 100 to 1,000 mg/l into the coastal waters of the wider Caribbean region. The yearly sediment load in the region can be estimated at 10⁹ tons per year,

which is approximately 12 per cent of the global sediment input from rivers, estimated at 8×10^9 tons/year. Most land in the Caribbean region, especially on the small islands, is relatively near the ocean, making the coastal and marine environments especially vulnerable to the sedimentation caused by human activities. In addition, the coastal areas are under increasing development pressure, while the shortage of land on small islands forces development activities onto steeper, erosion-prone terrain. In many Caribbean countries, intensive mining of beach sand, as well as inappropriate coastal engineering, such as the construction of breakwaters and seawalls, has led to increased coastal erosion. All of these activities combined can have serious ecological impacts.

Other Environmental Issues

Some of the main threats to biodiversity in the wider Caribbean region are: habitat destruction due to coastal development, population growth, tourism, sedimentation and pollution; overexploitation of living resources, including fisheries; and predation by introduced species. As a result, coral reefs, seagrasses and mangroves, among other coastal ecosystems, are under intense pressure, threatening the biodiversity in the region.

The Caribbean Sea ecosystem is showing signs of stress, particularly in the shallow waters of coral reef systems. There have been unexplained episodes of massive coral bleaching and coral deaths. Large sections of reefs are smothered by macroalgae. Two other diseases affecting coral are black ring disease and white band disease. The latter killed 90 per cent of the *Acropora palmata* off Buck Island, St. Croix, in the U.S. Virgin Islands. Coral-reef degradation is caused by increased sedimentation, anchor damage, excess nutrients, ship groundings, storms, hurricanes and diver contact.

< <http://www.cep.unep.org/index.html> >

< Environmental Protection Measures >

The Cartagena Convention and its protocols constitute an important legal instrument for regional cooperation in the wider Caribbean. The Cartagena Convention entered into force in 1986 for the purposes of the protection and management of the marine and coastal areas of the wider Caribbean region. The UNEP regional coordinating unit is administering the convention. The convention has three associated protocols under development, as follows.

- The Oil Spills Protocol provides for regional cooperation when an oil spill threatens the coast of a participating state, and for the preparation and updating of contingency plans. This protocol is in force.
- The Protocol Concerning Specially Protected Areas and Wildlife (SPA) provides for the protection and management of marine areas and associated terrestrial areas, as well as wildlife. This protocol is supported by a special subprogram of the Caribbean Environment Programme called the SPAW Programme. The protocol has been adopted but is not in force.
- The Land-Based Sources (LBS) Protocol, which though not yet finalized, is expected to become an instrument for dealing with environmental pollution that reaches the marine environment from land-based sources. The Protocol is supported by a special subprogram of the Caribbean Environment Programme called the Marine Pollution and Integrated Environmental Management Subprogramme (AMEP).

Monitoring program

The Caribbean Coastal Marine Productivity (CARICOMP) Programme is a regional scientific effort to study land-sea interaction processes, to monitor for change and to provide appropriate scientific information for management. Current flow, water quality, sediment quality, biological parameters and coral reef health are some of the parameters monitored in the program.

Related organizations and NGOs

- Caribbean Environment Programme (CEP)

The Caribbean Environment Programme (CEP) is facilitated by the Caribbean Regional Co-ordinating Unit (CAR/RCU) located in Kingston, Jamaica. Created in 1986, CAR/RCU serves as Secretariat to CEP. As a sub-programme of UNEP's Regional Seas Programme, CAR/RCU is under the administration of the UNEP Headquarters in Nairobi, however it is also directly responsible to the member Governments of the

Wider Caribbean Region.

< <http://www.cep.unep.org/index.html> >

- Specially Protected Areas and Wildlife in the Wider Caribbean Region (The SPAW Programme)

A new but integral component to the subprogramme of the Caribbean Environment Programme (CEP) on Specially Protected Areas and Wild Life (SPAW) is the on-going USAID/UNEP Caribbean Environment Network (CEN) Project on promotion of environmentally sound tourism in the Wider Caribbean Region.

< <http://www.cep.unep.org/programmes/spaw/spaw.html> >

- LAKENET

LAKENET is a global network working on the conservation and sustainable management of lakes. Its Secretariat is a U.S.-based nonprofit organization dedicated to protecting and restoring the health of the world's lakes. It has a marine program for Wider Caribbean region.

< <http://www.monitorinternational.org> >

- The Caribbean Natural Resource Institute (CANARI) < <http://www.canari.org/> >
- FUDENA (Venezuela) < <http://www.fudena.org> >
- Nicaraguan Association for Sustainable Development < <http://www.sdnnic.org.ni/> >
- Caribbean Conservation Association (Barbados) < <http://www.ccanet.net/> >
- Sea Turtle Survival League Caribbean Conservation Corporation (USA)
< <http://www.cccturtle.org> >
- Island Resources Foundation (St. Thomas) < <http://www.irf.org> >
- National Association for Natural Conservation (Panama) < <http://www.ancon.org> >