Baffin Bay is a semi-enclosed sea between Greenland and the Canadian islands of Ellesmere, Baffin, and Devon. It is connected to the North Atlantic through Davis Strait and to the Arctic Ocean through Nares Strait, Jones Sound, and Lancaster Sound. Baffin Bay is approximately 1200 km (746 mi) by 500 km (300 mi) in size with an area of approximately 700,000 sq km (290,000 sq mi).

Geology and Oceanography

The average depth of Baffin Bay is approximately 725 m (2379 ft), reaching a maximum depth of over 2700 m (8858 ft) in the Baffin Basin. The slope on the Canadian side is particularly steep. Communication to other ocean areas is limited by a shallow sill across Davis Strait of about 600 m (1969 ft) depth and even shallower sills across Nares Strait, Jones Sound, and Lancaster Sound of 150-200 m (492-656 ft) depth. The Baffin Basin is a remnant of the formation of the bay during the early Tertiary period (approximately 56 million years ago) when the bay was the site of an active spreading zone. The spreading left behind numerous normal and transform faults, and Baffin Bay and its environs are one of the most geologically active areas in the Arctic. The strongest earthquake ever recorded north of the Arctic Circle (magnitude 7.3) occurred in Baffin Bay off the coast near Pond Inlet in November 1933. The floor of Baffin Bay is composed mainly of Quaternary sediments.

The ocean water in Baffin Bay is highly stratified. The surface water, of Arctic origin, is cold and fresh. Below the Arctic layer is a layer of Atlantic origin, which is warm and saline. Below the Atlantic layer are Baffin Bay Deep Water and Baffin Bay Bottom Water, both of which are cold and saline. Two major ocean currents influence the water in Baffin Bay. The West Greenland current, a subsurface warm current, flows north along the West Greenland coast. The Baffin Current, a surface cold current, flows south along the east coast of Baffin Island. On a net annual basis, approximately 1.7 Sv (Sverdrup) flows out of the Arctic Ocean through Baffin Bay, making the bay the second most important conduit between the Arctic Ocean and the rest of the world's oceans.

Climate and Ice Cover

Lying entirely north of the Arctic Circle, Baffin Bay has a cold and dry polar climate. Annual average temperatures range from -12°C (10°F) in the northwest to -5°C (23°F) in the southeast. Precipitation is low; however, fog is a common occurrence in coastal areas and near openings in the ice cover. Along the Greenland coast, offshore katabatic winds (cold air flowing off inland mountains or icefields) are frequent. The usual track for cyclones is from west to east just south of Davis Strait; however,
Baffin Bay is covered by sea ice from October through May. Ice cover in Baffin Bay is almost entirely first-year ice (less than 1.6 m thick), although some multiyear ice enters the bay through Smith, Jones, and Lancaster Sounds. Because of wind and ocean currents, sea ice may pile up in places to a thickness of 3-4 m (10-13 ft). Off the southwestern coast of Greenland, ice cover tends to be reduced because of the warm ocean currents. At the northern end of the bay, in Smith, Jones, and Lancaster Sounds, episodic openings in the ice (called polynyas) form under the influence of winds and upwelling warm water. Collectively, these polynyas form what is called the North Water. The North Water is known to influence climate for hundreds of kilometers in all directions, and the large amount of heat pumped into the atmosphere through the polynyas sometimes triggers the formation of local cyclones.

A stream of icebergs passes through Baffin Bay, originating primarily from glaciers in northwestern Greenland. The typical track for the icebergs is north along the Greenland coast and south with the Baffin Current, after which the bergs join the Labrador Current and move out into the North Atlantic. Between 10,000 and 15,000 icebergs pass through Baffin Bay annually, creating a significant hazard for shipping.

**Ecology**

As is typical of Arctic marine environments, the Baffin Bay ecosystem is characterized by low productivity, low populations, and few trophic levels. Plankton are the primary producers, while primary consumers include crustaceans, molluscs, fish (char, turbot, Arctic cod), and bowhead whales. Secondary consumers include ringed seals, harp seals, walrus, narwhal, killer whales, and beluga whales. The Baffin Bay whale population remains very low as a result of excessive harvesting before 1900. Polar bears can be found along the shores of Baffin Bay.

**Exploration and Mapping**

Humans first arrived in the Baffin Bay area around 4500 years ago in the first of three distinct migrations of Inuit from the west. The Inuit were attracted by the open water areas, which served for both food and transportation. The first Europeans to explore Baffin Bay were Norse, who established settlements in West Greenland in the 10th century and explored the Canadian side of the bay, perhaps as far south as Newfoundland. With the collapse of the Norse Greenland colonies in the 13th century, European knowledge of the bay was lost until 1587 when John Davis passed through what is now called Davis Strait searching for a North West Passage to Asia. William Baffin and Robert Bylot further
explored the bay in 1616 and charted the positions of Jones, Lancaster, and Smith Sounds. Whaling in Baffin Bay developed rapidly after these voyages, although the treacherous ice and weather conditions in the bay claimed many ships. The 19th century was another period of exploration, including the voyages of John Franklin (1819), William Parry (1819), and John Ross (1829). A dramatic expansion of knowledge of Baffin Bay began in the mid-1800s with the loss of a large expedition led by John Franklin and the subsequent rescue efforts. Baffin Bay and Lancaster Sound formed part of the route taken by Roald Amundsen, who finally completed the North West Passage in 1903-1905.

Economic and Social Importance

Today, the land on both sides of the bay is inhabited primarily by Inuit peoples. Sovereignty over Baffin Bay is divided between Canada (Nunavut) and Greenland (Kalaallit Nunaat), with a line of demarcation running roughly through the middle of the bay. Although fish catches are limited on the Canadian side to avoid damage to the marine ecosystems, fishing is an important part of the Inuit subsistence economy and the basis of a small, but growing, industry. Turbot, char, and Arctic cod are the major commercial species. Communities on the Greenland side rely on fishing as the primary economic activity. Shrimp production and fishing for Greenland halibut are also very important along the Greenland coast. Commercial shipping in Baffin Bay is limited to a few months in the summer. Possible oil reserves in Baffin Bay have been estimated at 400 million barrels, and exploration for these resources is beginning.

See also Arctic Ocean; Baffin Island; Davis Strait; Devon Island; Ellesmere Island; Lancaster Sound

Further Reading


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