

ICEBERG AS A LARGE FLOATING MASS OF ICE DETACHED FROM A GLACIER  
OR ICE SHEET AND CARRIED OUT TO SEA<sup>\*1</sup>Dushyant P. Chaudhary, <sup>2</sup>Dr. Dhrubo Jyoti Sen & <sup>3</sup>Dr. Pruthviraj K. Chaudhary<sup>\*1</sup>The University of Texas at Arlington, 701 S Nedderman Drive, Arlington, Texas-76019, USA.<sup>2</sup>School of Pharmacy, Techno India University, Salt Lake City, Sector-V, EM: 4/1, Kolkata-700091, West Bengal, India.<sup>3</sup>Shri Sarvajani Pharmacy College, Gujarat Technological University, Arvind Baug, Mehsana-384001, Gujarat, India.

Article Received: 03 December 2025

Article Revised: 23 December 2025

Article Published: 01 January 2026

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DOI: <https://doi.org/10.5281/zenodo.18045183>**How to cite this Article:** Dushyant P. Chaudhary, Dr. Dhrubo Jyoti Sen Dr. Pruthviraj K. Chaudhary (2025). Iceberg As A Large Floating Mass of Ice Detached From A Glacier or Ice Sheet and Carried Out To Sea. World Journal of Advance Healthcare Research, 9(12), 220–223.

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**ABSTRACT**

An iceberg is a large chunk of freshwater ice, over 15 meters long, that has broken off a glacier or ice shelf and floats freely in the ocean, with most of its mass (about 90%) hidden underwater; they come in shapes like flat-topped tabular or irregular non-tabular forms, and the term also refers to an emotionally distant person or a type of lettuce.

**Characteristics**

- Origin: Forms from glaciers or ice shelves that reach the sea, a process called "calving".
- Size: Must be over 15 meters (about 50 feet) long to be an iceberg, with smaller pieces called "bergy bits" or "growlers".
- Appearance: Often white, but can appear blue due to compressed ice; tabular ones have flat tops, while others are irregular.
- Visibility: Only about 10-11% is visible above water, creating the famous "tip of the iceberg" phenomenon.
- Location: Found in Polar Regions (Antarctica, Arctic) and glacial lakes.
- Other meanings:
- Figurative: An emotionally cold or reserved person, as in "a cold iceberg".
- Lettuce: A crisp, pale green lettuce variety with mild flavour, known for its crunch.
- Technology: Apache Iceberg is an open-source data lake table format for large datasets.

**KEYWORDS:** iceberg, growlers, bergy, ice water, glacier, Antarctica.**INTRODUCTION**

An iceberg is a piece of fresh water ice more than 15 meters (16 yards) long that has broken off a glacier or an ice shelf and is floating freely in open water. Smaller chunks of floating glacially derived ice are called

"growlers" or "bergy bits". Much of an iceberg is below the water's surface, which led to the expression "tip of the iceberg" to illustrate a small part of a larger unseen issue.

**Figure-1: Iceberg in Antarctica.**

An iceberg is a large chunk of freshwater ice, bigger than 15 meters that has broken off a glacier or ice shelf and floats in the ocean, with most of its mass hidden underwater. These massive ice formations, like the one that sank the Titanic, are common in polar regions and calve (break off) from glaciers, appearing white due to air bubbles, or blue if very dense and old. The term also refers to a popular open-source table format (Apache Iceberg) for data lakes, a type of lettuce, a fashion brand, and metaphorically, a cold person.

#### Types & Formation (Natural)

- Origin: Detached from glaciers or ice shelves, making them freshwater.
- Calving: The process where pieces break off glaciers into water.
- Appearance: White (lots of air) or deep blue (dense, less air, absorbs red light).
- Bergy Bits & Growlers: Smaller pieces (less than 5m and 2m, respectively).

Bergy bits and growlers are classifications for smaller chunks of ice broken off from glaciers or larger icebergs,

with growlers being the smallest (under 1 meter high) and bergy bits slightly larger (1-5 meters high). They are significant hazards to ships because their small size and low profile make them hard to spot, especially at night or in poor weather, even though they pose less danger than massive icebergs like the one that sank the Titanic.

#### Growlers

- Size: Less than 1 meter (about 3 feet) high and 5 meters long.
- Appearance: Roughly the size of a truck or grand piano, hard to see.
- Origin: Calved from glaciers or larger ice, often with escaping air causing a "growling" sound as they melt.

#### Bergy Bits

- Size: 1 to 5 meters (about 3 to 16 feet) high, and 5 to 15 meters long.
- Appearance: Medium-sized fragments, still dangerous.
- Origin: Larger fragments from calving or melting icebergs.



Figure-2: Growlers & Bergy bits.

#### Why they are dangerous

- Stealth: Their low height makes them difficult to detect with radar and visually, especially with waves washing over them.
- Impact: Even small collisions can cause significant damage to a ship's hull.
- Origin of danger: These smaller pieces are numerous and are produced continuously as large icebergs break down, creating a constant risk in icy waters.

**Key Fact:** Only about 10% of an iceberg is visible above water, a classic example of density differences, as ice is less dense than water, allowing it to float. Icebergs are masses of ice larger than five meters that detach from a glacier and float out into a lake or the ocean. Icebergs more than 80 kilometers long have broken away from Antarctic shelves.



Figure-3: Iceberg bottom view.

Smaller chunks of ice from glaciers are called bergy bits (less than five meters) and growlers (less than two meters). The word iceberg literally means Ice Mountain, berg borrowed from German. Icebergs come in all shapes and sizes, from ice-cube-sized chunks to ice islands the size of a small country. The term "iceberg" refers to chunks of ice larger than 5 meters (16 feet) across. It is a large floating mass of ice detached from a glacier or ice sheet and carried out to sea. An iceberg is a massive chunk of freshwater ice that has broken off a glacier or ice shelf and is floating freely in the ocean, with most of its bulk hidden beneath the water's surface, posing a significant hazard to ships. The term also refers to a data table format in big data (Apache Iceberg) for efficient data lake management. An iceberg is a piece of freshwater ice more than 15 m long that has broken off a glacier or an ice shelf and is floating freely in open water. Smaller chunks of floating glacially-derived ice are called "growlers" or "bergy bits". Both are generally spawned from disintegrating icebergs. A bergy bit is a medium to large fragment of ice. Its height is generally greater than three feet but less than 16 feet above sea level and its area is normally about 1,076-3,229 square feet. Growlers are smaller fragments of ice and are roughly the size of a truck or grand piano.

### Physical Icebergs

**Formation:** Formed from compacted snow over centuries, becoming dense glacial ice, and then calving into the sea.

**Composition:** Made of freshwater, not saltwater, even though they float in the ocean.

**Appearance:** Can be white (due to trapped air) or deep blue (from dense, airless ice).

**Size:** Classified by size (e.g., smaller "bergy bits," "growlers") and shape (tabular with flat tops or irregular non-tabular).

**Hazard:** The "tip of the iceberg" saying comes from how little is visible above water, a key factor in the Titanic disaster.

**Apache Iceberg.**

**Purpose:** An open-source table format for huge datasets in data lakes, enabling reliable updates, versioning, and performance.

**Function:** Allows data systems (like Spark, BigQuery) to manage, query, and update massive data tables efficiently, offering features like time travel and data rollback.



**Figure-4: Big icebergs.**

Icebergs are made up of frozen freshwater, which is less dense than the liquid saltwater in the ocean. This causes icebergs to float in water. However, since the density of ice is about 90% the density of water, most of an iceberg's mass is below the surface while only about 10% sticks out of the water.

Icebergs are categorized by shape (like tabular, pinnacled, dome, blocky, wedge, dry-dock) and size (from tiny growlers to massive bergs), with the two main types being flat-topped tabular and varied non-tabular forms, all constantly changing due to melting and erosion.

### By Shape

1. Tabular: Large, flat-topped with steep sides, like a giant table.
2. Pinnacle: Has one or more spires or peaks.
3. Dome: Has a rounded top.

4. Blocky: Flat top with steep, vertical sides, but shorter and wider than tabular.
5. Wedge: A triangular shape with a steep side and a sloping side.
6. Dry-Dock: Eroded to form a channel or slot, sometimes allowing boats to pass through.

### By Size (International Ice Patrol Classification)

1. Growler: Less than 1 meter (3 ft) high, less than 5 meters (16 ft) long.
2. Bergy Bit: 1-4 meters (3-13 ft) high, 5-15 meters (15-46 ft) long.
3. Small: 5-15 meters (14-50 ft) high, 15-60 meters (47-200 ft) long.
4. Medium: 16-45 meters (51-150 ft) high, 61-122 meters (201-400 ft) long.
5. Large: 46-75 meters (151-240 ft) high, 123-204 meters (401-670 ft) long.
6. Very Large: Over 75 meters (240 ft) high, over 204 meters (670 ft) long.



**Figure-5: Shape of icebergs.**

### CONCLUSION

Icebergs are pieces of ice that formed on land and float in an ocean or lake. Icebergs come in all shapes and sizes, from ice-cube-sized chunks to ice islands the size of a small country. The term “iceberg” refers to chunks of ice larger than 5 meters (16 feet) across. An iceberg disaster primarily refers to the sinking of the RMS Titanic in 1912, when it struck an iceberg on its maiden voyage, leading to the deaths of over 1,500 people and prompting major maritime safety reforms like SOLAS [Safety of Life at Sea], though other smaller incidents involving icebergs have occurred, highlighting nature's power. An iceberg in subzero temperatures remains largely frozen because it's freshwater, even though the surrounding saltwater is below 0°C (32°F) due to salt content; its core stays extremely cold -15°C to -20°C for years due to ice's insulating properties, but its surface layers melt and refreeze in warmer water, affecting its strength and shape. Subzero air and water temperatures, especially with wind chill, create extreme frostbite risks for anything exposed, highlighting the intense cold of these environments,

### REFERENCE

1. <https://en.wikipedia.org/wiki/Iceberg>