**Ablation**

The loss of ice and snow from a glacier system. This occurs through a variety of processes including melting and runoff, sublimation, evaporation, calving, and wind transportation of snow out of a glacier basin.

**Accumulation**

The addition of ice and snow into a glacier system. This occurs through a variety of processes including precipitation, firnification, and wind transportation of snow into a glacier basin from an adjacent area.

**Accumulation Area**

The part of a glacier that is perennially covered with snow. Also called Névé.

**Advance**

An increase in the length of a glacier compared to a previous point in time. As ice in a glacier is always moving forward, a glacier's terminus advances when less ice is lost due to melting and/or calving than the amount of yearly advance.

**Arete**

A jagged, narrow ridge that separates two adjacent glacier valleys or cirques. The ridge frequently resembles the blade of a serrated knife. A French term referring to the bones in a fish backbone.

**Barren Zone**

An area of fresh, vegetation-free bedrock around the margin of a retreating glacier that documents the recent loss of ice.

**Bergschrund**

A single large crevasse or series of sub-parallel crevasses that develop at the head of a glacier. The location where ice pulls away from the bedrock wall of the cirque against which it accumulated. In winter, the crevasse fills with snow. In spring or summer, it reopens. (Originally a German term).

**Bergy Seltzer**

A crackling or sizzling similar to that made by soft drinks or seltzer water but louder. The sound made as air bubbles formed at many atmospheres of pressure are released during the melting of glacier ice. Also called Ice Sizzle.

**Braided Stream (Anastomizing Stream)**

A stream that is characterized by a complex network of branches that continuously separate and reunite. Streams braid when they have a much greater sediment load than they can carry. Also called an Anastomosing Stream.

**Calving**

The process by which pieces of ice break away from the terminus of a glacier that ends in a body of water or from the edge of a floating ice shelf that ends in the ocean. Once they enter the water, the pieces are called icebergs.

**Calving Glacier**

A glacier with a terminus that ends in a body of water (river, lake, ocean) into which it calves icebergs.

**Chatter Marks**

A series of small, closely spaced, crescentic grooves or scars formed in bedrock by rocks frozen in basal ice as they move along and chip the glacier's bed. The horns of the crescent generally point down glacier.

**Cirque**

A bowl-shaped, amphitheater-like depression eroded into the head or the side of a glacier valley. Typically, a cirque has a lip at its lower end. The term is French and is derived from the Latin word circus.

**Cirque glacier**

A small glacier that forms within a cirque basin, generally high on the side of a mountain.

**Crescentic Gouge**

Any curved mark or fracture produced by plucking or chipping of the glacier's bed. Larger than chatter marks,typically the horns of these gouges point up glacier. Also called Lunate Fracture or Crescentic Mark.

**Crevasse**

A crack or series of cracks that open in the surface of a moving glacier in response to differential stresses caused by glacier flow. They range in shape from linear to arcuate, in length from feet to miles. Their orientation may be in any direction with respect to the glacier flow. The deepest crevasses may exceed 100 feet.

**Debris Cone**

A cone or mound of debris-covered ice, with a thick enough sediment cover to protect the ice from melting.

**Dendrochronology**

The study of tree rings and subfossil wood to provide information about the glacial and climatic history of an area.

**Disarticulation**

Disarticulation is the process through which large blocks of ice, sometimes greater than .5 miles in width, detach from the thinning and retreating terminus of a glacier that ends in a body of water. Disarticulation occurs as the terminus thins to where its buoyandcy no longer permits it to remain in contact with its bed. As the glacier begins to float free and rises off the bottom it rapidly comes apart along old fracture scars and crevasses. For example, at Bering Glacier, in the Chugach Mountains, Alaska, a single observed disarticulation event resulted in nearly 2/3 of a mile of terminus retreat in a single day. As many as 100 discrete, tabular pieces of glacier ice have been observed separating from the glacier's terminus in a single event. Bering Glacier flows through Wrangell-St. Elias National Park, Alaska.

**Distributary**

A tongue of glacier ice that flows away from the main trunk of the glacier. This may result from differential melting changing the gradient of part of a glacier.

**Downwasting**

The thinning of a glacier due to the melting of ice. This loss of thickness may occur in both moving and stagnant ice. Also called Thinning.

**Drift**

A collective term used to describe all types of glacier sedimentary deposits, regardless of the size or amount of sorting. The term includes all sediment that is transported by a glacier, whether it is deposited directly by a glacier or indirectly by running water that originates from a glacier.

**Drumlin**

An elongated ridge of glacial sediment sculpted by ice moving over the bed of a glacier. Generally, the down-glacier end is oval or rounded and the up-glacier end tapers. The shape is often compared to an inverted, blunt-ended canoe. Although not common in Alaska, drumlins cover parts of the Eastern and Midwestern United States (Irish).

**Erratic**

A rock of unspecified shape and size, transported a significant distance from its origin by a glacier or iceberg and deposited by melting of the ice. Erratics range from pebble-size to larger than a house and usually are of a different composition that the bedrock or sediment on which they are deposited.

**Esker**

A meandering, water-deposited, generally steep-sided sediment ridge that forms within a subglacial or englacial stream channel. Its floor can be bedrock, sediment, or ice. Subsequent melting of the glacier exposes the deposit. Generally composed of stratified sand and gravel, eskers can range from feet to miles in length and may exceed 100 feet in height.

**Eustacy**

Fluctuations in the worldwide sea-level regime caused by changes in the quantity of seawater available. The greatest changes are caused by water being added to, or removed from, glaciers.

**Firn**

An intermediate stage in the transformation of snow to glacier ice. Snow becomes firn when it has been compressed so that no pore space remains between flakes or crystals, a process that takes less than a year.

**Firn line**

A line across the glacier, from edge to edge, that marks the transition between exposed glacier ice (below) and the snow-covered surface of a glacier (right). During the summer melt season, this line migrates up-glacier. At the end of the melt season the firn line separates the accumulation zone from the ablation zone.

**Fjord**

A glacially eroded or modified U-shaped valley that extends below sea level and connects to the ocean. Filled with seawater, depths may reach more than 1,000 feet below sea level. The largest Alaskan fiords are more than 100 miles long and more than 5 miles wide. Also spelled Fiord.

**Foliation**

The layering or banding that develops in a glacier during the process of transformation of snow to glacier ice. Individual layers, called folia, are visible because of differences in crystal or grain size, alternation of clear ice and bubbly ice, or because of entrained sediment.

**Fountain**

A glacial spring, generally discharging supercooled water with a significant hydrostatic head.

**Glacial Groove/Glacial Furrow**

A linear depression, inches to miles in length, produced by the removal of rock or sediment by the erosive action of a glacier.

**Glacial Lake**

An accumulation of standing liquid water on (supraglacial), in (englacial), or under (subglacial) a glacier.

**Glacial Stream**

A channelized accumulation of liquid water on (supraglacial), in (englacial), or under (subglacial) a glacier, moving under the influence of gravity.

**Glacier**

A large, perennial accumulation of ice, snow, rock, sediment and liquid water originating on land and moving down slope under the influence of its own weight and gravity; a dynamic river of ice. Glaciers are classified by their size, location, and thermal regime.

**Glacier Cave**

A cave formed in or under a glacier, typically by running water. Steam or high heat flow can also form glacier caves. Also called Ice Cave.

**Glacier Flow**

The movement of ice in a glacier, typically in a downward and outward direction, caused by the force of gravity. 'Normal' flow rates are in feet per day. 'Rapid' flow rates (i.e. surge) are in 10s or 100s of feet per day.

**Glacier Ice**

A mono-mineralic type of rock, composed of crystals of the mineral ice, formed through metamorphism of snowflakes. Metamorphism results in recrystallization, increased density, and the growth of hexagonal crystals. This ice comprises the majority of the mass of a glacier. Intermediate stages include Firn and Neve.

**Glacier Table**

A rock that is balanced on a pedestal of ice, and elevated above the surface of a glacier. The rock protects the pedestal of ice from melting by insulating it from the sun.

**Hanging glacier**

A glacier that originates high on the wall of a glacier valley and descends only part of the way to the surface of the main glacier. Avalanching and icefalls are the mechanisms for ice and snow transfer to the valley floor below.

**Hanging Valley**

A former tributary glacier valley that is incised into the upper part of a U-shaped glacier valley, higher than the floor of the main valley. Hanging valley streams often enter the main valley as waterfalls.

**Holocene**

The current part of geologic time. The Holocene epoch began ~12,000 years ago, at the end of the Pleistocene epoch.

**Horn**

A pointed, mountain peak, typically pyramidal in shape, bounded by the walls of three or more cirques. Headward erosion has cut prominent faces and ridges into the peak. When a peak has four symmetrical faces, it is called a Matterhorn.

**Ice Cap**

A dome-shaped accumulation of glacier ice and perennial snow that completely covers a mountainous area or island, so that no peaks or Nunataks poke through.

**Ice Field**

A continuous accumulation of snow and glacier ice that completely fills a mountain basin or covers a low-relief mountain plateau to a substantial depth. When the thickness become great enough, tongues of ice overflow the basins or plateaus as Valley Glaciers.

**Ice Rafting**

The transportation of glacier sediment away from the ice margin by icebergs. Sediment transported by floating ice and deposited in the ocean is called glacial-marine sediment. Deposited in lakes, it is called glacial-lacustrine sediment.

**Ice Sheet**

A thick, subcontinental to continental-scale accumulation of glacier ice and perennial snow that spreads from a center of accumulation, typically in all directions. Also called a Continental Glacier.

**Ice Shelf**

The floating terminus of a glacier, typically formed when a terrestrial glacier flow into a deep water basin, such as in Antarctica and the Canadian Arctic.

**Iceberg**

A block of ice that has broken or calved from the face of a glacier and is floating in a body of marine of fresh water. Alaskan icebergs rarely exceed 500 feet in maximum dimension. In order of increasing size, the following names are used: Brash Ice, Growler, Bergy Bit.

**Ice-Dammed Lake**

A lake that exists because its water is restricted from flowing by an ice dam. Sometimes these lakes form because an advancing glacier had blocked a valley.

**Icefall**

Part of a glacier where the ice flows over a bed with a very steep gradient, typically at a higher rate than both above and below. As a result the surface is fractured and heavily crevassed. In a river system, this would be a waterfall.

**Ice-Marginal Lake**

A lake that is located adjacent to the terminus of a glacier. Typically, these lakes form in bedrock basins scoured by the glacier. They enlarge as the glacier retreats. Sometimes they are dammed by an End or Recessional Moraine.

**Isostasy**

The balance between changes within the Earth's crust and mantle, where material is displaced in response to an increase (isostatic depression) or decrease (isostatic rebound) in mass at any point on the Earth's surface above. Such changes are frequently caused by advances or retreats of glaciers.

**Jökulhlaup**

A glacier outburst flood resulting from the failure of a glacier-ice-dam, glacier-sediment-dam, or from the melting of glacier ice by a volcanic eruption (Icelandic).

**Kame**

A sand and gravel deposit formed by running water on stagnant or moving-glacier ice. Crevasse fills or crevasse ridges form within crevasses. Kames form on flat or inclined ice, in holes, or in cracks. A kame terrace forms between the glacier and the adjacent land surface. Shapes include hills, mounds, knobs, hummocks, or ridges.

**Kettle**

A depression that forms in an outwash plain or other glacial deposit by the melting of an in-situ block of glacier ice that was separated from the retreating glacier-margin and subsequently buried by glacier sedimentation. As the buried ice melts, the depression enlarges.

**Little Ice Age (Neoglaciation)**

The most recent interval of temperate glacier expansion and advance on Earth. It began ~650 years ago and continued into the 20th century in many locations. Temperate glaciers in North America, South America, Africa, Europe, and Asia were affected.

**Mass Balance**

A measure of the change in mass of a glacier at a certain point for a specific period of time. The balance between accumulation and ablation. Also called Mass Budget.

**Moraine**

A general term for unstratified and unsorted deposits of sediment that form through the direct action of, or contact with, glacier ice. Many different varieties are recognized on the basis of their position with respect to a glacier.

**Ablation Moraine**

An irregular-shaped layer or pile of glacier sediment formed by the melting of a block of stagnant ice. Ultimately, ablationa moraine is deposited on the former bed of the glacier. Also called Ablation Till.

**Ground Moraine**

A blanket of glacier till deposited on all of the surfaces over which a glacier moves, typically by moving ice.

**Ice-cored Moraine**

A moraine ridge consisting of a drape of sediment overlying a mass of stagnant ice.

**Lateral Moraine**

A sediment ridge, located on a glacier's surface adjacent to the valley walls, extending down glacier to the terminus. It forms by the accumulation of rock material falling onto the glacier from the valley wall, rather than by water deposition.

**Medial Moraine**

A sediment ridge, located on a glacier's exposed ice surface, away from its valley walls, extending down glacier to the terminus. It forms by the joining of two lateral moraines when two glaciers merge.

**Piedmont glacier**

A fan or lobe-shaped glacier, located at the front of a mountain range. It forms when one or more valley glaciers flow from a confined valley onto a plain where it expands. The 30-mile wide Malaspina is the largest in Alaska.

**Polar Glacier**

A glacier with a thermal or temperature regime in which ice temperatures always remain below the freezing point.

**Push Moraine**

A ridge or pile of unstratified glacial sediment that is formed in front of the ice margin by the terminus of an advancing glacier, bulldozing sediment in its path.

**Recessional Moraine**

A ridge of glacial sediment that forms when the terminus of a retreating glacier remains at or near a single location for a period of time sufficient for a cross-valley accumulation to form.

**Terminal Moraine**

A cross-valley, ridge-like accumulation of glacial sediment that forms at the farthest point reached by the terminus of an advancing glacier. Also called an End Moraine.

**Moulin (Glacier Mill)**

A narrow, tubular chute or crevasse through which water enters a glacier from the surface. Occasionally, the lower end of a moulin may be exposed in the face of a glacier or at the edge of a stagnant block of ice.

**Nunatak**

A mountain peak or ridge that pokes through the surface of an Ice Field or a Glacier. It may separate adjacent Valley Glaciers (Greenlandic).

**Ogive**

An arcuate, convex, down-glacier-pointing band or undulation that forms on the surface of a glacier at the base of an icefall. Two types of ogives occur: wave ogives, which are undulations of varying height and band ogives, which are alternating light- and dark-colored bands.

**Outwash plain**

A broad, low-slope angle alluvial plain composed of glacially eroded, sorted sediment (termed outwash), that has been transported by meltwater. The alluvial plain begins at the foot of a glacier and may extend for miles. Typically, the sediment becomes finer grained with increasing distance from the glacier terminus.

**Pit Pond**

A depression in an outwash plain by the melting of a block of ice floated to its depositional site by meltwater and subsequently buried by sediment. As it melts, a depression in the surface of the outwash plain develops.

**Pleistocene**

The epoch of geologic time, informally called the 'The Great Ice Age' or the 'Glacial Epoch', that began ~1.8 million years ago and ended ~8,000 years ago (see the CVO's Geologic Time Scale). During this interval continental glaciers repeatedly formed and covered significant parts of the Earth's surface. Together, the Holocene and Pleistocene epochs comprise the Quaternary Period.

**Plucking**

The mechanical removal of pieces of rock from a bedrock face that is in contact with glacier ice. Blocks are quarried and prepared for removal by the freezing and thawing of water in cracks, joints, and fractures. The resulting pieces are frozen into the glacier ice and transported.

**Reconstituted Glacier**

A glacier formed below the terminus of a hanging glacier by the accumulation, and reconstitution by pressure melting (regelation), of ice blocks that have fallen and/or avalanched from the terminus of the hanging glacier. Also called Glacier Remaniè.

**Rock Glacier**

A glacier-like landform that often heads in a cirque and consists of a valley-filling accumulation of angular rock blocks. Rock glaciers have little or no visible ice at the surface. Ice may fill the spaces between rock blocks. Some rock glaciers move, although very slowly.

**Remnant**

An isolated melting mass of glacier ice, that has become detached from its source and the remainder of the glacier. Some remnants cover many square miles.

**Retreat**

A decrease in the length of a glacier compared to a previous point in time. As ice in a glacier is always moving forward, its terminus retreats when more ice is lost at the terminus to melting and/or calving than reaches the terminus. During retreat, ice in a glacier does not move back up the valley.

**Roche Moutonnee**

An elongated, rounded, asymmetrical, bedrock knob produced by glacier erosion. It has a gentle slope on its up-glacier side and a steep- to vertical-face on the down-glacier side.

**Rockslide**

Several landslides generated by the Great Alaskan Earthquake, Good Friday 1964, fell onto the surface of the so-named glacierin the Chugach Mountains, Alaska.

**Rock Flour**

Fine-grained, silt-size sediment formed by the mechanical erosion of bedrock at the base and sides of a glacier by moving ice. When it enters a stream, it turns the stream's color brown, gray, iridescent blue-green, or milky white. Also called Glacier Flour or Glacier Milk.

**Sérac**

A jagged pinnacle or tower of glacier ice located on the surface of a glacier, formed as a glacier flows down an icefall or by the intersection of crevasses. Frequently, large areas of a glacier will be covered by séracs.

**Snowbridge**

A mass of snow that has accumulated in the top of an open crevasse, masking the existence of the crevasse. Frequently, a large void exists below the snowbridge.

**Stagnation**

The in-situ melting of glacier ice. Many glaciers have stagnant termini, covered by thick sediment debris. Some support vegetation, including mature forests.

**Striations**

Multiple, generally parallel, linear grooves, carved by rocks frozen in the bed of a glacier into the bedrock over which it flows.

**Suncups**

A series of bowl-like depression melted into a snow or ice surface, separated by a network of connected ridges. Individual suncups may be more than three feet deep and ten feet in diameter. Suncups form during warm, sunny conditions.

**Surge**

A short-lived, frequently large-scale, increase in the rate of movement of the ice within a glacier. Ice velocities may increase 10 to 100 times above normal flow rates. In some surges, the terminus of a glacier rapidly advances. Although not all glaciers surge, those that do often surge with some sort of a periodicity.

**Tarn**

A lake that develops in the basin of a cirque, generally after the melting of the glacier.

**Temperate Glacier**

A glacier with a or temperature-regime in which liquid water coexists with frozen water (glacier ice) during part or even all of the year.

**Terminus**

The lower-most margin, end, or extremity of a glacier. Also called Toe, End or Snout.

**Tidewater Glacier**

A glacier with a terminus that ends in a body of water influenced by tides, such as the ocean or a large lake. Typically, tidewater glaciers calve ice to produce icebergs.

**Till**

An unsorted and unstratified accumulation of glacial sediment, deposited directly by glacier ice. Till is a heterogeneous mixture of different sized material deposited by moving ice (lodgement till) or by the melting in-place of stagnant ice (ablation till). After deposition, some tills are reworked by water.

**Trimline**

A clear boundary line on the wall of a glacier valley that delineates the maximum recent thickness of a glacier. It may be a change in the color of the bedrock, indicating the separation of weathered from unweathered bedrock; the limit of a former lateral moraine or other sediment deposit; or the boundary between vegetated and bare bedrock.

**U-Shaped Valley**

A valley with a parabolic or "U" shaped cross-section, steep walls and generally a broad and flat floor. Formed by glacier erosion, a U-shaped valley results when a glacier widens and over-steepens a V-shaped stream valley.

**Valley Glacier**

A glacier that flows for all or most of its length within the walls of a mountain valley. Also called an Alpine Glacier or a Mountain Glacier.

**Varve**

A varve is a pair of sedimentary layers, a couplet, that form in an annual cycle as the result of seasonal weather changes. Typically formed in glacial lakes a varve couplet consists of a coarser grained summer layer formed during open-water conditions, and a finer grained winter layer formed from deposition from suspension during a period of winter ice cover. Many varve deposits contain hundreds of couplets.