

GLOSSARY

Advection Fog: Fog that forms when warm air flowing over a cold surface cools from below until saturation is reached.

Air Mass: A body of air covering a relatively wide area and exhibiting horizontally uniform properties.

Alto cumulus Cloud: A medium-altitude (2400-6100 m) cloud characterized by globular masses or rolls in layers or patches, the individual elements of which are larger and darker than those of cirrocumulus and smaller than those of stratocumulus clouds.

Altostratus Cloud: A medium-altitude (2400-6100 m) cloud characterized by a generally uniform gray sheet or layer, lighter in color than nimbostratus and darker than cirrostratus clouds.

Anabatic Wind: Wind created by air flowing uphill.

Arctic Sea Smoke: Steam fog; often applied specifically to steam fog that rises from a small area of open water within sea ice.

Backing: A counterclockwise shift in wind direction (e.g., south winds shifting to the east).

Backwash: The motion of receding waves.

Bathymetry: The science of measuring the depth of water bodies (e.g., oceans, lakes, seas).

Beaufort Scale: A system invented in the early 19th century by Admiral Sir Francis Beaufort of the British Navy to estimate and report wind speeds based on conditions at sea. The scale has since been modernized for use on land.

Breaker: A heavy sea wave that breaks into white foam on a shore or shoal.

Buys-Ballots Law: The law stating that when a person is standing back to the wind, the area of low pressure will be to his or her left.

Circulation Cell: Large areas of air movement created by the rotation of the earth and the transfer of heat from the equator toward the poles.

Cirrocumulus Cloud: A high-altitude (6000-12 000 m) cloud characterized by thin, white patches, each of which is composed of very small granules or ripples.

Cirrostratus Cloud: A high-altitude (6000-12 000 m) cloud that appears as a whitish and usually somewhat fibrous veil across the sky—sometimes so thin, it is hardly visible. Cirrostratus clouds are composed of ice crystals and often produce halos.

Cirrus Cloud: A high-altitude (6000-12,000 m) cloud composed of ice crystals that appears as delicate, white filaments or as white (or mainly white) patches or narrow bands—and is often semi-transparent. Although thunderstorm anvils are a form of cirrus cloud, most cirrus clouds are not associated with thunderstorms.

Cliff Effect: A sudden shift in wind direction that occurs when wind encounters a steep barrier, such as a cliff.

Cold Front: The zone between two air masses in which the cooler, denser mass is advancing and replacing the warmer.

Cold Low: A low-pressure system that is cold at its core and has little change in temperature gradient along its horizontal plane.

Convection: The vertical transport of heat and moisture within the atmosphere.

Convergence Effect (Coastal Convergence): The process by which a band of stronger wind occurs near the shoreline when it is to the right of the prevailing wind direction due to frictional differences between water and land.

Coriolis Force (Coriolis Effect): The fictitious force (caused by the rotation of the earth) that accounts for the apparent deflection of a body in motion to the right in the Northern Hemisphere and to the left in the Southern Hemisphere.

Corner Effect: A small-scale but often quite severe convergence effect that occurs around steep islands and headlands.

Crossing Sea: A sea with a choppy surface, caused by the intersection of waves.

Cumulonimbus Cloud: A lower- to middle-layer cloud characterized by strong vertical development in the form of mountains or huge towers topped, at least partially, by a smooth, flat, and often fibrous anvil. Also known informally as a “thunderhead”.

Cumulus Cloud: A detached cloud, formed in the lower layer of the atmosphere, that is generally dense with sharp outlines and shows vertical development in the form of domes, mounds, or towers. Cloud tops are normally rounded, while bases are more horizontal.

Dew Point: A measure of atmospheric moisture indicating the temperature to which air must be cooled in order to reach saturation, assuming that both air pressure and moisture content are constant.

Ebb Tide: The period between high tide and the next low tide, during which the sea is receding.

Eddy: A swirling current of air or water flowing contrary to the main current.

Ekman Transport: The flow of surface currents at a 45-degree angle to the wind due to the balance between the Coriolis Force and the drags generated by the wind and water.

Fetch: An area in which ocean waves are generated by the wind; also refers to the length of the fetch area, measured in the direction of the wind.

Fathom: A unit of water depth equal to six feet or about 1.83 m.

Flood Tide: An incoming tide.

Fog: Water droplets suspended in the air at the earth's surface.

Front: A boundary or transition zone between two air masses of different density and, usually, different temperature.

Funnelling: The process whereby wind is forced to flow through a narrow opening between adjacent land areas, resulting in an increase in its speed.

Funnel Cloud: A condensation funnel extending from the base of a towering cumulus or cumulonimbus cloud that is associated with a rotating column of air that is not in contact with the ground.

Gale-Force Winds: Sustained winds at speeds of 34 to 47 kt.

Geostrophic Wind: Wind that would result from an exact balance between the Coriolis Force and the pressure gradient force.

Gust: A rapid fluctuation of wind speed, with variations of 10 kt or more between peaks and lulls.

Gyre: A vortex or spiral.

High (Anticyclone): A region of high pressure.

High Cloud: Cloud in the layer of the atmosphere above 6000 m.

High Water Slack: The period at high tide when the water is neither rising nor falling.

Hurricane: A tropical cyclone in the Atlantic Ocean, Caribbean Sea, Gulf of Mexico, or Eastern Pacific Ocean in which the maximum one-minute sustained surface wind is 64 kt or higher.

Hurricane-Force Wind: A sustained wind of 64 kt or higher.

Ice: Water in a frozen state.

Ice Fog (Ice-Crystal Fog, Frozen Fog, Frost Fog, Frost Flakes, Air Hoar, Rime Fog, Pogonip): Fog composed of suspended ice particles—some 20 to 100 microns in diameter but most (especially if the fog is dense) about 12 to 20 micron in diameter—formed by the direct freezing of supercooled water droplets with little growth directly from vapor.

Iceberg: A piece of a glacier that has broken off and is floating in the sea.

Inversion: An increase in temperature with height.

Isobar: The line on a weather map connecting points of equal pressure.

Katabatic Wind: Wind generated by air flowing downhill.

Knot: A unit of speed used in navigation that is equal to one nautical mile per hour.

Lake Breeze/Land Breeze: A thermally produced wind that blows during the day from the surface of a large lake toward shore, caused by the difference in the heating rates of the water and land.

Lapse Rate: The rate of change of an atmospheric variable, usually temperature, with height. A steepening lapse rate implies a rapid decrease in temperature with height and is a sign of destabilization.

Lee Effect (Lee Wave): A warm, dry wind that flows down the lee side of a mountain range.

Lee Trough (Lee Low): A trough or low caused by the stretching of a column of air as it descends the leeward side of highly elevated terrain, such as the Rocky Mountains.

Leeward: The direction downwind from a point of reference. The opposite of “windward”.

Light Winds: Sustained winds at speeds of less than 15 kt.

Low (Cyclone): A region of low pressure, the low centre of which is usually accompanied by precipitation, extensive cloudiness, and moderate winds.

Low Cloud: Cloud in the lower levels of the atmosphere, typically from near-surface level to 2000 m.

Low Water Slack: The period at low tide when the water level is neither rising nor falling.
Magnetic Wind Direction: The direction from which the wind is blowing with respect to magnetic north.

Marine Inversion: Inversion that occurs when cold marine air underlies warmer air.

Mesoscale System: A weather system, such as a squall line or mesoscale convective systems, that is 80 km to several hundred kilometres in horizontal extent.

Microclimate: Climate conditions at the microscale level (typically, less than 2 km).

Microscale System: A weather system, such as a wind circulation or cloud pattern, that is less than 2 km in horizontal extent.

Middle Cloud: Cloud in the “alto” level of the atmosphere, from 2000 to 6000 m.

Millibar: A unit of atmospheric pressure equal to 1/1000 bar or 1000 dynes per square cm.

Mist: A visible aggregate of minute water particles suspended in the atmosphere that reduces visibility to less than 11 km, but not less than 2 km—at which point, it is considered “fog”.

Moderate Winds: Sustained winds at speeds of 15 to 19 kt.

Mountain Wave: An undulating flow of wind on the leeward side of a mountain ridge.

Nautical Mile: A unit of distance used in marine navigation and forecasts, equal to 1.15 miles or 1852 m. It is also the length of one minute of latitude.

Neap Tide: The lowest level of high tide, when the difference between the high and low tide is least.

Nimbostratus Cloud: A class of low-altitude (usually less than 2400 m) cloud characterized by a formless layer that is almost uniformly dark gray and brings light to moderate precipitation.

Pack Ice: An expanse of floating ice composed of large pieces that have been driven together into a nearly continuous mass, as occurs in polar seas.

Polar Low: A short-lived, mesoscale, low-pressure system (depression) found over the ocean areas on the poleward side of the main polar front, in both the Northern and Southern hemispheres.

Pressure: The exertion of force on a surface by a fluid (e.g., the atmosphere) in contact with it.

Pressure Gradient: The change in pressure measured across a given distance.

Pressure Gradient Force: The force that results when there is a difference in pressure across a surface.

Prevailing Wind: The wind coming from the most usual direction at a particular time or place.

Quasi-Stationary Front: A stationary front that is moving at a speed of 5 kt or less.

Radiation Fog: Fog that forms when outgoing, long-wave radiation cools the near-surface air below its dew point.

Reflection (of Waves): The process by which waves striking a vertical barrier, such as a cliff or wharf, are reflected back in the direction from which they came.

Refraction (of Waves): The process by which differences in the depth of water beneath a wave's crest cause it to bend and change direction.

Ridge: An elongated area of relatively high atmospheric pressure. The opposite of “trough”.

Riptide: A stretch of turbulent water in a river or sea caused by one current flowing into or across another.

Salinity: The ratio of salt to water; saltiness.

Sea Breeze: Wind that blows during the day from a cool ocean surface onto adjoining warm land, caused by the difference in heating rates between the two.

Sea Fog: Advection fog caused by the transport of moist air over a cold body of water.

Sea State: The overall state of agitation of a large expanse of ocean or sea due to the combined effects of wind-generated waves, swell waves, and surface currents.

Seas: The combination of wind waves and swell, in which the two components are not distinguished from one another (i.e., $Seas^2 = S^2 + W^2$ where S is the swell height and W is the wind-wave height). Considered the same as Significant Wave Height.

Seiche: A standing-wave oscillation of water in large lakes usually created by strong winds, a large pressure gradient, or both.

Set: The direction towards which a current is headed (e.g., a current moving from west to east is “set to east”).

Set-Up: The process whereby strong winds blowing the length of a lake cause the water level at the downwind end to increase and at the upwind end to decrease.

Shoaling: The process by which surface waves entering shallower water increase in height.

Significant Wave Height: The mean or average height of the highest one third of all waves in a particular area.

Slack Water: The state of the tide when it is turning, especially at low tide.

Snow Streamer: Narrow, intense bands of snowfall that occur on leeward shores during cooler atmospheric conditions, when cold winds move across long expanses of warmer water, picking up energy and water vapor.

Snow Squall: A sudden, moderately heavy snowfall with blowing snow and strong, gusty surface winds.

Spring Tide: A higher-than-normal tide that occurs around the time of the new moon and full moon.

Squall: A strong, sudden-onset wind in which the wind speed increases by at least 16 kt and is sustained at 22 kt or more for at least a minute. It is often used by mariners as a general term for a severe local storm.

Squall Line: A line of active thunderstorms, either continuous or with breaks between them, including adjacent areas of precipitation.

Stability: The degree to which a layer of air is resistant to vertical motion.

Stable Atmosphere: An atmospheric state in which vertical movement is inhibited by a layer of warm air capping a layer of cold air below it.

Starboard: The side of the ship that is on the right, when facing forward.

Stationary Front: A transition zone between two nearly stationary air masses of different density, neither of which is strong enough to replace the other.

Steam Fog: Fog formed when water vapor is added to air that is much colder than the source of the vapor (e.g., when very cold air drifts across relatively warm water).

Storm-Force Winds: Sustained winds at speeds of 48 to 63 kt.

Storm Surge: An abnormal rise in sea level accompanying a hurricane or other intense storm, usually estimated by subtracting the normal or astronomic tide from the observed storm tide.

Stratus Cloud: A low-level cloud that is generally gray in colour, has a fairly uniform base, and occasionally appears in the form of ragged patches. Fog is usually a form of surface-based stratus.

Strong Winds: Sustained winds at speeds of 20 to 33 kt.

Swell: Wind-generated waves that have travelled out of the area in which they originated. They characteristically exhibit smoother, more uniform crests and a longer period than wind waves.

Synoptic Scale: The spatial scale of the migratory high- and low- pressure systems of the lower troposphere, where the horizontal distance between systems is 1000 to 2500 km.

Thermal Trough/Low: An area of low pressure that is shallow in vertical extent and produced primarily by warm surface temperatures.

Thunderstorm: A local storm produced by a cumulonimbus cloud and accompanied by thunder and lightning.

Tidal Bore: A phenomenon that occurs where the ocean feeds into a river or bay, in which the leading edge of the incoming tide forms waves of water that travel inland against the current.

Tidal Range: The vertical difference between the high tide and the succeeding low tide.

Tidal Rip: A stretch of turbulent water in a river or the sea caused by one current flowing into or across another.

Topography: The shape of the land.

Tornado: A violently rotating column of air that usually forms a pendant to a cumulonimbus cloud, the bottom end of which reaches the ground.

Towering Cumulus: A large cumulus cloud with significant vertical development and, usually, a cauliflower-like appearance. It lacks the characteristic anvil of a cumulonimbus cloud.

Tropical Cyclone: A warm-core, low-pressure system that develops over tropical and, sometimes, subtropical waters and has an organized circulation. Depending on sustained surface winds, it is classified as a tropical disturbance, a tropical depression, a tropical storm, or a hurricane or typhoon.

Tropical Depression: A tropical cyclone in which the maximum one-minute sustained surface wind is 33 kt or less.

Tropical Disturbance: An area of organized convection that originates in the tropics or subtropics and maintains its identity for 24 hours or more. Often the first stage in the development of more intense tropical cyclones, it may or may not be associated with increased wind speeds.

Tropical Storm: A tropical cyclone in which the maximum one-minute sustained surface wind ranges from 34 to 63 kt.

Trough: An elongated area of relatively low atmospheric pressure, not usually associated with a closed circulation. The opposite of “ridge”.

Trowal (Trough of Warm Air Aloft): A “tongue” of relatively warm and moist air aloft that wraps around to the north and west of a mature cyclone, often during winter.

True Wind Direction: The direction the wind is blowing with respect to true north.

Tsunami: A series of long-period waves (on the order of tens of minutes) that are usually generated by an impulsive disturbance that displaces massive amounts of water, such as an earthquake occurring on or near the sea floor.

Upwelling: In ocean dynamics, the upward motion of sub-surface water toward the surface of the ocean.

Unstable Atmosphere: An atmospheric state in which vertical movement is encouraged by the presence of a layer of cold air over a layer of warmer air.

Valley Wind: Wind that ascends a mountain valley during the day as a result of daytime heating.

Veering: A clockwise shift in wind direction (e.g., south winds shifting to the west).

Warm Front: The transition zone between a mass of warm air and the colder air it is replacing.

Water Vapour: Water in a vaporous form in the atmosphere.

Waterspout: A small, relatively weak rotating column of air that occurs over water, beneath a cumulonimbus or towering cumulus cloud.

Wave Length: The distance between the crest of one wave and the next, adjacent to it.

Wave Period: The time, in seconds, between consecutive wave crests passing a fixed point.

Wave Steepness: The ratio of wave height to wave length. Steepness is an indicator of a wave’s stability; when it exceeds a 1/7 ratio, it typically begins to break.

Wave Height: The distance from the trough to the crest of a wave.

Whirlwind: A small, rotating column of air that may be visible as a dust devil.

Wind: The horizontal motion of the air past a given point. Winds originate from differences in air pressures.

Wind Shadow: An area having relatively little wind due to the effect of a barrier, such as a steep cliff or heavily treed shoreline.

Wind Shift: A change in wind direction of 45 degrees or more that takes place within a 15-minute period.

Wind Waves: Local, short-period waves generated by the action of the wind on the surface of the water.

Windward: The direction upwind from a point of reference. The opposite of “leeward”.