

Glossary of Meteorological Terms

A

Absolute humidity: In a system of moist air, the ratio of the mass of water vapor to the total volume of the system. Usually expressed as grams per cubic meter (g/m^3).

Absolute instrument: An instrument whose calibration can be determined by means of simple physical measurements on the instrument. Compare to secondary instrument.

Absolute temperature: Temperature based on an absolute scale.

Absolute temperature scale: A temperature scale based on absolute zero. See Kelvin temperature scale.

Absolute zero: A hypothetical temperature characterized by a complete absence of heat and defined as 0°K , -273.15°C , or -459.67°F .

Absorption: The process in which incident radiation is retained by a substance. A further process always results from absorption.

Absorption hygrometer: A type of hygrometer which measures the water vapor content of the atmosphere by means of the absorption of vapor by a hygroscopic chemical.

Accretion: Growth of a cloud or precipitation particle by the collision and union of a frozen particle with a super-cooled water drop.

Accuracy: The degree of conformity of an indicated value to an accepted standard value, or ideal value. See accuracy rating, measured accuracy.

Accuracy rating: A number of quantity defining a limit that errors will not exceed when a device is used under specified operating conditions. Accuracy rating can be expressed in a number of forms, i.e. in terms of the measured variable ($\pm 1^\circ\text{C}$), percent of span ($\pm 0.5\%$ of span), percent of upper range value ($\pm 0.5\%$ of upper range value F.S.), percent of scale length ($\pm 0.5\%$ of scale length), or percent of actual output reading ($\pm 1\%$ of actual output reading).

Acid rain: Precipitation that carries to earth sulfuric and nitric acid accumulated from air pollutants.

Acre-foot: The volume of water required to cover one acre to a depth of one foot; 43,560 cubic feet.

Actinograph: A recording actinometer.

Actinometer: An instrument which measures the intensity of radiation by determining the amount of chemical change or fluorescence produced by that radiation.

Actual pressure: The atmospheric pressure at the level of the barometer. May or may not be the same as station pressure.

Adfreezing: The process by which one object becomes adhered to another by the binding action of ice.

Adiabatic process: A thermodynamic change of state in a system in which there is no transfer of heat or mass across the boundaries of the system. In an adiabatic process, compression always results in warming, expansion in cooling. Compare to diabatic process.

Aeolian: Pertaining to the action or effect of the wind.

Derived from the name of the Greek god of the winds, Aeolus.

Aeolian anemometer: An anemometer utilizing the principle that the pitch of the aeolian tones generated by air moving past an obstacle is a function of the speed of the air. Largely a curiosity and has been put to no practical application in modern meteorology.

Aerial: Of or pertaining to the air, atmosphere, or aviation. Also, same as antenna.

Aerograph: In general, any self-recording instrument carried aloft by any means to obtain meteorological data.

Aerometeorograph: A self-recording instrument used on aircraft for the simultaneous recording of atmospheric pressure, temperature, and humidity.

AFOS: Automation of Field Operations and Services. A communication system developed in the 1970s by the National Weather Service which utilized minicomputers, video displays, and high-speed communications to replace teletype and facsimile machines. It was replaced by AWIPS in the 1990s.

Air current: Very generally, any moving stream of air. It has no particular technical connotation.

Air density: The mass density of a parcel of air expressed in units of mass per volume.

Airlight formula: See Koschmieder's law.

Air meter: A small anemometer with flat vanes which indicates the number of linear feet or meters of air which have passed the instrument during its exposure.

Albedo: The ratio of the amount of electromagnetic radiation reflected by a body to the amount incident upon it, commonly expressed as a percentage. The albedo is to be distinguished from the reflectivity, which refers to one specific wavelength.

Albedometer: An instrument used for the measurement of the reflecting power (the albedo) of a surface. A pyranometer adapted for the measurement of radiation reflected from the earth's surface is sometimes employed as an albedometer.

ALERT: Automated Local Evaluation in Real Time. Flood warning program, developed by the National Weather Service in the 1970s, that uses remote sensors in the field to transmit environmental data to a central computer in real time.

Allard's law: A basic equation in night visual range theory, relating the illuminance of a point source of light to distance and the transmissivity of the atmosphere.

ALOHA: Areal Locations of Hazardous Atmospheres. A computer model used to predict how a hazardous gas cloud might disperse in the atmosphere after an accidental chemical release. Part of the CAMEO system.

Alter shield: A type of rain gauge shield consisting of freely hanging, evenly spaced slats arranged circularly around the gauge. The advantage of this shield is that the slats do not easily accumulate snow, permitting its use on unattended gauges. See rain gauge shield.

Altimeter: An instrument which determines the altitude of an object with respect to a fixed level. There are two general types of altimeters: (a) the pressure altimeter, which gives an approximate measure of altitude from a pressure measurement and an assumed standard temperature distribution; and (b) the radio altimeter, which deduces altitude by electronic techniques.

Altimeter setting: The value of atmospheric pressure to which the scale of a pressure altimeter is set so as to indicate airport elevation. The altimeter setting is included as part of an aviation weather observation.

Anabatic wind: An upslope wind due to local surface heating. Opposite of katabatic wind.

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Analog: Pertaining to measurements or devices in which the output varies continuously, i.e. voltage or rotation signals. Compare to digital.

Anemo-biograph: A recording pressure-tube anemometer in which the wind scale of the float manometer has been made linear by the use of springs, i.e. Dines anemometer.

Anemoclinograph: A recording anemoclinometer.

Anemoclinometer: General name for a type of instrument which measures the inclination of the wind to the horizontal plane. See bivane.

Anemograph: A recording anemometer.

Anemometer: A general term for instruments designed to measure the speed or force of the wind. Italian architect Leon Battista Alberti invented the first mechanical anemometer in 1450. Derived from the Greek word "anemos," meaning wind.

Aneroid: Literally "not wet", containing no liquid.

Aneroid barograph: An aneroid barometer arranged so that the deflection of the aneroid capsule actuates a pen which graphs a record on a rotating drum. Sometimes called aneroidograph.

Aneroid barometer: A barometer which measures atmospheric pressure using one or a series of aneroid capsules. Also called holosteric barometer.

Aneroid capsule: A thin metal disc partially evacuated of air used to measure atmospheric pressure by measuring its expansion and contraction.

Aneroidogram: The record of an aneroid barograph.

Angstrom compensation pyrhelimeter: An absolute instrument developed by Swedish physicist Knut Johan Angstrom (1857-1910) for the measurement of direct solar radiation. The radiation receiver station consists of two identical manganin strips whose temperatures are measured by attached thermocouples. One of the strips is shaded, while the other is exposed to sunlight. An electrical heating current is passed through the shaded strip so as to raise its temperature to that of the exposed strip. The electric power required to accomplish this is a measure of the solar radiation.

Angstrom pyrgeometer: An instrument developed by Swedish physicist Knut Johan Angstrom (1857-1910) for measuring the effective terrestrial radiation. It consists of four manganin strips, of which two are blackened and two are polished. The blackened strips are allowed to radiate to the atmosphere while the polished strips are shielded. The electrical power required to equalize the temperature of the four strips is taken as a measure of the solar radiation.

Antenna: A conductor or system of conductors for radiating and/or receiving radio energy. Also called aerial.

Antenna feed: See feed.

Antenna gain: See gain.

Antenna pattern: Same as radiation pattern.

Anticyclone: An area of high atmospheric pressure which has a closed circulation that is anticyclonic (clockwise in northern hemisphere and counterclockwise in southern hemisphere).

Antitriptic wind: In Jeffreys' classification, a wind for which the pressure force exactly balances the viscous force, in which the vertical transfers of momentum predominate.

Apparent freezing point: Same as freezing point.

Apparent temperature: The perceived temperature derived from either a combination of temperature and wind (wind chill) or temperature and humidity (heat index).

Approximate absolute temperature scale: A temperature scale with the ice point at 273° and boiling point of water at 373°. It is intended to approximate the Kelvin temperature scale with sufficient accuracy for many sciences, notably meteorology.

ARDC model atmosphere: See standard atmosphere.

ASCII: American Standard Code for Information Interchange. A standard code used to represent data using 8 bits (7 data bits and 1 parity bit) per character.

ASOS: Automated Surface Observing System. A network of instrumented weather stations deployed primarily by the National Weather Service to make weather observations without operator involvement.

Aspiration meteorograph: An instrument, for the recording of two or more meteorological parameters, in which the ventilation is provided by a suction fan.

Aspiration psychrometer: A psychrometer in which the ventilation is provided by a suction fan.

Aspiration thermograph: A thermograph in which ventilation is provided by a suction fan.

Aspirator: A device attached to a meteorological instrument to provide ventilation; usually a suction fan.

Assmann psychrometer: A special form of the aspiration psychrometer, developed by German meteorologist Dr. Richard Assmann, in which the thermometric elements are well shielded from radiation. Psychrometric measurements may be taken with the instrument in the presence of direct solar radiation.

Asynchronous: Lacking a relationship to a time base or clock. In asynchronous communications, individual data characters are sent at an arbitrary rate.

Atmidometer: Same as atmometer.

Atmometer: General name for an instrument which measures the evaporation rate of water into the atmosphere. See clay atmometer, evaporation pan, evapotranspirometer, Livingston sphere, Piché evaporimeter, radio atmometer.

Atmoradiograph: A device for measuring the frequency of occurrence of atmospheric phenomena whose intensity is greater than a predetermined level.

Atmosphere: The envelope of air surrounding the earth and bound to it more or less permanently by virtue of the earth's gravitational attraction. The system whose chemical properties, dynamic motions, and physical processes constitute the subject matter of meteorology. Also, a unit of pressure. See standard atmosphere.

Atmospheric pressure (barometric pressure): The pressure exerted by the atmosphere as a consequence of gravitational attraction exerted upon the "column" of air lying directly above the point in question.

Atmospheric radiation: Infrared radiation emitted by or being propagated through the atmosphere.

Attenuation: In physics, any process in which the flux density (or power, amplitude, intensity, illuminance, etc.) of a "parallel beam" of energy decreases with increasing distance from the source.

Attenuation is always due to the action of the transmitting medium itself, mainly by absorption and scattering. In meteorological optics, the attenuation of light is termed extinction.

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Audio-modulated radiosonde: A radiosonde whose carrier wave is modulated by audio-frequency signals whose frequency is controlled by the sensing elements of the instrument.

Aviation weather forecast: A forecast of weather elements of particular interest to aviation; including ceiling, visibility, upper winds, icing, turbulence, precipitation types, and storms.

Aviation weather observation: An evaluation, according to set procedures, of those weather elements which are most important for aircraft operations. Always includes cloud height or vertical visibility, sky cover, visibility, obstructions to vision, certain atmospheric phenomena, and wind speed and direction. Complete observations include sea level pressure, temperature, dew point temperature, and altimeter setting. Compare to synoptic weather observation.

AWIPS: Advanced Weather Interactive Processing System. The computerized system that processes NEXRAD and ASOS data received at National Weather Service Forecast Offices.

AWOS: Automated Weather Observing System. A self-contained weather station designed to make aviation weather observations without operator involvement.

B

Backing: A change in wind direction in a counterclockwise sense; opposite of veering.

Backlash: The play or loose motion in an instrument due to the clearance existing between mechanically contacting parts.

Backplane: Area of a computer or other device where various logic and control elements are interconnected. Often a printed circuit board into which other circuit boards plug at right angles.

Balloon: See captive balloon, ceiling balloon, constant-level balloon, free balloon, hurricane beacon, kytoon, Moby Dick balloon, pilot balloon, radiosonde balloon, rockoon, skyhook balloon, transosonde.

Balloon ceiling: The ceiling classification which is applied when the ceiling height is determined by timing the ascent and disappearance of a ceiling balloon or pilot balloon.

Balloon cover: A cover which fits over a large inflated balloon to facilitate handling in high or gusty winds.

Balloon drag: A small balloon, loaded with ballast and inflated so that it will explode at a predetermined altitude, which is attached to a larger balloon.

Balloon shroud: Same as balloon cover.

Bandwidth: The number of cycles per second between the limits of a frequency band.

Bankfull stage: The stage, on a fixed river gauge, corresponding to the top of the lowest banks within the reach for which the gauge is used as an index. Compare to flood stage.

Bar: A unit of pressure equal to 10^6 dyne per cm^2 (10^6 barye), 1000 millibars, 29.53 inches of mercury.

Barogram: The record of a barograph.

Barograph: A continuous-recording barometer.

Barometer: An instrument for measuring the pressure of the atmosphere. The two principal types are aneroid and mercurial.

Barometric altimeter: Same as pressure altimeter.

Barometric column: Same as mercury column.

Barometric constant: Factor relating the pressure and the height of a column of mercury, for example, 1 mb = 0.750062 mm, 1 mm = 1.333224 mb.

Barometric correction table: Table or graph to facilitate compensation of the instrumental errors of a mercury barometer. The required compensation is generally very small and is normally included in the barometric reduction table. See compensation of instruments.

Barometric corrections: The corrections that must be applied to the reading of a mercury barometer in order that this observed value may be rendered accurate. There are four kinds. (1) The instrument correction is the mean difference between the readings of a given mercury barometer and those of a standard instrument. It is a composite correction, including the effects of capillarity, index misalignment, imperfect vacuum, and scale correction, which are the barometric errors. (2) The temperature correction is applied to account for the difference between the coefficient of expansion of mercury and that of the scale. (3) The gravity correction is necessary because the acceleration of gravity varies with both altitude and latitude. (4) The removal correction is applied when the barometer elevation differs from the adopted station elevation and/or climatological station elevation. See also capacity correction. U.S. Weather Bureau, 1941: *Barometers and the Measurement of Atmospheric Pressure*, Circular F, 7th ed., rev

Barometric errors: See barometric corrections.

Barometric hypsometry: The technique of estimating elevation by means of atmospheric pressure measurements.

Barometric pressure: Same as atmospheric pressure.

Baroswitch: A pressure-operated switching device used in a radiosonde. In operation, the expansion of an aneroid capsule causes an electrical contact to scan a radiosonde commutator composed of conductors separated by insulators.

Barothermograph: An instrument that automatically records pressure and temperature.

Basin: See river basin.

Basin accounting: See hydrologic accounting.

Basin lag: A computed characteristic of a particular river basin, expressed as the time difference between the time-center of mass of rainfall and the time-center of mass of resulting runoff.

Basin recharge: The difference between amounts of precipitation and runoff for a given storm. It is that portion of the precipitation that remains in the basin as soil moisture, surface storage, ground water, etc.

Baud: A unit of signaling speed representing the number of code elements sent per second; often, bits per second.

BCD: Binary Coded Decimal. A coding system in which each decimal digit from 0 to 9 is represented by a 4-digit binary number.

Beaufort wind scale: A system of estimating and reporting wind speed, originally based on the effect of various wind speeds on the amount of canvas that a full-rigged nineteenth century frigate could carry.

Bellani atmometer: An instrument which measures evaporation by measuring the loss of water from a burette reservoir through a ceramic disc.

Bellows: See aneroid capsule.

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Bimetallic thermometer: A thermometer, the sensitive element of which consists of two metal strips which have different coefficients of expansion and are brazed together. The distortions of the system in response to temperature variations are used as a measure of temperature. It is a type of deformation thermometer.

Bimetal strip: See bimetallic thermometer.

Binary: A numbering system using a base number of 2 and having only two digits: 0 and 1. The fundamental system of representing information with electrical pulses.

Bit: Abbreviation for binary digit. The smallest unit of information, equal to one binary decision, i.e. 1/0, on/off, yes/no.

Bivane: A wind vane used to obtain the horizontal and vertical components of the wind.

Black body: A hypothetical, ideal body which absorbs completely all incident radiation, independent of wavelength and direction. No actual substance behaves as a true black body, although platinum black and other soots rather closely approximate this ideal. However, one does speak of a black body with respect to a particular wavelength interval. Compare to gray body, white body.

Black-bulb thermometer: A thermometer whose sensitive element has been made to resemble a black body by covering it with lamp black. The thermometer is placed in an evacuated transparent chamber which is maintained at a constant temperature. The instrument responds to insolation, modified by the transmission characteristics of its container.

Blizzard: A severe weather condition characterized by low temperatures and strong winds bearing a great amount of snow, either falling or picked up from the ground.

Boiling point: Temperature of equilibrium between the liquid and vapor phases of a substance at a given pressure.

Bologram: The record obtained from a bolometer.

Bolometer: Instrument for measuring the intensity of radiant energy. Its principle is based on the variation of electrical resistance, with the incoming radiation, of one or both the metallic strips which the instrument comprises.

Bottle thermometer: A thermoelectric thermometer used for measuring air temperature. The name is derived from the fact that the reference thermocouple is placed in an insulated bottle.

Bourdon tube: Closed, curved, flexible tube of elliptic cross section which is deformed, according to type, by variations of atmospheric pressure or temperature and so provides a measurement of the particular parameter.

Breeze: Wind with a speed between 4 and 27 knots (4 and 31 mph); Beaufort scale numbers 2 through 6.

Bridled-cup anemometer: A combination cup anemometer and pressure-plate anemometer, consisting of an array of cups about a vertical axis of rotation, the free rotation of which is restricted by a suitable spring arrangement.

British thermal unit: A unit of energy defined as the heat required to raise the temperature of one pound of water one degree Fahrenheit. It is equal to 252.1 calories or to 1055 joules.

Brontometer: A general term to designate apparatus designed to observe the details of weather during thunderstorms.

Bucket thermometer: A water-temperature thermometer provided with an insulated container around the bulb. It is lowered into the sea on a line until it has had time to reach the temperature of the surface water, then withdrawn and read.

The insulated water surrounding the bulb preserves the temperature reading and is available as a salinity sample.

Burst: A radar term for a single pulse of radio energy.

Bus: A set of electrical conductors, often on a backplane, that carry data and power signals among the various components of a computer.

Byte: The group of bits which a computer processes as a unit; often, 8 bits.

C

Calibration: The process whereby a position on the scale of an instrument is identified with the magnitude of the signal (or input force) actuating the instrument.

Calibration error: The inaccuracy that the manufacturer permits when the unit is calibrated in the factory.

Calm: Wind with a speed below 1 knot (1 mph); Beaufort scale number 0.

Calorie: A unit of heat originally defined as the amount of heat required to raise the temperature of water through one degree centigrade (the gram-calorie or small calorie), but this proved to be insufficiently precise. The 15° gram-calorie (cal₁₅) is the amount of heat required to raise the temperature of one gram of water from 14.5° to 15.5°C, and is equal to 4.1855 joules. The kilogram calorie or large calorie (Kcal, kg-cal, or Cal) is 1,000 times as large as a calorie.

Calorimeter: An instrument designed to measure quantities of heat. Sometimes used in meteorology to measure solar radiation.

Campbell-Stokes recorder: A sunshine recorder of the type in which the time scale is supplied by the motion of the sun. It consists essentially of a spherical lens which burns an image of the sun upon a specially prepared card.

CAMEO: Computer-Aided Management of Emergency Operations. A system of software applications used to plan for and respond to chemical emergencies. Developed by the U.S. Environmental Protection Agency (EPA) and the National Oceanic and Atmospheric Administration (NOAA).

Canadian hardness-gauge: A type of disk hardness-gauge, especially useful in relatively soft snow. See disk hardness gauge.

Candela: Unit of luminous intensity. One candela is one lumen per steradian. Formerly called the candle.

Candle: A unit of luminous intensity of a light source. See candela.

Candlepower: Luminous intensity expressed in candelas.

Capacity correction: The correction applied to a mercury barometer with a nonadjustable cistern in order to compensate for the change in level of the cistern as the atmospheric pressure changes. Thus, as the pressure falls, the height of the cistern increases, due to the exchange of mercury between the barometer tube and its cistern. This correction is not required if the scale is calibrated as in the Kew barometer. See also barometric corrections.

Capillary collector: An instrument for collecting liquid water from the atmosphere.

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Captive balloon: A buoyant balloon kept from rising freely by means of a line secured to a point on the ground, as opposed to a free balloon. See kytoon.

Carbon-film hygrometer element: An electrical hygrometer element constructed of a plastic strip coated with a film of carbon black dispersed in a hygroscopic binder. Variations in atmospheric moisture content vary the volume of the binder and thus change the resistance of the carbon coating. This element is characterized by high sensitivity and rapid response.

Cardinal winds: Winds from the four cardinal points of the compass; that is, north, east, south, and west winds.

Carrier frequency: The frequency of a carrier wave.

Carrier wave: Transmitted energy which is modulated in order to carry information. Usually, it is in the form of a radio-frequency sine wave, modulated either in amplitude or in frequency.

Carry-over: The portion of the streamflow during any month or year derived from precipitation in previous months or years.

Catch: The amount of precipitation captured by a rain gauge.

Ceiling: The height ascribed to the lowest layer of clouds or obscuring phenomena when it is reported as broken, overcast, or obscuration and not classified as "thin" or "partial." The ceiling is termed unlimited when these conditions are not satisfied.

Ceiling balloon: A small balloon used to determine the height of the cloud base. The height can be computed from the ascent velocity of the balloon and the time required for its disappearance into the cloud.

Ceiling classification: A description or explanation of the manner in which the height of the ceiling is determined, i.e. aircraft ceiling, balloon ceiling, estimated ceiling, indefinite ceiling, measured ceiling, precipitation ceiling.

Ceiling light: A type of cloud height indicator which uses a searchlight to project vertically a narrow beam of light onto the cloud base. The height of the cloud is determined using a clinometer, located at a known distance from the ceiling light, to measure the angle included by the illuminated spot on the cloud, the observer, and the ceiling light.

Ceiling projector: Same as ceiling light.

Ceilometer: An automatic, recording cloud height indicator.

Celsius temperature scale: International thermometric scale on which the freezing point of water equals 0° and the boiling point equals 100° at standard atmospheric pressure (760 mm Hg). Named for Swedish astronomer Anders Celsius (1701-1744), who devised the system in 1742.

Centibar: The pressure unit of the meter-ton-second system of physical units, equal to 10 millibars or 10⁴ dynes per cm².

Centigrade temperature scale: The older name for the Celsius temperature scale. Officially abandoned by international agreement in 1948, but still in common use.

Centimeter-gram-second system: A system of physical units based on the use of the centimeter, gram, and the second as elementary quantities of length, mass, and time.

Channel storage: The water volume within a specified portion of a stream channel.

Character: Part of a computer word that has meaning in itself; often, a byte.

Chronograph: A clock-driven device for recording the time of occurrence of an event or the time interval between the occurrence of events.

Chronometric radiosonde: A radiosonde whose carrier wave is switched on and off in such a manner that the interval of time between the transmission of signals is a function of the magnitude of the meteorological elements being measured.

Chronothermometer: A thermometer consisting of a clock mechanism the speed of which is a function of temperature.

Cistern barometer: A mercury barometer in which the lower mercury surface is larger in area than the upper surface. The basic construction of a cistern barometer is as follows: A glass tube one meter in length, sealed at one end, is filled with mercury, and then inverted. The tube is mounted so that its mount penetrates the upper surface of a reservoir of mercury called the cistern of the barometer. See Fortin barometer, Kew barometer.

Class A pan: See evaporation pan.

Clay atmometer: An atmometer consisting of a porous porcelain or ceramic container connected to a calibrated reservoir filled with distilled water. Evaporation is determined by the depletion of water in the reservoir.

Clear-air turbulence: Turbulence encountered by aircraft when flying through air space devoid of clouds. Thermals and wind shear are the main causes.

Clinometer: An instrument for measuring angles of inclination. Used in conjunction with a ceiling light to measure cloud height at night.

Cloud: A hydrometeor consisting of a visible aggregate of minute water and/or ice particles in the atmosphere above the earth's surface. Cloud differs from fog only in that the latter is, by definition, in contact with the earth's surface.

Cloud base: For a given cloud or cloud layer, the lowest level in the atmosphere at which the air contains a perceptible quantity of cloud particles.

Cloud height: The height of the cloud base above the local terrain.

Cloudburst: Any sudden and heavy rain, almost always of the shower type.

CMOS: Complementary Metal-Oxide Semiconductor. A method of making silicon chips that results in low power consumption by the circuits.

Coalescence: Formation of a single water drop by the union of two or more colliding drops.

Cockeyed bob: A colloquial term in western Australia for a squall, associated with thunder, on the northwest coast in summer.

Code-sending radiosonde: A radiosonde which transmits the indication of the meteorological sensing elements in the form of a code consisting of combinations of dots and dashes.

Collector: A class of instruments employed to determine the electric potential at a point in the atmosphere, and ultimately the atmospheric electric field.

Color temperature: An estimate of the temperature of an incandescent body, determined by observing the wavelength at which it is emitting with peak intensity (its color) and using that wavelength in Wien's law.

Combined error: The total of all deviations of a transducer's output from a specified straight line in a constant environment.

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Comb nephoscope: A direct-vision nephoscope which is constructed in the following manner: a comb consisting of a cross-piece containing equispaced vertical rods is attached to one end of a column eight to ten feet long and is supported on a mounting that is free to rotate about its vertical axis. In use, the comb is turned so that the cloud appears to move parallel to the tips of the vertical rods.

Commutator: See radiosonde commutator.

Condenser-discharge anemometer: A contact anemometer connected to an electrical circuit which is so arranged that the average wind speed is indicated.

Conductivity: A unit measure of electrical conduction. The facility with which a substance conducts electricity, as represented by the current density per unit electrical-potential gradient in the direction of flow. Electrical conductivity is the reciprocal of electrical resistivity and is expressed in units such as mhos (reciprocal ohms) per cm. It is an intrinsic property of a given type of material under given physical conditions (dependent mostly on temperature). Conductance, on the other hand, varies with the dimensions of the conducting system and is the reciprocal of the electrical resistance.

Compass points: The cardinal points of the compass, i.e. north, south, east, west.

Compensated pyrheliometer: Pyrheliometer based on the comparison of the heating of two identical metal strips, one exposed to radiation, the other to a joule effect.

Compensation of instruments: The use of electromechanical devices to reduce (compensate for) the sensitivities of meteorological sensors to other parameters (e.g., the effect of temperature on a pressure sensor).

Condensation: The process by which a vapor becomes a liquid. In meteorology it occurs when water vapor changes to dew, fog, or becomes a cloud.

Condensation nucleus: Small particle on which water vapor condenses.

Conformal coating: A protective coating applied to circuits.

Constant-level balloon: A balloon designed to float at a constant pressure level. This may be accomplished by a pressure valve which controls the release of ballast so as to maintain flight above a selected pressure level until the supply of ballast is exhausted. See Moby Dick balloon, skyhook balloon, transosonde.

Constant-pressure balloon: Same as constant-level balloon.

Contact anemometer: Anemometer which generates an electrical contact output with a frequency proportional to wind speed.

Contact-cup anemometer: Same as contact anemometer.

Cooling-power anemometer: The general term for anemometers operating on the principle that the heat transfer to air from an object at an elevated temperature is a function of the air speed. Examples are the hot-wire anemometer and the katathermometer.

Coordinated Universal Time (UTC): The international standard of time, kept by atomic clocks around the world. Formerly known as Greenwich Mean Time (GMT), local time at zero degrees longitude at the Greenwich Observatory, England. UTC uses a 24-hour clock.

Coriolis force: In meteorology, a deflecting force acting on a body in motion and resulting from the earth's rotation. It deflects air currents to the right in the northern hemisphere and to the left in the southern hemisphere, thus having an effect on wind direction.

Coronagraph: An instrument for photographing the corona and prominences of the sun at times other than at solar eclipse.

Cotton-region shelter: A medium-sized instrument shelter. It is a white louvered box with a flat double roof and is mounted four feet above the ground on a four-legged stand.

Counterradiation: The downward flux of atmospheric radiation passing through a given level surface, usually taken as the earth's surface. This result of infrared (long-wave) absorption and re-emission by the atmosphere is the principal factor in the greenhouse effect.

CPU: Central Processing Unit. The part of a computer which controls and directs all functions.

Creeping: Defect in the action of an aneroid barometer resulting in a sluggish adjustment of the index toward the correct reading when the barometer is subjected to a large and rapid change in pressure.

Crosswind: A wind blowing in a direction perpendicular to the course of a moving object.

CRT: Cathode Ray Tube. A display element, consisting of a vacuum tube and screen, used with computers.

Cryopedometer: Instrument for measuring the depth to which the soil is frozen.

Cup anemometer: Anemometer which measures wind speed by the speed of rotation of 3 or 4 hemispherical or conical cups, each fixed to the end of a horizontal arm projecting from a vertical axis. Invented by Thomas Romney Robinson (1792-1882), Irish astronomer and physicist, about 1845. See condenser-discharge anemometer, contact anemometer. Compare to bridled-cup anemometer.

Current meter: Any one of numerous devices for the measurement of either speed alone or of both direction and speed (set and drift) in flowing water.

Cyanometer: Generally, an instrument designed to measure or estimate the blueness of the sky. See Linke-scale.

Cyclone: An area of low atmospheric pressure which has a closed circulation that is cyclonic (counterclockwise in northern hemisphere and clockwise in southern hemisphere).

D

Damping ratio: A constant which describes the performance of a wind vane in response to a step change in wind direction. It is calculated from the relative amount of overshoot on two successive swings (half cycles) of a decaying oscillation. This specification is dimensionless and is generally between 0.3 and 0.7.

Data acquisition: The process by which events in the real world are translated into machine-readable signals.

Dead band: The range through which the input may be varied without initiating a response. Usually expressed as a percentage of full-scale range.

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Decibar: A unit of pressure used principally in oceanography. One decibar (10^5 dynes/cm²) equals 0.1 bar. In the ocean, hydrostatic pressure in decibars very nearly equals the corresponding depth in meters.

Decibel: A measure of the relative power, or of the relative values of two flux densities, especially of sound intensities and radar power densities. The decibel is derived from the less frequently used unit, the bel, named in honor of Alexander Graham Bell.

Deformation thermometer: A thermometer using transducing elements which deform with temperature. Examples are the bimetallic thermometer and the Bourdon tube type of thermometer.

Deepening: A decrease in the central pressure of a pressure system. Usually applied to a low rather than to a high.

Degree day: A unit that represents one degree of deviation from a reference point in the mean daily outdoor temperature (usually 65°F) and that is used to measure heating and cooling requirements. Generally, a measure of the departure of the mean daily temperature from a given standard; one degree day for each degree (°C or °F) of departure above (or below) the standard during one day. Degree days are accumulated over a "season." As used by the U.S. Army Corps of Engineers, freezing degree days are computed above and below 32°F, positive if above and negative if below.

Degree hour: As used by the U.S. Army Corps of Engineers, the departure (in °F) of the hourly temperature form a standard 32°F, positive if above and negative if below. Degree hours may be accumulated over any period of time, depending upon the use to which they are applied.

Delay distance: The length of air flow past a wind vane required for the vane to respond to 50 percent of a step change in wind direction. Expressed in feet or meters and calculated from delay time times wind tunnel speed.

Delta temperature: The difference between temperature measurements taken at two significant levels above the ground. Temperatures at 10 and 40 meters are commonly used.

Depression: In meteorology, an area of low pressure; a low or trough.

Dew: Water condensed onto objects at or near the ground, due to the fact that their temperatures have fallen below the dew point temperature of the surrounding air, but not below freezing.

Dew cell: An instrument used to determine dew point.

Dew point (or dew-point temperature): The temperature to which a sample of air must be cooled, while the mixing ratio and barometric pressure remain constant, in order to attain saturation by water vapor. When this temperature is below 0°C, it is sometimes called the frost point.

Dew-point apparatus: Same as dew-point hygrometer.

Dew-point hygrometer: Hygrometer in which the dew (frost) point is determined by observing the temperature of an artificially cooled surface at the moment at which dew (frost) first appears on it.

Dew-point spread: The difference between the air temperature and the dew-point. Also called dew-point deficit, dew-point depression.

Diabatic process: Thermodynamic change of state of a system in which there is transfer of heat across the boundaries of the system. Compare to adiabatic process.

Diamond-Hinnman radiosonde: A variable audio-modulated radiosonde developed at the Bureau of Standards and used by the United States weather services.

Diffuse solar radiation (sky radiation): Downward scattered and reflected solar radiation, coming from the whole hemisphere with the exception of the solid angle of the sun's disc on a surface perpendicular to the axis of this cone.

Diffusion hygrometer: A hygrometer based upon the diffusion of water vapor through a porous membrane.

Digital: Pertaining to measurements or devices in which the output varies in discrete steps, i.e. on-off or pulse signals. Compare to analog.

Dines anemometer: A type of pressure-tube anemometer, named after the inventor.

Dines radiometer: An instrument for measuring radiant energy. It consists of an ether differential thermometer with blackened bulbs. One of the bulbs is exposed to the unknown radiation and the other to a black body source whose temperature can be varied. Equality of radiation is indicated by the balance of the differential thermometer.

Direct solar radiation: Radiation coming from the solid angle of the sun's disc, as opposed to diffuse sky radiation, effective terrestrial radiation, or radiation from any other source. Direct solar radiation is measured by pyrhemometers.

Discharge: Rate of flow of water past a point in a stream, expressed as volume per unit time, i.e. cubic feet per second.

Disdrometer: Apparatus designed to measure and record the size distribution of raindrops as they occur in the atmosphere.

Disk hardness gauge: An instrument for measuring snow hardness in terms of the resistance of snow to the pressure exerted by a disk attached to a spring-loaded rod, a gauge calibrated in pounds per square inch registers the amount of resistance. See Canadian hardness gauge.

Distance constant: The length of fluid flow (gas or liquid) past a sensor required for the sensor to respond to 63.2% of a step change in speed. Expressed in feet or meters. For anemometers, this value is calculated from time constant times wind tunnel speed.

Dobson spectrophotometer: A photoelectric spectrophotometer which is used in the determination of the ozone content of the atmosphere.

Doppler radar: Radar that can measure radial velocity, the instantaneous component of motion parallel to the radar beam (i.e., toward or away from the radar antenna). Named for J. Christian Doppler, an Austrian physicist, who in 1842 explained why the whistle of an approaching train had a higher pitch than the same whistle when the train was moving away.

Dosimeter: An instrument for measuring the ultraviolet in solar and sky radiation.

Double-theodolite observation: A technique for making winds aloft observations in which two theodolites located at either end of a baseline follow the ascent of a pilot balloon. Synchronous measurements of the elevation and azimuth angles of the balloon, taken at periodic intervals, permit computation of the wind vector as a function of height.

Glossary of Meteorological Terms

Downdraft: A relatively small-scale, downward moving current of air.

Downward total radiation: Solar and terrestrial radiation directed downwards (towards the earth's surface); incoming radiation.

Downwind: The direction toward which the wind is blowing; with the wind.

Drainage area: The size of the area comprising a watershed or river basin. Also called catchment area.

Drift: The variation over a period of time in device output when the input parameter is fixed. Temperature change is a common cause of drift.

Drizzle: Very small precipitation drops (diameters less than 0.5 mm) that appear to float with air currents while falling in an irregular path. Unlike fog droplets, drizzle falls to the ground.

Dropsonde: A radiosonde which is dropped by parachute from an aircraft for the purpose of obtaining soundings of the atmosphere below.

Drosometer: An instrument used to measure the amount of dew formed on a given surface.

Dry adiabatic lapse rate: The rate of decrease of temperature with height when unsaturated air is lifted adiabatically (without exchange of heat with its surroundings). The decrease is due to expansion as the air is lifted to a lower pressure.

Dry-bulb temperature: Technically, the temperature registered by the dry-bulb thermometer of a psychrometer. However, it is identical with the temperature of the air and may also be used in that sense.

Dry-bulb thermometer: Companion to the wet-bulb thermometer in a psychrometer. Used to measure ambient air temperature.

Dyne: The unit of force in the centimeter-gram-second system of physical units, i.e. one gm cm per sec², equal to 7.233 x 10⁻⁵ poundal.

E

EBCDIC: Extended Binary Coded Decimal Interchange Code. A standard code used to represent data using 8 bits per character.

Ebert ion-counter: An ion counter of the aspiration condenser type, used for the measurement of the concentration and mobility of small ions in the atmosphere.

Eddy velocity: Difference between the instantaneous wind velocity at a point and the mean wind velocity taken over a given time interval. Also called fluctuation velocity.

Effective snow melt: That part of snow melt that reaches stream channels as runoff.

Effective terrestrial radiation: The difference between the outgoing infrared terrestrial radiation of the earth's surface and the downcoming infrared counterradiation from the atmosphere.

Electrical hygrometer: A hygrometer which uses a transducing element whose electrical properties are a function of atmospheric water vapor content. The humidity strip and carbon-film hygrometer element are examples of such a transducer.

Electrical thermometer: A thermometer which uses a transducing element whose element properties are a function of its thermal state. Common meteorological examples of such thermometers are the resistance thermometer and the thermoelectric thermometer.

Electrolytic strip: Same as humidity strip.

Electrometer: An instrument for measuring differences of electric potential.

Electronic theodolite: See radar theodolite, radio direction-finder.

Electroscope: A general name for instruments which detect the presence of (but do not necessarily measure) small electrical charges by electrostatic means. Compare to electrometer.

Emanometer: An instrument for the measurement of the radon content of the atmosphere.

Eolian: Same as Aeolian.

Eppley pyrhelimeter: A pyrhelimeter of the thermoelectric type. Radiation is allowed to fall on two concentric silver rings, the outer covered with magnesium oxide and the inner covered with lamp black. A system of thermocouples (thermopile) is used to measure the temperature difference between the rings. Attachments are provided so that measurements of direct and diffuse solar radiation may be obtained.

EPROM: Erasable Programmable Read Only Memory. Programmable read-only memory which can be erased, usually by ultraviolet light, and re-programmed.

Error: The difference between the measured value and the true value. See instrument error, observational error, random error, standard error, systematic error. See also accuracy, accuracy rating, measured accuracy.

Error distribution: The probability distribution of random errors, typically a normal distribution with a zero mean.

Evaporation: The process by which a liquid is transformed to a vapor. The opposite of condensation.

Evaporation gauge: General name for an instrument which measures the evaporation rate of water into the atmosphere. Same as atmometer.

Evaporation hook gauge: See hook gauge.

Evaporation opportunity: The ratio of the actual amount of water evaporated into the atmosphere to the evaporative power. Also called relative evaporation.

Evaporation pan: A type of atmometer. It is a pan used in the measurement of the evaporation of water into the atmosphere. The NWS Class A pan is a cylindrical container 48 inches in diameter and 10 inches deep.

Evaporation pan coefficient: The ratio of the amount of evaporation from a large body of water to that measured in an evaporation pan. The coefficient varies seasonally, as well as from region to region.

Evaporation rate: The volume of liquid water evaporated per unit area in unit time, usually measured as the depth of liquid water lost per unit time from the whole area.

Evaporative power (or capacity): A measure of the degree to which the weather or climate of a region is favorable to the process of evaporation. Usually considered to be the rate of evaporation, under existing atmospheric conditions, from a surface of water which is chemically pure and has the temperature of the lowest layer of the atmosphere.

Evaporimeter: Same as atmometer.

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Evaporograph: Instrument which measures and records the amount of evaporation over time.

Evapotranspiration (ET): The combined processes by which water is transferred from the earth's surface to the atmosphere: evaporation of liquid or solid water plus transpiration from plants.

Evapotranspirometer: A type of lysimeter that measures the rate of evapotranspiration. It consists of a vegetation soil tank so designed that all water added to the tank and all water left after evapotranspiration can be measured.

Extinction: The attenuation of light.

F

FAA: Federal Aviation Administration.

Fahrenheit temperature scale: A temperature scale on which the freezing point of water equals 32° and the boiling point equals 212° at standard atmospheric pressure (760 mm Hg). Introduced in 1724 by German physicist Gabriel Daniel Fahrenheit (1686-1736).

Fastest mile wind speed: The highest wind speed measured over a period of time it takes for one mile of wind to pass by the anemometer. Compare peak gust.

Feed: The source of illumination for an antenna reflector. Also called antenna feed.

Fiducial point: A point (or line) on a scale used for reference or comparison purposes. In calibration of meteorological thermometers, for example, the fiducial points are 100°C (212°F) and 0°C (32°F), which correspond to the boiling point and ice point at standard pressure (760 mm Hg).

Fiducial temperature: That temperature at which, in a specified latitude, the reading of a particular barometer requires no temperature or latitude correction.

Field elevation: The officially designated elevation of an airport above mean sea level, taken as the highest point on any of the runways of the airport. Same as airport elevation.

Filling: An increase in the central pressure of a pressure system; opposite of a deepening. More commonly applied to a low rather than a high.

Fire-danger meter: A graphical aid used in fire weather forecasting to calculate the degree of forest-fire danger (or burning index). Commonly in the form of a circular slide rule, the fire-danger meter relates numerical indices of (a) the seasonal stage of foliage, (b) the cumulative effect of past precipitation or lack thereof, (c) the measured fuel moisture, and (d) the speed of the wind in the woods.

Fire weather: The state of the weather with respect to its effect upon the kindling and spreading of forest fires.

Firmware: Programs or instructions which are stored in read-only memory.

Firn: Old snow that has become granular and compacted as a result of melting and refreezing.

Fixed-beam ceilometer: See ceilometer.

Flight forecast: An aviation weather forecast for a specific flight.

Float barograph: A type of recording siphon barometer. The mechanically magnified motion of a float resting on the lower mercury surface is used to record atmospheric pressure on a rotating drum.

Floating pan: An evaporation pan in which the evaporation is measured from water in a pan floating in a larger body of water.

Float-type rain gauge: A class of rain gauge in which the level of the collected rain water is measured by the position of a float resting on the surface of the water.

Flood: Overflowing by water of the normal confines of a stream or other body of water, or accumulation of water by drainage over areas which are not normally submerged.

Flood stage: That stage, on a fixed river gauge, at which overflow of the natural banks of the stream begins to cause damage in any portion of the reach for which the gauge is used as an index.

Flyoff: The total amount of water transferred to the atmosphere by evapotranspiration.

Foehn: A warm, dry wind on the lee side of a mountain range, the warmth and dryness due to adiabatic compression upon descent.

Fog: A hydrometeor consisting of a visible aggregate of minute water droplets suspended in the atmosphere near the earth's surface. Fog differs from cloud only in that the base of fog is at the earth's surface while clouds are above the surface.

Fogbow: A faintly-colored circular arc similar to a rainbow but formed on fog layers containing drops whose diameters are 100 microns or less. Also called mistbow, white rainbow.

Föhn: See foehn.

Foot-candle: A unit of illuminance or illumination equal to one lumen per foot². This is the illuminance provided by a light source of one candle at a distance of one foot.

Foot-lambert: A unit of luminance (photometric brightness). The foot-lambert describes the luminance of a surface that emits or reflects one lumen per square foot; it is the luminance of a perfectly reflecting surface under an illumination of one foot-candle. One foot-lambert equals 0.3183 candles per square foot.

Foot-pound: A unit of energy equal to 1.356 joules.

Forel scale: A scale of yellows, greens, and blues for recording the color of sea water, as seen against the white background of a Secchi disk.

Fortin barometer: A type of cistern barometer in which the level of mercury in the cistern is adjusted to the zero point of the scale before each reading.

Free balloon: A buoyant balloon rising freely in the atmosphere, as opposed to a captive balloon.

Free lift: The actual lifting force of an inflated balloon, usually expressed in grams.

Freezing level: Lowest altitude in the atmosphere over a given location at which the air temperature is 0°C.

Freezing nucleus: Particle on which the freezing of water occurs.

Freezing point: Temperature at which a liquid solidifies under any given set of conditions. It may or may not be the same as the melting point or the more rigidly defined true freezing point or (for water) ice point.

Fresh breeze: Wind with a speed between 17 and 21 knots (19 and 24 mph); Beaufort scale number 5.

Fresh gale: Wind with a speed between 34 and 40 knots (39 and 46 mph); Beaufort scale number 8.

Frost: Ice crystal deposits formed by sublimation (conversion of water vapor directly to ice) when temperature and dew point are below freezing.

Glossary of Meteorological Terms

Frequency modulation: A type of modulation in which the frequency of a continuous radio carrier wave is varied in accordance with the properties of a second (modulating) wave.

Frost-point hygrometer: An instrument for measuring the frost point of the atmosphere.

FSK: Frequency Shift Keying. A form of frequency modulation of a data signal performed by a modem for transmission over dedicated wire or phone lines.

F.S. output: The transducer's output when the maximum sensed value is applied to the transducer's input. For example, the F.S. output of a 4-20 mA transmitter is 20 mA, whereas its span is only 16 mA.

Fuel-moisture: Determined by weighing a special type of wooden stick that has been exposed in the woods, its weight being proportional to its contained water. Sticks are rated 1-hour, 10-hour, 100-hour, or 1000-hour based on the time required to lose or gain 63% of the difference between the dead fuel itself and the surrounding atmosphere. Fuel moisture percentage is computed by dividing the weight of "water" in the fuel by the oven-dried weight of the fuel, then multiplying by 100.

Fujita tornado scale: Based upon damage patterns, classifies twisters into six categories of wind speed (F0 thru F5), ranging from 40 to 318 mph estimated wind speed, plus a hypothetical F6 with winds from 318 mph to Mach 1. Developed in 1971 by T. Theodore Fujita of the University of Chicago. Also known as the Fujita-Pearson Scale.

Full duplex: Operation mode of a communication circuit in which each end can simultaneously transmit and receive.

G

Gain: An increase or amplification. There are two general usages of the term in radar meteorology: (a) antenna gain (or gain factor) is the ratio of the power transmitted along the beam axis to that of an isotropic radiator transmitting the same total power; and (b) receiver gain (or video gain) is the amplification given a signal by the receiver.

Gain factor: See gain.

Gale: Wind with a speed between 28 and 55 knots (32 and 63 mph); Beaufort scale numbers 7 through 10.

Galilei: The unit of acceleration in the centimeter-gram-second system of units, equal to one cm per sec². Commonly used in gravimetry.

Gas thermometer: A thermometer which utilizes the thermal properties of gas. There are two forms of this instrument: (a) a type in which the gas is kept at constant volume, and pressure is the thermometric property; and (b) a type in which the gas is kept at constant pressure, and volume is the thermometric property. The gas thermometer is the most accurate of all thermometers and is used as the standard instrument for measurement of temperature.

Gauge relation: An empirical curve relating stream discharge or stage at a point on a stream to discharge or stage at one or more upstream points and, possibly, to other parameters. Also called stage relation.

Gentle breeze: Wind with a speed between 7 and 10 knots (8 and 12 mph); Beaufort scale number 3.

Geostrophic wind: That horizontal wind velocity at which the Coriolis acceleration exactly balances the horizontal pressure force. It is directed along contour lines or isobars.

Geostrophic wind level: The lowest level at which the wind becomes geostrophic in the theory of the Ekman spiral. Also called gradient wind level.

Geostrophic-wind scale: A graphical device used for the determination of the speed of the geostrophic wind from the isobar or contour-line spacing on a synoptic chart.

Gerdien aspirator: An instrument used for the determination of the electrical conductivity of the atmosphere.

Glass: In nautical terminology, a contraction for "weather glass" (a mercury barometer).

Glaze: A coating of ice, generally clear and smooth, formed by the freezing of supercooled water on a surface.

Glime: An ice coating with a consistency intermediate between glaze and rime.

Global radiation: The total of direct solar radiation and diffuse sky radiation received by a unit horizontal surface.

Global radiation is measured by pyranometers.

Goldbeater's-skin hygrometer: A hygrometer using goldbeater's skin as the sensitive element. Variations of the physical dimensions of the skin caused by its hygroscopic character indicate relative humidity. (Note: Goldbeater's skin is the prepared outside membrane of the large intestine of an ox. It is used in goldbeating to separate the leaves of the metal.)

Goniometer: An instrument used for measuring geometric angles. See radio direction-finder.

Gradient wind: Any horizontal wind velocity tangent to the contour line of a constant pressure surface (or to the isobar of a geopotential surface) at the point in question.

Gradient wind level: Same as geostrophic wind level.

Gram: A c.g.s. (centimeter-gram-second) unit of mass. Originally defined as the mass of 1 cubic centimeter of water at 4°C but now taken as the one-thousandth part of the standard kilogram, a mass preserved by the International Bureau of Weights and Measures.

Gram calorie: See calorie.

Gram-mole: See mole.

Gram-molecule: See mole.

Graphing board: Board that holds graph paper on which is plotted information obtained from a pilot-balloon observation.

Grass minimum: The minimum temperature shown by a minimum thermometer exposed in an open situation with its bulb at the level of the tops of the grass blades of short turf.

Grass temperature: The temperature registered by a thermometer with its bulb at the level of the tops of the grass blades in short turf.

Gravity wind: A wind (or component thereof) directed down the slope of an incline and caused by greater air density near the slope than at the same levels some distance horizontally from the slope. Also called drainage wind and sometimes called katabatic wind.

Gray body: A hypothetical body which absorbs some constant fraction, between zero and one, of all electromagnetic radiation incident upon it, which fraction is the absorptivity and is independent of wavelength. Compare to black body, white body.

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Grid nephoscope: A direct-vision nephoscope constructed in the following manner: A grid-work of bars is mounted horizontally on the end of a vertical column and made free to rotate about the vertical axis. The observer rotates the grid and adjusts his or her position until some feature of the cloud appears to move along the major axis of the grid. The azimuth angle at which the grid is set is taken as the direction of cloud motion.

Ground-check chamber: A chamber used to check the sensing elements of radiosonde equipment.

Ground-Hog Day: February 2nd. In American folklore, a day that is popularly supposed to provide the key to the weather for the remainder of the winter. Specifically, if the ground-hog upon emerging from its hole casts a shadow, it will return underground, thereby foreboding more wintery weather. There is no convincing statistical evidence to support this belief.

Gust: A sudden brief increase in the speed of the wind, followed by a lull or slackening. Compare to peak gust.

Gustiness components: The ratios, to the mean wind speed, of the average magnitudes of the component fluctuations of the wind along three mutually perpendicular axes.

Gustiness factor: A measure of the intensity of gusts given by the ratio of the total range of wind speed between gusts and the intermediate periods of lighter wind to the mean wind speed, averaged over both gusts and lulls.

Gustsonde: An instrument, dropped from high altitude and carried by a stable parachute, used to measure the vertical component of turbulence aloft.

H

Hail: Precipitation composed of balls or irregular lumps of ice with diameters between 5 and 50 mm.

Hair hygrometer: A recording hair hygrometer.

Hair hygrometer: A hygrometer in which the sensitive element is a strand or strands of human hair, the length of which is a function of the relative humidity of the air.

Half duplex: Operation mode of a communication circuit in which each end can transmit and receive, but not simultaneously.

Hardware: Physical equipment used in data processing. Compare to firmware, software.

Haze: Fine dust or salt particles dispersed through a portion of the atmosphere; a type of lithometer. The particles are so small they cannot be felt or seen with the naked eye. Many haze formations are caused by the presence of an abundance of condensation nuclei which may grow in size, due to a variety of causes, and become mist, fog, or cloud.

Hazemeter: Name sometimes given to a transmissometer.

Head wind: A wind blowing in a direction opposite to the heading of a moving object, thus opposing the object's intended progress; the opposite of a tailwind.

Heliograph: An instrument which records the duration of sunshine and gives a quantitative measure of the amount of sunshine by the action of the sun's rays upon blueprint paper. A type of sunshine recorder.

Heliostat: A clock-driven instrument mounting which automatically and continuously points in the direction of the sun. It is used with a pyrheliometer when continuous direct solar radiation measurements are required.

Heliotropic wind: A subtle, diurnal component of the wind velocity leading to a diurnal shift of the wind or turning of the wind with the sun, produced by the east-to-west progression of daytime surface heating.

Helium (He): An inert gas. A colorless, monatomic element which is found to occur in dry air to the extent of only 0.000524 percent by volume. Helium is very light, having a molecular weight of only 4.003 and specific gravity referred to air of 0.138. Because helium is non-inflammable and has a lifting power 92 percent of that of hydrogen, it is widely used as the inflation gas for meteorological balloons.

Hexadecimal: A numbering system using a base number of 16 and including the ten decimal digits (0 to 9) along with six alpha digits (A to F). Thus, a digit is available to represent each of the possible values of a 4-bit binary digit.

High: An area of high barometric pressure, with its attendant system of winds; an anticyclone.

Hi-reference signal: The audio-frequency signal transmitted by the Diamond-Hinman radiosonde when the baroswitch pen passes each fifteenth contact of the commutator, up to a number determined by the design of the commutator, and each fifth contact thereafter. This signal is transmitted so that the pressure, temperature, and humidity may be more readily distinguished.

Histogram: A graphical representation of a frequency distribution. The range of the variable is divided into class intervals for which the frequency of occurrence is represented by a rectangular column. The height of the column is proportional to the frequency of observations within the interval.

Holosteric barometer: Same as aneroid barometer. Holosteric means wholly made of solids, while aneroid means devoid of liquid.

Hook gauge: An instrument used to measure changes in the level of the water in an evaporation pan. The gauge is normally placed in a stillwell and adjusted so that the point of the hook just breaks the water surface. The change in water level is read on the attached micrometer.

Hot film anemometer: Anemometer which measures wind speed by measuring the degree of cooling of a metal film heated by an electric current. A type of cooling-power anemometer.

Hot wire anemometer: Anemometer which measures wind speed by measuring the degree of cooling of a metal wire heated by an electric current. A type of cooling-power anemometer.

Hotplate precipitation gauge: An instrument which measures rainfall and snowfall by electronically maintaining the temperature of two back-to-back round plates at a constant temperature above ambient and measuring the difference of the power required to hold them at that temperature. Developed and patented by The National Center for Atmospheric Research of Boulder, Colorado, and the Desert Research Institute of Reno, Nevada.

Humidity: Water vapor content of the air. See absolute humidity, dew point, mixing ratio, relative humidity, specific humidity.

Humidity coefficient: A measure, proposed by Angstrom, of the precipitation effectiveness of a region.

Glossary of Meteorological Terms

Humidity element: The transducer of any hygrometer, i.e. that part of a hygrometer that quantitatively “senses” atmospheric water vapor.

Humidity strip: The humidity transducing element in a Diamond-Hinman radiosonde. Also called electrolytic strip.

Hurricane balloon: See hurricane beacon.

Hurricane beacon: An air-launched balloon designed to be released in the eye of a tropical cyclone, float within the eye at predetermined levels, and transmit radio signals for RDF positioning.

Hurricane-force wind: Wind with a speed above 64 knots (73 mph); Beaufort scale numbers 12 through 17.

Hurricane wind: In general, the severe wind of an intense tropical cyclone (hurricane or typhoon). The term has no further technical connotation, but, unfortunately, is easily confused with the strictly defined hurricane-force wind.

Hydrogen (H): A colorless and odorless gaseous element. The lightest and apparently the most abundant chemical element in the universe. However, it is found only in trace quantities in the observable portion of our atmosphere, only about 0.00005 percent by volume of dry air. Hydrogen has a molecular weight of 2.0160 and specific gravity referred to air of 0.0695. At one time hydrogen was the commonly used inflation gas for meteorological balloons, but because of its dangerous combustibility, it has been largely replaced by helium.

Hydrograph: A graphical representation of stage or discharge at a point on a stream as a function of time.

Hydrography: The study of waters (including oceans, lakes, and rivers) embracing either: (a) their physical characteristics, from the standpoint of the oceanographer or limnologist; or (b) the elements affecting safe navigation, from the point of view of the mariner. Compare to hydrology.

Hydrologic accounting: A systematic summary of the terms (inflow, outflow, and storage) of the storage equation as applied to the computation of soil-moisture changes, ground-water changes, etc. An evaluation of the hydrologic balance of an area. Also called basin accounting, water budget.

Hydrologic balance: Generally, the relative states of inflow, outflow, and storage of moisture over a given area of earth's surface.

Hydrologic cycle: The succession of stages through which water passes on the ground and in the atmosphere: evaporation from land or bodies of water, condensation to form clouds, precipitation, accumulation in the soil or in bodies of water, and re-evaporation.

Hydrologic year: Same as water year.

Hydrology: The scientific study of the waters of the earth, especially with relation to the effects of precipitation and evaporation upon the occurrence and character of water in streams, lakes, and on or below the land surface. In terms of the hydrologic cycle, the scope of hydrology may be defined as that portion of the cycle from precipitation to re-evaporation or return to the water of the seas. Applied hydrology utilizes scientific findings to predict rates and amounts of runoff (river-forecasting), estimate required spillway and reservoir capacities, study soil-water-plant relationships in agriculture, estimate available water supply, and for other applications necessary to the management of water resources. Compare to hydrography.

Hydrometeor: A general term for atmospheric water in any of its forms, i.e. clouds, fog, hail, ice crystals, rain.

Hydrometer: An instrument used for measuring the specific gravity of a liquid.

Hydrophotometer: An instrument for measuring the extinction coefficient in water.

Hydrosphere: The water portion of the earth as distinguished from the solid part, called the lithosphere, and from the gaseous outer envelope, called the atmosphere.

Hyetal: Of or pertaining to rain.

Hygristor: A modification of the dew cell used in radiosonde equipment.

Hygrodeik: A form of psychrometer with wet-bulb and dry-bulb thermometers mounted on opposite sides of a specially designed graph of the psychrometric tables. It is so arranged that the intersections of two curves determined by the wet-bulb and dry-bulb readings yield the relative humidity, dew-point, and absolute humidity.

Hydrogram: The record made by a hygrograph.

Hydrograph: A hygrometer which includes an arrangement for the time recording of atmospheric humidity.

Hygrometer: An instrument used to measure the water vapor content of the air.

Hygroscope: An instrument that shows changes in humidity.

Hygroscopic: Readily taking up and retaining moisture.

Hygrothermograph: An instrument resulting from the combination of a thermograph and a hygrograph and furnishing, on the same chart, simultaneous time recording of ambient temperature and humidity.

Hygrothermoscope: Apparatus using the combined simultaneous action of a bimetallic thermometer and a hair hygrometer to move a needle in front of a divided scale. Its construction permits dew point variations to be indicated approximately.

Hypsometer: An instrument used to determine atmospheric pressure or elevation by observing the boiling point of water or other liquids. The sensitivity of the hypsometer increases with decreasing pressure, making it more useful for high altitude work.

Hysteresis: The maximum difference in output for any given input (within the specified range) when the value is approached first with increasing, and then with decreasing, input signals. Caused by energy absorption in the elements of the measuring instrument. Usually expressed as a percentage of full-scale range.

Hythergraph: A type of climatic diagram whose coordinates are some form of temperature vs. a form of humidity or precipitation.

Ice crystals: A type of precipitation composed of unbranched crystals in the form of needles, columns, or plates. Usually has a very slight downward motion and may fall from a cloudless sky.

Ice point: The true freezing point of water. The temperature at which a mixture of air-saturated pure water and pure ice may exist in equilibrium at a pressure of one standard atmosphere.

Iceing-rate meter: An instrument for the measurement of the rate of ice accretion on an unheated body.

Glossary of Meteorological Terms

IFLOWS: Integrated Flood Observing and Warning System. A joint undertaking by the National Weather Service and the participating States to improve flood warning capabilities by giving local communities the ability to obtain real-time rain and stream level data.

IFR: Abbreviation for Instrument Flight Rules, but commonly used to refer to the weather and/or flight conditions to which these rules apply, i.e. low visibility.

Illuminance: The total luminous flux received on a unit area of a given real or imaginary surface, expressed in such units as the foot-candle, lux, or phot.

Illuminometer: Same as photometer.

Impactor: A general term for instruments which sample atmospheric suspensoids by impactation. Same as impactometer.

Inaccuracy: The difference between the input quantity applied to a measuring instrument and the output quantity indicated by the instrument. The inaccuracy of an instrument is equal to the sum of its instrument error and its uncertainty.

Inch of mercury: A common unit used in measurement of atmospheric pressure. Defined as that pressure exerted by a one-inch column of mercury at standard gravity and a temperature of 0°C.

Index: The indicating part of an instrument. For example, the hand of a watch or the meniscus of a mercury column.

Indicator: An instrument used to reveal but not necessarily measure the presence of an electrical quantity. It is used to display the output of a sensing element after suitable amplification and modification. Sometimes called display.

Inert gas: Any one of six gases, helium, neon, argon, krypton, xenon, and radon, all of whose shells of planetary electrons contain stable numbers of electrons such that the atoms are chemically inactive.

Infiltration: Movement of water through the soil surface into the soil, or the quantity of water entering the soil. Infiltration is equal to the total precipitation less the losses due to interception by vegetation, retention in depressions on the land surface, evaporation, and surface runoff.

Infiltration capacity: The maximum rate at which precipitation can pass through the surface into the soil, for a given soil in a given condition.

Infrared radiation: Electromagnetic radiation lying in the wavelength interval between 0.8 micron and 1 millimeter. At the lower limit of this interval, the infrared radiation spectrum is bounded by visible radiation, while on its upper limit it is bounded by microwave radiation.

Input (or input signal): The quantity to be measured (or modulated, or detected, or operated upon) which is received by an instrument. For a thermometer, temperature is the input quantity.

Insolation: In general, solar radiation received at the earth's surface. Contracted from incoming solar radiation.

Instrument: A term used to describe a sensor (or sensors), the associated transducer(s), and the data readout or recording device.

Instrument correction: The mean difference between the readings of a given instrument and those of a standard instrument.

Instrument error: The correctable part of the inaccuracy of an instrument.

Instrument exposure: The physical exposure of an instrument. The effect of immediate environment upon the representativeness of the measurements obtained by meteorological instruments is considerable and not always correctable. The purpose of the instrument shelter is to provide as good an exposure as possible.

Instrument flight rules (IFR): A set of regulations set down by the U.S. Civil Aeronautics Board to govern the operational control of aircraft on instrument flight. The abbreviation of this term is seldom used to denote the rules themselves, but is in popular use to describe the weather and/or flight conditions to which these rules apply.

Instrument landing system (ILS): A navigational aid used to facilitate the landing of an aircraft at an airport in instrument weather, i.e. low visibility.

Instrument shelter: A box-like structure designed to protect certain meteorological instruments from exposure to direct sunlight, precipitation, and condensation, while at the same time providing adequate ventilation. Instrument shelters are painted white, have louvered sides, usually a double roof, and are mounted on a stand several feet above the ground with the door side facing poleward. See cotton-region shelter, Stevenson screen.

Instrument weather: In aviation terminology, route or terminal weather conditions of sufficiently low visibility to require the operation of aircraft under instrument flight rules.

Interceptometer: A rain gauge which is placed under trees or foliage to determine the rainfall in that location. By comparing this catch with that from a rain gauge set in the open, the amount of rainfall which has been intercepted by foliage can be determined.

Interface: The point (physical and/or electrical) where two distinct data processing elements meet.

International Geophysical Year: By international agreement, a period during which greatly increased observation of worldwide geophysical phenomena is undertaken through the cooperative effort of participating nations. July 1957 to December 1958 was the first such year. However, precedent was set by the International Polar Years of 1882 and 1932.

International index numbers: A system of designating meteorological observing stations by number, established and administered by the World Meteorological Organization. Under this scheme, specified areas of the world are divided into "blocks" each bearing a two-number designator. Stations within each block have an additional unique three-number designator, the numbers generally increasing from east to west and from south to north.

International Practical Temperature Scale of 1948

(IPTS-48): Specified by the 9th General Conference of Weights and Measures held in 1948. In the IPTS-48, the name "degree Centigrade" was replaced by "degree Celsius."

International Practical Temperature Scale of 1968 (IPTS-68): Set by the 1968 General Conference of Weights and Measures. In the IPTS-68, both thermodynamic and practical units were defined to be identical and equal to 1/273.16 of the thermodynamic temperature of the triple point of water. The unit itself was renamed "the kelvin" in place of "degree Kelvin" and designated "K" in place of "°K".

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International Temperature Scale of 1927 (ITS-27):

Adopted by the 7th General Conference of Weights and Measures in 1927.

International Temperature Scale of 1990 (ITS-90): An approximation to the thermodynamic temperature scale, it became the internationally recognized standard on January 1, 1990. On the ITS-90 scale, the atmospheric boiling temperature of water is approximately 373.124K (99.974°C).

International synoptic code: A synoptic code approved by the World Meteorological Organization in which the observable meteorological elements are encoded and transmitted in "words" of five numerical digits length. Often abbreviated synoptic code.

Isobar: A line of equal or constant pressure.

Isobaric: Of equal or constant pressure, with respect to either space or time.

Iso-elastic spring: A spring which is designed to achieve a fixed spring constant over a wide temperature range. Usually, this involves an alloy with high nickel content such as Ni-Span C. It is common for these springs to be stress relieved at elevated temperature after forming.

Isohel: A line drawn through geographical points having the same duration of sunshine (or other function of solar radiation) during a given interval of time.

Isohume: A line drawn through points of equal humidity on a given surface.

Isohyet: Line drawn through geographical points recording equal amounts of precipitation during a given time period or for a particular storm.

Isonep: A line drawn through all points on a map having the same amount of cloudiness.

Isophane: A line drawn through geographical points where a given seasonal biological event occurs on the same date.

Isopluvial: A line drawn through geographical points having the same pluvial index.

Isotherm: A line of equal or constant temperature.

Isothermal layer: Atmospheric layer throughout which there is no change of temperature with height, i.e. a zero lapse rate.

Isotropic radiation: Diffuse solar radiation which has the same intensity in all directions.

Ivory point: A small pointer extending downward from the top of the cistern of a Fortin barometer. The level of the mercury in the cistern is adjusted so that it just comes in contact with the end of the pointer, thus setting the zero of the barometric scale.

J

Jevons effect: The effect upon the measurement of rainfall caused by the presence of the rain gauge.

Jordan sunshine recorder: A sunshine recorder of the type in which the time scale is supplied by the motion of the sun. It consists of two opaque metal semi-cylinders mounted with their curved surfaces facing each other. Each of the semi-cylinders has a short narrow slit in its flat side. Sunlight entering the slits falls on light sensitive paper which lines the curved side of the semi-cylinder. One semi-cylinder covers morning hours, the other afternoon hours.

Joule: A unit of energy equal to 10^7 ergs or to 0.2389 calories.

K

Katabatic wind: Any wind blowing down an incline. If warm, it is a foehn. If cold, it may be a fall wind or a gravity wind.

Katathermometer: A type of cooling-power anemometer based upon the principle that the time constant of a thermometer is a function of its ventilation.

Kelvin temperature scale: An absolute temperature scale with the ice point of pure water defined as 273.16K. The size of the degree is the same as on the Celsius scale, and the zero point is absolute zero. Temperatures on this scale are called kelvins, not degrees kelvin, the unit kelvin is not capitalized, and the symbol (capital K) stands alone with no degree symbol. There are no negative temperatures in the Kelvin scale. In photometry, the Kelvin scale is used to express "color temperature," a simplified way to characterize the spectral properties of a light source. Technically, color temperature refers to the temperature to which one would have to heat a theoretical "black body" source to produce light of the same visual color. The Kelvin temperature scale is named after the British mathematician and physicist William Thomson (Lord Kelvin), who proposed it in 1848.

Kew-pattern barometer: Mercurial barometer with a fixed scale and cistern and which therefore requires only one adjustment before each reading.

Kilogram calorie: See calorie.

Koschmieder's law: A basic equation in daytime visual range theory, relating the apparent luminance of a distant black object, the apparent luminance of the background sky above the horizon, and the extinction coefficient of the atmosphere.

Knot: The unit of speed in the nautical system; one nautical mile per hour. It is equal to 1.1508 statute miles per hour or 0.5144 meters per second.

Konimeter: An instrument for determining the dust content of a sample of air. Also spelled conimeter.

Koniscope: An instrument which indicates the presence of dust particles in the atmosphere. Also spelled coniscope.

Koschmieder's Law: A basic equation in daytime visual range theory, relating the apparent luminance of a distant black object, the apparent luminance of the background sky above the horizon, and the extinction coefficient of the air layer near the ground. Also called airlight formula.

Krypton: An inert gas. An element found in the atmosphere to the extent of only 0.000114 percent by volume. Its molecular weight is 83.7.

Kytoon: A captive balloon used to maintain meteorological equipment aloft at approximately a constant height. The kytoon is streamlined and combines the aerodynamic properties of a balloon and a kite.

L

Lambert: A unit of luminance (photometric brightness). One lambert is the luminance of a surface that emits or reflects one lumen per square centimeter. The lambert honors the German physicist Johann Lambert (1728-1777), who showed that the illuminance of a surface is inversely proportional to the square of the distance from the light source.

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Laminar Smooth, non-turbulent. Often used to describe cloud formations which appear to be shaped by a smooth flow of air traveling in parallel layers or sheets.

Langley: A unit of energy per unit area commonly employed in radiation theory. Equal to one gram-calorie per square centimeter.

Lapse line: A curve showing the variation of temperature with height in the free air. See lapse rate.

Lapse rate: The decrease of an atmospheric variable with height, the variable being temperature, unless otherwise specified.

Large calorie: See calorie.

Laurence: A common type of terrestrial scintillation; shimmering over a hot surface (such as a roadway) on a quiet, cloudless, summer day.

Leeward: Facing away from the wind.

Lee wave: A wave disturbance in airflow due to some barrier in the flow, i.e. a hill or mountain.

LIDAR: Light Detecting And Ranging. A technique used to detect atmospheric constituents or related parameters such as atmospheric extinction coefficient. Light is produced in a modulated source and the resulting backscattered or reflected light is analyzed to quantify some property of the atmosphere.

Light: Visible radiation (about 0.4 to 0.7 microns in wavelength) considered in terms of its luminous efficiency, that is, evaluated in proportion to its ability to stimulate the sense of sight.

Light air: Wind with a speed between 1 and 3 knots (1 and 3 mph); Beaufort scale number 1.

Light breeze: Wind with a speed between 4 and 6 knots (4 and 7 mph); Beaufort scale number 2.

Linearity: The maximum deviation of any points from a straight line drawn as a "best fit" through the calibration points of an instrument with a linear response curve. Usually expressed as a percentage of full-scale range.

Linke-scale: A type of cyanometer, an instrument used to measure the blueness of the sky. The Linke-scale is simply a set of eight cards of different standardized shades of blue. They are evenly numbered 2 to 26. The odd numbers are used by the observer if he or she judges the sky color to lie between any of the given shades.

Liquid thermometer: Thermometer in which the difference in the rates of expansion with temperature of a liquid and its receptacle is used as a measure of the temperature. The liquid used may be ethyl alcohol, toluene, petroleum, or mercury.

Lithometeor: The general term for dry atmospheric suspensoids, including dust, haze, smoke, and sand. Compare to hydrometeor.

Lithosphere: The outer, solid portion of the earth; the crust of the earth.

Livingstone sphere: An clay atmometer consisting of a hollow ceramic sphere through which evaporation occurs. Evaporation is measured by the loss of water from the reservoir which feeds the sphere.

Lizard balloon: A balloon having a detachable tail which is released when the balloon has undergone a predetermined expansion. It thus serves to measure approximately the density of the atmosphere at the point of release.

Local visual distance: The meteorological visual range, which can be estimated from the average extinction coefficient using the Koschmieder equation.

Local winds: Winds which, over a small area, differ from those which would be appropriate to the general pressure distribution.

Long-wave radiation: Radiation with wavelengths greater than 4 microns. (In meteorology, same as infrared radiation.)

Lo-reference signal: The audio-frequency signal transmitted by the Diamond-Hinman radiosonde when the baroswitch pen passes each fifth contact of the commutator up to a number determined by the design of the commutator. It then signals every contact except the fifth, which is transmitted as a hi-reference signal.

Low: An area of low barometric pressure, with its attendant system of winds. Also called a depression or cyclone.

Low level wind shear: A local variation in the wind direction or speed. This condition can present danger to aircraft, especially at landing, when a sudden shift from headwind to tailwind can cause a rapid loss of airspeed and lift.

Lucimeter: Instrument for measuring the mean intensity of global solar radiation (direct and diffuse) near the earth's surface in a specified time interval.

Lull: A momentary decrease in the speed of the wind.

Lumen: A unit of luminous flux. The lumen is equal to the luminous flux radiated into a unit solid angle (steradian) from a small source having a luminous intensity of one candle. An ideal source possessing an intensity of one candle in every direction would radiate a total of 4 pi lumens. "Lumen" is a Latin word for light.

Luminance: A measure of the intrinsic luminous intensity emitted by a source in a given direction. Luminance is a measure only of light. The comparable term for electromagnetic radiation in general is radiance.

Luminescence: Any emission of light at temperatures below that required for incandescence.

Luminous flux: The flux of visible radiation, so weighted as to account for the manner in which the response of the human eye varies with the wavelength of radiation. The basic unit for luminous flux is the lumen.

Luminous intensity: The intensity (flux per unit solid angle) of visible radiation weighted to take into account the variable response of the human eye as a function of the wavelength of light. Usually expressed in candles.

Lux: A photometric unit of illuminance or illumination equal to one lumen per square meter.

Lysimeter: A type of evaporation gauge consisting of a tank or pan of soil placed in a field so that the soil, water, thermal, and vegetative properties in the tank duplicate as closely as possible the properties of the surrounding area.

M

Magnetic wind direction: The direction, with respect to magnetic north, from which the wind is blowing. Distinguish from true wind direction.

Magneto anemometer: A cup anemometer with its shaft mechanically coupled to a magneto.

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Magnetograph: A recording magnetometer.

Magnetometer: General name for an instrument which measures the earth's magnetic field intensity.

Manometer: An instrument for measuring the pressure of gases and vapors. A mercury barometer is a type of manometer.

Marine barometer: A mercury barometer designed for use aboard ship. The instrument is of the fixed-cistern type (see Kew barometer). The mercury tube is constructed with a wide bore for its upper portion and with a capillary bore for its lower portion. This is done to increase the time constant of the instrument and thus prevent the motion of the ship from affecting the reading. The instrument is suspended in gimbals to reduce the effects of pitch and roll of the ship.

Marine rainbow: A rainbow seen in the spray of the ocean. It is optically the same phenomenon as the ordinary rainbow.

Marine thermometer: See sea-water thermometer, reversing thermometer.

Mariners 1-2-3 Rule: A method of avoiding winds associated with a tropical cyclone by taking into account the forecast track error of the National Weather Service over a 10 year period which is approximately 100 nm in 24 hours, 200 nm for 48 hours, and 300 nm in 72 hours. The forecast track error is added to the 34 knot wind radii to compute the danger area.

MARPLOT: Mapping Applications for Response, Planning, and Local Operational Tasks. Part of the CAMEO system.

MARS: Motor Aspirated Radiation Shield. See radiation shield.

Marvin sunshine recorder: A sunshine recorder of the type in which the time scale is supplied by a chronograph. It consists of two bulbs, one of which is blackened, which communicate through a glass tube of small diameter. The tube is partially filled with mercury and contains two electrical contacts. When the instrument is exposed to sunshine, the air in the blackened bulb is warmed more than that in the clear bulb. The warmed air expands and forces the mercury through the connecting tube to a point where the electrical contacts are shorted by the mercury. This completes the electrical circuit to the pen of the chronograph.

Maximum thermometer: Thermometer used for measuring the highest temperature attained during a given interval of time, for example, a day.

Maximum-wind level: The height at which the maximum wind speed occurs, determined in a winds-aloft observation.

Maxwell's law: The statement that the viscosity of air is independent of the density of air.

Mean radiant temperature: The temperature at which an object gives out as much radiation as it receives from its surroundings.

Mean temperature: The average temperature of the air as indicated by a properly exposed thermometer for a given time period, usually a day, a month, or a year.

Measured accuracy: The maximum positive and negative deviation observed in testing a device under specified conditions and by a specified procedure. It is usually measured as an inaccuracy and expressed as accuracy, typically in terms of the measured variable, percent of span, percent of upper range variable, percent of scale length, or percent of actual output reading. See accuracy, accuracy rating.

Melting level: The level at which ice crystals and snowflakes melt as they descend through the atmosphere.

Melting point: The temperature at which a solid substance undergoes fusion, i.e. melts, changes from solid to liquid form. All substances have their characteristic melting points. For very pure substances the temperature range over which the process of fusion occurs is very small. The melting point of a pure crystalline solid is a process of pressure. It increases with increasing pressure for most substances.

However in the case of ice (and a few other substances) the melting point decreases with increasing pressure. Under a pressure of one standard atmosphere, the melting point of pure ice is the same as the ice point, that is 0°C or 32°F.

Meniscus: The upper surface of a column of liquid.

Mercurial barometer: Same as mercury barometer.

Mercury: A metallic element of atomic weight 200.61, unique (for metals) in that it remains liquid under all but very extreme temperatures.

Mercury barometer: Barometer in which pressure is determined by balancing air pressure against the weight of a column of mercury in an evacuated glass tube.

Mercury column: (Also called barometer column, barometric column.) The column of mercury employed in a mercury barometer, the height of which (inches of mercury) is used as a measure of atmospheric pressure.

Mercury-in-glass thermometer: A common type of liquid-in-glass thermometer, used, in meteorology, in psychrometers and as a maximum thermometer.

Mercury-in-steel thermometer: A liquid-in-metal thermometer in which mercury is enclosed in a steel envelope. The change in internal pressure caused by the temperature variation is measured by a Bourdon tube which is connected to the mercury by a capillary tube. This instrument is highly accurate and has extremely good pen control when arranged as a thermograph.

Mercury thermometer: A liquid-in-glass or liquid-in-metal thermometer using mercury as the liquid.

Mesonet: A regional network of observing stations (usually surface stations) designed to diagnose mesoscale weather features and their associated processes.

Mesoscale: Pertaining to atmospheric phenomena having horizontal scales ranging from a few to several hundred kilometers, including thunderstorms, squall lines, fronts, precipitation bands in tropical and extratropical cyclones, and topographically generated weather systems such as mountain waves and sea and land breezes.

Meteorogram: A record obtained from a meteorograph. A chart in which meteorological variables are plotted against time.

Meteorograph: An instrument which automatically records the measurement of two or more meteorological elements.

Meter-ton-second system: A system of physical units based upon the use of the meter, the metric ton (10⁶ grams), and the second as elementary quantities of length, mass, and time, respectively.

Michaelson actinograph: A pyrheliometer of the bimetallic type used to measure the intensity of direct solar radiation.

Microbarm: That portion of the record of a microbarograph between any two (or a specified small number) of successive crossings of the average pressure level (in the same direction). Analogous to microseism.

Glossary of Meteorological Terms

Microbarogram: The record or trace made by a microbarograph.

Microbarograph: An aneroid barograph designed to record atmospheric pressure variations of very small magnitude.

Micropluviometer: Rain gauge which registers precipitation that is too light to be registered by ordinary recording of the depth of water from precipitation. Same as ombrometer.

Microprocessor: A small, limited-capacity central processing unit contained entirely on one semiconductor chip.

Microseism: A feeble oscillatory disturbance of the earth's crust, detectable only by very sensitive seismographs. Certain types of microseisms seem to be closely correlated with pressure disturbances. See microbarm.

Millibar: A unit of pressure which directly expresses the force exerted by the atmosphere. Equal to 1000 dynes/cm² or 100 pascals.

Minimum thermometer: Thermometer used for measuring the lowest temperature attained during a given interval of time, for example, a day.

Mirror nephoscope: A nephoscope in which the motion of the cloud is observed by its reflection in a mirror.

Mist: A hydrometeor consisting of an aggregate of microscopic and more-or-less hygroscopic water droplets suspended in the atmosphere. It reduces visibility to a lesser extent than fog. The relative humidity of mist is often less than 95 percent.

Mistbow: Same as fogbow.

Mixing ratio: In a system of moist air, the dimensionless ratio of the mass of water vapor to the mass of dry air. For many purposes, the mixing ratio may be approximated by the specific humidity.

MMTS: Maximum-Minimum Temperature System. Electronic temperature measurement devices deployed by the US National Weather Service as a part of their cooperative network beginning in the mid-1980s.

Moby Dick balloon: A large plastic constant-level balloon for duration flying (in excess of 24 hours) at altitudes above 40,000 feet, used for the determination of wind fields and the measurement of upper atmospheric parameters.

Modem: A device that allows a terminal or computer at one location to communicate with a terminal or computer at a distant location via wire or phone lines.

Moderate breeze: Wind with a speed between 11 and 16 knots (13 and 18 mph); Beaufort scale number 4.

Moderate gale: Wind with a speed between 28 and 33 knots (32 and 38 mph); Beaufort scale number 7.

Modulation: The process of modifying some characteristic of a wave (the carrier) so that it varies in step with the instantaneous value of another wave (the modulating wave) in order to transmit a message. The modified characteristic may be frequency, phase, and/or amplitude.

Mole: A unit of mass numerically equal to the molecular weight of the substance. The gram-mole or gram-molecule is the mass in grams numerically equal to the molecular weight, i.e. a gram-mole of oxygen is 32 grams.

Moll thermopile: A thermopile used in some types of radiation instruments. See solarimeter.

Monsoon: A seasonal wind of persistent direction, characterized by a pronounced change in direction between seasons.

Mountain barometer: Any conventional barometer fitted with an extended scale so that atmospheric pressure measurements may be made at both high and low altitudes.

Mount Rose snow sampler: A particular pattern of snow sampler having an internal diameter of 1.485 inches so that each inch of water in the sample weighs one ounce.

Moveable scale barometer: A mercury barometer of the fixed cistern type in which a moveable scale terminating in an ivory point is used to compensate for the variations in the height of the mercury in the cistern.

MSL: Abbreviation for mean sea level.

MST radar: Abbreviation for mesosphere-stratosphere-troposphere radar. A type of wind profiler designed to measure winds and other atmospheric parameters up to altitudes of 100 km or more.

MTBF: Abbreviation for mean time between failures.

Multiple register: A chronograph used to make a time-record of certain measured meteorological elements. The most common type, the triple register, records wind direction and speed, duration of sunshine, and amount of rainfall (sensed respectively by a contact anemometer, Marvin sunshine recorder, and tipping bucket rain gauge). The register consists of a rotating, clock-driven drum on a helical axis, a separate pen for each element, and the actuating mechanism for the pens. Double registers are also used. Multiples registers of this type are becoming obsolete.

Multiplexer: A device that combines several separate communications signals into one and outputs them on a single line.

Muskingum method: A method of streamflow routing which assumes that storage is a linear function of the weighted flow in the reach and is adaptable to a simple mathematical solution.

N

Nansen bottle: A device used by oceanographers to obtain subsurface samples of sea water. The "bottle" is lowered by wire, its valves open at both ends. It is then closed in situ by allowing a weight (called a messenger) to slide down the wire and strike the reversing mechanism. This causes the bottle to turn upside down, closing the valves and reversing the reversing thermometers which are mounted on it in a special thermometer case. If, as is usually the case, a series of bottles are lowered, then the reversal of each bottle releases another messenger to actuate the bottle beneath it.

Nautical mile: The nautical mile is closely related to the geographical mile which is defined as the length of one minute of arc on the earth's equator. By international agreement, the nautical mile is now defined as 1852 meters.

Nasen cast: A series of Nansen-bottle water samples and associated temperature observations resulting from one release of a messenger.

Nephelometer: An instrument which measures the scattering function of particles suspended in a medium in order to determine the visual range through the medium. See visibility meter.

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Nepheloscope: (1) An instrument for demonstrating the temperature changes which occur in air that is rapidly expanded or compressed. (2) A laboratory instrument for the production of clouds by the condensation process. (3) Same as nephoscope.

Nephometer: A general term for instruments designed to measure the amount of cloudiness.

Nephoscope: An instrument for determining the direction of cloud motion. There are two basic designs of nephoscope, the direct-vision nephoscope and the mirror nephoscope. Also called nepheloscope.

Net pyranometer: An instrument for measuring the difference of the solar radiation falling on both sides of a horizontal surface from the whole hemisphere.

Net pyrgeometer: An instrument for measuring the difference between incoming and outgoing terrestrial radiation.

Net radiation: The difference between downward and upward (total) radiation; net flux of all radiation.

Net radiometer: An instrument for the measurement of the net flux of downward and upward total (solar and terrestrial) radiation through a horizontal surface.

Net solar radiation: The difference between the solar radiation directed downward and upward; net flux of solar radiation.

Newtonian telescope: A reflecting type telescope with a 45° mirror, so that the primary image is observed through a hole in the side of the tube.

NEXRAD: Acronym for NEXt generation weather RADar. A network of advanced Doppler radars, known as the WSR-88D (Weather Surveillance Radar - 1988 Doppler), developed in the 1980s and implemented in the 1990s to replace the aging network of WSR-57 and WSR-74 radar systems.

Nine light indicator: A remote indicator for wind speed and direction used in conjunction with a contact anemometer and a wind vane. The indicator consists of a center light, connected to the contact anemometer, surrounded by eight equally spaced lights which are individually connected to a set of similarly spaced electrical contacts on the wind vane. Wind speed is determined by counting the number of flashes of the center light during an interval of time. Direction, indicated by the position of the illuminated outer bulbs, is given to 16 points of the compass.

Nipher shield: A conically shaped, copper rain gauge shield.

Nonlinear: Not a linear function of the relevant variables.

Non-recording rain gauge: A rain gauge which indicates but does not record the amount of precipitation captured.

Normal operating conditions: The range of operating conditions within which a device is designed to operate and for which operating influences are stated. See operating conditions, reference operating conditions.

Normal-plate anemometer: A type of pressure-plate anemometer in which the plate, restrained by a stiff spring, is held perpendicular to the wind. The wind-activated motion of the plate is measured electrically. The natural frequency of this system can be made high enough so that resonance magnification does not occur.

NRM wind scale: A wind scale adapted by the U.S. Forest Service for use in the forested areas of the northern Rocky Mountains (NRM). It is an adaptation of the Beaufort wind scale. The difference between these two scales lies in the specification of the visual effects of the wind. The force numbers and the corresponding wind speeds are the same in both.

NWS: National Weather Service. Administered by the U.S. Department of Commerce.

O

Obscuring phenomenon: An atmospheric phenomenon, other than clouds, which obscures a portion of the sky from the point of observation. Also called obscuration.

Observational error: The difference between the true value of some quantity and its observed value. Every observation is subject to certain errors. *Systematic errors* affect the whole of a series of observations in nearly the same way. For example, the scale of an instrument may be out of adjustment. These instrument errors can be detected and corrected by comparison with a standard. The personal equation of an observer may lead him or her to make small systematic errors in his or her readings, for example, if the scale is not at eye level. *Random errors*, which appear in any series of observations, are generally small and as likely to be positive as negative. Their magnitudes are usually distributed according to the error distribution. *Mistakes* are widely discrepant readings.

Ombrometer: A rain gauge capable of measuring very small amounts of precipitation. Also called micropluviometer, trace recorder.

Ombroscope: An instrument which indicates the presence of precipitation. The ombroscope consists of a heated, water-sensitive surface which indicates by mechanical or electrical techniques the occurrence of precipitation.

Operational weather limits: The limiting values of ceiling, visibility, and wind, or runway visual range, established as safety minima for aircraft landings and take-offs.

Operating conditions: Conditions to which a device is subjected, not including the variable measured by the device. See normal operating conditions, reference operating conditions.

Operating influence: The change in a performance characteristic caused by a change in a specified operating condition from reference operating condition, all other conditions being held within the limits of reference operating conditions.

Orographic precipitation: Precipitation caused by the ascent of moist air over an orographic barrier such as a mountain range.

OSHA: Occupational Safety and Health Administration. A regulatory office of the U.S. Department of Labor.

Owens dust recorder: An instrument for rapidly obtaining samples of airborne dust; a type of dust counter. Particles pass through a cylindrical chamber, are drawn at high velocity through a narrow slit, and then impinge upon a microscope cover glass located a short distance from the slit. Analysis for quantity and size of the particles is made using a microscope. The vacuum required to operate the instrument is developed by an attached hand pump.

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P

Pan coefficient: Same as evaporation pan coefficient.

PAR: Abbreviation for photosynthetically active radiation.

Parachute radiosonde: Same as dropsonde.

Paranhelion: A refraction phenomenon similar to a parahelion, but occurring generally at a distance of 120° (occasionally 90° and 140°) from the sun, on the parhelic circle.

Paraselene: A weakly colored lunar halo identical in form and optical origin to the solar parahelion.

Paraselenic circle: A halo phenomenon consisting of a horizontal circle passing through the moon, corresponding to the parhelic circle through the sun. Produced by reflection of moonlight from ice crystals.

Parahelic circle: A halo consisting of a faint white circle passing through the sun and running parallel to the horizon for as much as 360° of azimuth. Produced by reflection of sunlight from ice crystals.

Parhelion: Either of two colored luminous spots that appear at points 22° (or somewhat more) on both sides of the sun and at the same elevation as the sun. Also called mock sun, sun dog.

Parallel data transmission (parallel output): A form of data transmission in which the bits of each character are all sent simultaneously, resulting in extremely fast communication but requiring a communication path for each bit. Compare to serial data transmission.

Parity: The addition of one or more redundant bits to information to verify its accuracy.

Pascal: Name given to the unit of pressure in the International System of Units (SI). Equal to 1 newton/meter² or 0.01 millibar.

Pascal's law: A hydrostatic principle that pressure applied to an enclosed fluid is transmitted undiminished to every portion of the fluid and to the walls of the containing vessel.

Peak gust: In United States weather observing practice, the highest "instantaneous" wind speed recorded at a station during a specified period, usually the 24-hour observation day. Therefore, a peak gust need not be a true gust of wind.

P-E index: Abbreviation for precipitation effectiveness index.

Pendulum anemometer: A pressure-plate anemometer consisting of a plate which is free to swing about a horizontal axis in its own plane above its center of gravity. The angular deflection of the plate is a function of the wind speed. This instrument is not used for station measurements because of the false reading which results when the frequency of the wind gusts and the natural frequency of the swinging plate coincide. This was the earliest form of anemometer.

Penetrometer: A pointed device which indicates the amount of resistance encountered when it is forced into a material such as snow or soil. See ram penetrometer.

P-E quotient: Abbreviation for precipitation-evaporation quotient.

P-E ratio: Abbreviation for precipitation-evaporation ratio.

Percolation: The gravity flow of water within soil.

Permeability: Capacity of a soil or other surface to be penetrated by water sinking into the ground under the force of gravity. It thus expresses the rate of percolation.

Personal equation: A systematic observational error due to the characteristics of the observer. The uncertainty in a reading made by an observer may be ascertained by a statistical analysis of his or her readings.

Pers sunshine recorder: A sunshine recorder of the type in which the time scale is supplied by the motion of the sun. The instrument, which is pointed at the celestial pole, consists of a hemispherical mirror mounted externally on the optical axis of a camera. The lens of the camera forms an image of the sun which is reflected by the hemispherical mirror so that as the sun moves across the sky, the image traces an arc of a circle on the photographic paper.

Phenolic: A plastic molding component formed by the reaction of phenol and formaldehyde. It can be heavily reinforced or "filled" with glass fibers or other materials. Phenolics are known for their high impact strength, excellent wear characteristics, and dimensional stability over a wide temperature range.

Phot: A photometric unit of illuminance or illumination equal to one lumen per square centimeter.

Photoelectric cell: A transducer which converts electromagnetic radiation in the infrared, visible, and ultraviolet regions into electrical quantities such as voltage, current, or resistance. Also called photo cell.

Photoelectric photometer: See photometer.

Photoelectric transmittance-meter: An instrument for measuring the transmissivity of the atmosphere; a type of transmissometer. It consists of a constant-intensity collimated light source located at a suitable distance from a photoelectric cell. Variation in the turbidity of the atmosphere causes changes in the intensity of the light received by the photo cell, thereby varying its electrical output. Also called photoelectric transmissometer.

Photographic barograph: A mercury barometer arranged so that the position of the upper or lower meniscus may be measured photographically. In one design the image of the meniscus is formed on a rotating drum covered with sensitized paper so that a continuous record of pressure as a function of time is obtained.

Photometer: An instrument for measuring the intensity of light or the relative intensity of a pair of lights. Also called an illuminometer. If the instrument is designed to measure the intensity of light as a function of wavelength, it is called a spectrophotometer. Photometers may be divided into two classes: photoelectric photometers in which a photoelectric cell is used to compare electrically the intensity of an unknown light with that of a standard light; and visual photometers in which the human eye performs the function of a photo cell. A photometer used to measure the intensity of a distant light is referred to as a telephotometer or transmissometer.

Photopolarimeter: A polarimeter utilizing a Wollaston prism as a polarizer and a Nicol prism as an analyzer.

Phytometer: A device, similar to a potometer, for measuring transpiration, consisting of a vessel containing soil in which one or more plants are rooted and sealed so that water can escape only by transpiration from the plant.

Pibal: Contraction for pilot balloon observation.

Glossary of Meteorological Terms

Piche evaporimeter: An atmometer which uses a filter paper disc as the evaporating element. The amount of water evaporated through the paper is read at the graduated tube reservoir.

Pilot balloon: A small balloon whose ascent is followed by a theodolite in order to obtain data for the computation of winds aloft.

Pilot balloon observation: A method of winds aloft observation in which the elevation and azimuth angles of a theodolite are read while visually tracking a pilot balloon. Balloon height data is estimated from assumed balloon ascension rates.

Pitot-static tube: Same as pitot tube.

Pitot tube: An instrument for measuring the relative speed of a fluid. It consists of a concentric pipe arrangement in which the inner pipe is open at one end and the outer pipe is perforated and closed at both ends. Each pipe is connected to a manometer. The unit is operated with the open end pointing upstream, so that the inner pipe measures the total pressure and the outer pipe measures the static pressure. The difference between these pressures, the dynamic pressure, is proportional to the square of the fluid speed.

Pitot tube anemometer: A pressure tube anemometer, consisting of a pitot tube mounted on the windward end of a wind vane and a suitable manometer to measure the developed pressure and calibrated in units of wind.

Pluvial: Pertaining to rain, or more broadly, to precipitation.

Pluvial index: The amount of precipitation falling in one day, or other specified period, that is likely to be equalled or exceeded in any given place only once in a century. That is, a precipitation amount that has a return period of 100 years.

Pluviograph: Same as recording rain gauge.

Pluviometer: Same as rain gauge.

Pluvioscope: Apparatus from which the nature and time of precipitation may be determined.

Polarimeter: An instrument for determining the degree of polarization of light. See photopolarimeter.

Polariscope: An instrument for studying, or examining substances in, polarized light. See Savant polariscope.

Pole-star recorder: An instrument used to determine approximately the amount of cloudiness during the dark hours. It consists of a fixed long-focus camera positioned so that Polaris is permanently within its field of view. The apparent motion of the star appears as a circular arc on the photograph and is interrupted as clouds come between the star and the camera.

Potential evaporation: Same as evaporative power.

Potential evapotranspiration: The amount of moisture which, if available, would be removed from a given land area by evapotranspiration. Expressed in units of water depth.

Potential temperature: Temperature assumed by an unsaturated air parcel when brought adiabatically to a standard pressure (1,000 mb).

Potentiometer: An instrument for measuring differences in electric potential.

Potometer: A device, similar to a phytometer, for measuring transpiration. It consists of a small vessel containing water and sealed so that the only escape of moisture is by transpiration from a leaf, twig, or small plant with its cut end inserted in the water.

Precipitable water: Amount of water, expressed as a depth or as a mass, which would be obtained if all the water vapor in a specified column of the atmosphere were condensed and precipitated.

Precipitation: Any and all forms of water particles, liquid or solid, that fall from the atmosphere and reach the ground.

Precipitation-effectiveness index: For a given location, a measure of the long-range effectiveness of precipitation in promoting plant growth. Also called precipitation-evaporation index.

Precipitation-effectiveness ratio: Same as precipitation-evaporation ratio.

Precipitation-evaporation index: Same as precipitation-effectiveness index.

Precipitation-evaporation quotient: A measure of long-term precipitation effectiveness. The ratio of the normal annual rainfall to the normal annual evaporation.

Precipitation-evaporation ratio: For a given locality and month, an empirical expression devised for the purpose of classifying climates numerically on the basis of precipitation and evaporation.

Precipitation gauge: General term for any device that measures precipitation; principally a rain gauge or snow gauge.

Precipitation scavenging: Removal of pollutants from the air by either rain or snow.

Pressure altimeter: An aneroid barometer with a scale graduated in altitude instead of pressure units.

Pressure gradient: The rate of decrease of pressure per unit distance at a fixed time.

Pressure jump: A sudden, significant increase in station pressure.

Pressure-plate anemometer: An anemometer which measures wind speed in terms of the drag which the wind exerts on a solid body. See bridled-cup anemometer, normal-plate anemometer, pendulum anemometer.

Pressue port: A device used to create a static pressure inlet for a barometric pressure sensor by shielding the sensor from the effects of wind.

Pressure tendency (barometric tendency): The change in barometric pressure within a specified period of time (typically 3 hours for meteorological observations).

Pressure-tube anemometer: An anemometer which derives wind speed from measurements of dynamic wind pressures. Wind blowing into a tube develops a pressure greater than the static pressure, while wind blowing across a tube develops a pressure less than the static. This pressure differential, which is proportional to the square of the wind speed, is measured by a suitable manometer. See anemo-biograph, Dines anemometer, Pitot tube.

PROM: Programmable Read-Only Memory. Read-only memory which can be programmed by the user using a special hardware programmer.

Price meter: A current meter consisting of six conical cups, mounted around a vertical axis, which rotate and generate a signal with each rotation. Tail vanes and a heavy weight stabilize the instrument.

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Primary rainbow: The most common of the principal rainbow phenomena, which appears as an arc of about 42° about the observers antisolar point. On occasion, inside the primary rainbow one or more supernumerary rainbows may be seen. The secondary rainbow lies outside the primary rainbow at an angular radius of about 50°.

Propeller anemometer: A rotation anemometer which has a horizontal axis upon which helicoidal shaped vanes are mounted. See windmill anemometer.

Protected thermometer: A reversing thermometer which is encased in a strong glass outer shell that protects it against hydrostatic pressure. Compare to unprotected thermometer.

Protocol: A set of rules or conventions used to standardize data transfer between devices.

PSK: Phase Shift Keying. A form of phase modulation of a data signal performed by a modem for transmission over dedicated wire or phone lines.

Psychograph: A self-recording psychrometer.

Psychrometer: An instrument used to measure the water vapor content of the air. A type of hygrometer. It consists of a wet-bulb and a dry-bulb thermometer. See aspiration psychrometer, Assmann psychrometer, hygrodisk, sling psychrometer.

Psychrometric calculator: A device for computing certain psychrometric data, usually the dew point and the relative humidity, from known values of the dry-bulb and wet-bulb temperatures and the atmospheric pressure. One type is the circular slide-rule form and, like the psychrometric tables, it is derived from the psychrometric formula.

Psychrometric tables: Tables prepared from the psychrometric formula and used to obtain vapor pressure, relative humidity, and dew point from values of wet-bulb and dry-bulb temperatures.

p.t.u.: Abbreviation for the pressure, temperature, and humidity data obtained by a radiosonde observation.

Pulse-time-modulated radiosonde: A radiosonde which transmits the indications of the meteorological sensing elements in the form of pulses spaced in time. The meteorological data are evaluated from the intervals between the pulses. Also called time-interval radiosonde.

Pyranograph: An instrument for recording global solar radiation.

Pyranometer: An instrument which measures combined direct solar radiation and diffuse sky radiation. See pyrhelimeter, Robitzsch actinograph, solarimeter. See also albedometer.

Pygeometer: An instrument which measures the effective terrestrial radiation. See Angstrom pygeometer.

Pyrhelimeter: An instrument for measuring the intensity of direct solar radiation at normal incidence. See Angstrom compensation pyrhelimeter, Eppley pyrhelimeter, Michaelson actinograph, silver-disc pyrhelimeter, spectropyrhelimeter, water-flow pyrhelimeter.

Pyrradiometer: An instrument for the measurement of both solar and terrestrial radiation.

Q

QFE: Atmospheric pressure at field elevation.

QNH: Same as altimeter setting.

Quadrant electrometer: A very sensitive electrostatic electrometer for measuring small potential differences.

R

Rabal: A method of winds aloft observation essentially the same as a pilot balloon observation except the height data is derived from the radiosonde observation rather than from assumed ascension rates.

Radar: Acronym for RADio Detection And Ranging. An electronic instrument used to detect distant objects and measure their range by how they scatter or reflect radio energy. Precipitation and clouds are detected by measuring the strength of the electromagnetic signal reflected back. See Doppler radar, NEXRAD.

Radarsonde: A system in which radar techniques are used to determine the range, elevation, and azimuth of a radar target carried aloft by a radiosonde, so that wind data may be obtained along with the other meteorological data.

Radar theodolite: A radar which is used to obtain the azimuth, elevation, and slant range of an airborne target.

Radar wind system: Apparatus in which radar techniques are used to determine the range, elevation, and azimuth of a balloon-borne target, to computer upper-air wind data. It is a type of rawin system.

Radiance: In radiometry, a measure of the intrinsic radiant intensity emitted by a radiator in a given direction.

Radiant energy: The energy of any type of electromagnetic radiation. Also called radiation.

Radiant-energy thermometer: An instrument which determines the black-body temperature of a substance by measuring its thermal radiation.

Radiation: Emission or transfer of energy in the form of electromagnetic waves or particles.

Radiation pattern: A diagram showing the intensity of the radiation field in all directions from a transmitting radio or radar antenna at a given distance from the antenna.

Radiation shield: A device used on certain types of instruments to prevent unwanted radiation from affecting the measurement of a quantity. Also called solar radiation shield.

Radiator: Any source of radiant energy, especially electromagnetic energy.

Radio atmometer: An instrument designed to measure the effect of sunlight on evaporation from plant foliage. It consists of a porous clay atmometer whose surface has been blackened so that it absorbs radiant energy.

Radio direction-finder: An instrument for determining the direction from which radio waves approach a receiver. It may consist of a manually operated direction indicator, or it may use a servo system to position the antenna automatically in the direction of the incident waves. This instrument may be used in place of a theodolite for observation of a radiosonde. Also called radio theodolite, radio goniometer.

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Radio frequency (RF): The RF waves emanating from an antenna are generated by the movement of electrical charges in the antenna. Electromagnetic waves can be characterized by a wavelength and a frequency. The wavelength is the distance covered by one complete cycle of the electromagnetic wave, while the frequency is the number of electromagnetic waves passing a given point in one second. The frequency of an RF signal is usually expressed in terms of a unit called the "hertz" (abbreviated Hz). One Hz equals one cycle per second. One megahertz (MHz) equals one million cycles per second.

Radio theodolite: An instrument for determining the direction from which radio waves approach a receiver. It may consist of a manually operated direction indicator, or it may use a servo system to position the antenna automatically in the direction of the incident waves.

Radioactive snow gauge: A device which automatically records the water equivalent of snow on a given surface as a function of time. A small sample of a radioactive salt is placed in the ground in a shielded collimator which directs a beam of radioactive particles upwards. A Geiger-Müller counting system located above the snow level measures the amount of depletion of radiation caused by the presence of snow.

Radiometer: An instrument for measuring radiant energy. See actinometer, Dines radiometer, photometer, Tulipian radiometer.

Radiosonde: A balloon-borne instrument for the simultaneous measurement and transmission of meteorological data. It includes transducers for the measurement of pressure, temperature, and humidity; a modulator for the conversion of the output of the transducers to a quantity which controls a property of the radio frequency signal; a selector switch which determines the sequence in which the parameters are to be transmitted; and a transmitter which generates the radio-frequency carrier.

Radiosonde balloon: A balloon used to carry a radiosonde aloft, considerably larger than pilot balloons or ceiling balloons.

Radiosonde commutator: A component of a radiosonde consisting of a series of alternate electrically conducting and insulating strips. As these are scanned by a contact the radiosonde transmits temperature and humidity signals alternately. The contact may be a baroswitch as in the Diamond-Hinman radiosonde, or may be motor driven.

Radiosonde modulator: That part of an audio-modulated radiosonde consisting of the baroswitch, the sensing elements, the reference elements, and the relay.

Radiosonde observation: An evaluation of upper air temperature, pressure, and humidity from radio signals received from a balloon-borne radiosonde.

Radiosonde recorder: An instrument, located at the surface observing station, which is used to record the data presented by a radiosonde aloft.

Radiosonde transmitter: The component of the radiosonde which includes the modulating blocking oscillator and the radio-frequency carrier oscillator.

Radiosonde-radiowind system: Apparatus consisting of (a) standard radiosonde and radiosonde ground equipment to obtain upper-air data on pressure, temperature, and humidity, and (b) a self-tracking radio direction-finder to provide the elevation and azimuth angles of the radiosonde so that wind vectors may be obtained. It is a type of rawinsonde system.

Rain: Precipitation composed of liquid water drops more than 0.5 mm in diameter, falling in relatively straight, but not necessarily vertical, paths. Compare to drizzle.

Rain gauge: Instrument for measuring the depth of water from precipitation that is assumed to be distributed over a horizontal, impervious surface and not subject to evaporation.

Rain gauge shield: A device which surrounds a rain gauge and acts to maintain horizontal flow in the vicinity of the funnel so that the catch will not be influenced by eddies generated near the gauge. See Alter shield, Nipher shield, Wild fence.

Rain-intensity gauge: An instrument which measures the instantaneous rate at which rain is falling on a given surface. Also called a rate-of-rainfall gauge.

Rainbow: Any one of a family of circular arcs consisting of concentric colored bands, arranged from red on the inside to blue on the outside, which may be seen on a "sheet" of water drops (rain, fog, spray). The most common of the many possible is the primary rainbow. The second most common is the secondary rainbow, seen outside the primary bow and having the reverse spectral sequence. Tertiary and higher order bows are exceedingly rare due to their low luminosity. Supernumerary rainbows are seen fairly often just within the primary bow.

Raindrop spectrograph: An instrument which automatically determines the size distribution of raindrops.

RAM: Random Access Memory. The memory of a computer which can be read and written into at any location without passing through preceding locations.

Ram penetrometer: A cone-tipped metal rod designed to be driven downward into deposited snow or firn. The measured amount of force required to drive the rod a given distance is an indication of the physical properties of the snow or firn.

Random: Eluding precise prediction, completely irregular.

Random error: The inherent imprecision of a given process of measurement, the unpredictable component of repeated independent measurements of the same object under sensibly uniform conditions.

Range: The interval between the lower and upper measuring limits of an instrument, i.e. a thermometer with a range of -35 to 50°C. Compare to span.

Rankine temperature scale: An absolute temperature scale with the degree of the Fahrenheit scale and the zero point of the Kelvin scale. The freezing point of water equals 491.67°. The boiling point of water equals 671.67°. The temperature scale is named after the Scottish engineer and physicist William John Macquorn Rankine, who proposed it in 1859.

Raob: Contraction for radiosonde observation.

Rate-of-rainfall gauge: Same as rain-intensity gauge.

Rawin: A method of winds aloft observation accomplished by tracking a balloon-borne radar target or radiosonde with either radar or a radio theodolite.

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- Rawinsonde:** A method of upper air observation consisting of an evaluation of the wind speed and direction, temperature, pressure, and humidity aloft by means of a balloon-borne radiosonde tracked by radar or a radio theodolite.
- Rawin target:** A special type of radar target, usually a corner reflector, tied beneath a free balloon and designed to be an efficient reflector of radio energy.
- RAWS:** Remote Automated Weather Station. A network of weather stations positioned throughout the U.S. that collect, store, and forward data hourly via satellite to a computer system located at the National Interagency Fire Center in Boise, Idaho.
- RDF:** Radio Direction Finder.
- Reach:** A definite portion of a stream channel, commonly taken between two gauging stations, but may be taken between any two specified points.
- Real-time:** The actual time during which physical events take place.
- Reaumur temperature scale:** A scale with the ice point at zero degrees and the boiling point of water at 80 degrees, with pressure of one atmosphere.
- Receiver:** (1) The initial component or the sensing element of a measuring system. For example, the receiver of a rain gauge is the funnel which captures the rain and the receiver of a thermoelectric thermometer is the measuring thermocouple. (2) An instrument used to detect the presence of and to determine the information carried by electromagnetic radiation, i.e. a radio receiver.
- Recording potentiometer:** An instrument which automatically records the voltage applied to it, as a function of time.
- Recording rain gauge:** A rain gauge which automatically records the amount of precipitation collected, as a function of time.
- Reduction:** In general, the transformation of data from a "raw" form to some useable form. In meteorology, this often refers to the conversion of the observed value of an element to the value which it would theoretically have at some selected or standard level. The most common reduction in weather observing is that of station pressure to sea level pressure.
- Reflected solar radiation (reflected global radiation):** Upward-directed solar radiation, reflected by the earth's surface and the atmosphere.
- Reflecting nephoscope:** Same as mirror nephoscope.
- Reflection rainbow:** A rainbow formed by light rays which have been reflected from an extended water surface. Not to be confused with a reflected rainbow whose image may be seen in a still body of water. The center of a reflection rainbow is at the same elevation as the sun but in the opposite part of the sky.
- Reflector:** In general, any object that reflects incident energy. Usually it is a device designed for specific reflection characteristics.
- Reflectometer:** Downward-facing pyranometer used for measuring reflected solar radiation.
- Reference operating conditions:** The range of operating conditions of a device within which operating influences are negligible. The range is usually narrow. Reference operating conditions are the conditions under which reference performance is stated and the base from which the values of operating influences are determined. See normal operating conditions, operating conditions.
- Register:** The writing component of a recording instrument.
- Relative evaporation:** See evaporative opportunity.
- Relative humidity:** The ratio of the existing amount of water vapor in the air at a given temperature to the maximum amount that could exist at that temperature. Usually expressed in percent.
- Repeatability:** The closeness of agreement among a number of consecutive output values measuring the same input value under the same operating conditions, approaching from the same direction. Usually measured as nonrepeatability but expressed as repeatability, a percentage of span.
- Reproducibility:** The closeness of agreement among measurements of the same value of the same quantity where the individual measurements are made under different defined conditions, i.e. by different methods or with different measuring instruments.
- Resistance thermometer:** A type of electrical thermometer in which the thermal element is a substance whose electrical resistance varies with the temperature. Such thermometers can be made with very short time constants and are capable of highly accurate measurements.
- Resolution:** The smallest change in the environment that causes detectable change in the indication of an instrument. Compare to sensitivity.
- Response:** The value of the quantity measured, as indicated or otherwise provided by a measuring instrument.
- Response time:** The time required for an instrument to register a designated percentage (frequently 90%) of a step change in the variable being measured.
- Retreater:** A defective maximum thermometer of the liquid-in-glass type in which the mercury flows too freely through the constriction. Such a thermometer will indicate a maximum temperature that is too low.
- Reversing thermometer:** A mercury-in-glass thermometer which records the temperature upon being inverted and retains its reading until being returned to the first position.
- RF:** Abbreviation for radio frequency.
- Ridge:** An elongated area of relatively high pressure. Usually associated with and most clearly identified as an area of maximum anticyclonic curvature of the wind flow. The opposite of a trough.
- Rime:** An accumulation of granular ice tufts on the windward sides of exposed objects that is formed from supercooled fog or cloud and built out directly against the wind.
- River basin:** The total area drained by a river and its tributaries. Same as watershed.
- River forecast:** A forecast of the expected stage or discharge at a specified time, or of the total volume of flow within a specified interval of time, at one or more points along a stream.
- River gauge:** A device for measuring the river stage. Also called stream gauge.
- River stage:** See stage.
- RMS:** Root Mean Square. This notation is used frequently with error analysis. In that context, it is the square root of the arithmetic mean of the squares of the deviations of the individual calibration points from the theoretical or ideal response.

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Robitzsch actinograph: A pyranometer developed by M. Robitzsch. Its design utilizes three bimetallic strips which are exposed horizontally at the center of a hemispherical glass bowl. The outer strips are white reflectors and the center strip is a blackened absorber. The bimetals are joined in such a manner that the pen of the instrument deflects in proportion to the difference in temperature between the black and white strips and is thus proportional to the intensity of the received radiation.

Rocketsonde (meteorological rocket): A rocket designed primarily for routine upper air observations in the lower 250,000 feet of the atmosphere, especially that portion inaccessible to balloons (above 100,000 feet).

Rockoon: A high-altitude sounding system consisting of a small solid-propellant research rocket carried aloft by a large plastic balloon. The rocket is fired near the maximum altitude of the balloon flight.

ROM: Read Only Memory. A memory that cannot be altered in normal use of a computer. Usually used to store information permanently, such as firmware programs.

ROMAN: Real-Time Observations Monitor and Analysis Network. A web-based weather observations monitor linking RAWS, airport observations, and other miscellaneous observations to a single user interface.

Rotating multicylinder: An instrument consisting of a series of graduated cylinders possessing selective collection efficiencies. It is used for the measurement of quantities relating to the size distribution of cloud droplets.

Rotation anemometer: A type of anemometer in which the rotation of an element serves to measure the wind. Rotation anemometers are divided into two classes; those in which the axis of rotation is horizontal, such as the windmill anemometer, and those in which the axis of rotation is vertical, such as the cup anemometer.

RS232: A standard interface between a computer input/output port and a peripheral device. Signal properties including time duration, voltage, and current, are specified by the Electronic Industries Association.

RS422: A protocol similar to RS232 which makes use of differential transmission to provide high speed data transmission over significantly longer distances.

RS485: A protocol similar to RS232 which permits data interchange on multidrop networks of up to 32 nodes using a single twisted pair cable. In order for this protocol to be used, each device on a network must have some level of intelligence in order to establish orderly data transfer over a single path.

Runoff: The portion of the precipitation on the land which ultimately reaches the streams, especially the water from rain or melted snow that flows over the surface.

Runway visibility: The visibility along an identified runway, determined from a specified point on the runway with the observer facing in the same direction as a pilot using the runway. Compare to runway visible range.

Runway visual range (RVR): The maximum distance along the runway at which the runway lights are visible to a pilot at touchdown. Runway visual range may be determined by an observer located at the end of the runway, facing in the direction of landing, or by means of a transmissometer installed near the end of the runway.

S

Salinometer: Any device or instrument for measuring salinity, especially one based on electrical conductivity methods.

SAM: Station for Atmospheric Measurements. A portable meteorological station used to provide weather data to the ALOHA air model that predicts how a cloud of pollutant gas might disperse in the atmosphere after an accidental release. Also see CAMEO.

Saturation: The condition of the atmosphere when the amount of water vapor present is the maximum possible at the existing temperature.

Savart polariscope: A polariscope consisting of a specially constructed double plate polarizer and a tourmaline plate analyzer. Polarized light passing through the instrument is indicated by the presence of parallel colored fringes, while unpolarized light results in a uniform field.

SAWRS: Supplemental Aviation Weather Reporting Station. A facility where weather observations are taken, prepared, and transmitted by a local operator under federal government supervision.

SCADA: Supervisory Control and Data Acquisition. A type of industrial process control system used for gathering data in real time from remote locations in order to control equipment and conditions.

Scale: The array of indicating marks and figure in relation to which the position of an index is observed, i.e. a scale plate on a recorder.

Scatter: The process by which small particles suspended in a medium of a different refractive index diffuse a portion of the incident radiation in all directions. In scattering no energy transformation results, only a change in the spatial distribution of the radiation. Along with absorption, scattering is a major cause of the attenuation of radiation by the atmosphere.

Scattered radiation: Solar radiation scattered by particles in the atmosphere.

Scattering coefficient: A measure of the attenuation due to scattering of light as it traverses a medium containing scattering particles.

Scintillation: Generic term for rapid variations in apparent position, brightness, or color of a distant luminous object viewed through the atmosphere.

Scintillometer: A type of photoelectric photometer used to measure high-altitude winds on the assumption that stellar scintillation is caused by atmospheric inhomogeneities being carried along by wind near the tropopause level.

Scud: Ragged low clouds, usually stratus fractus. Most often applied when such clouds are moving rapidly beneath a layer of nimbostratus.

Sea level pressure: The atmospheric pressure at mean sea level either directly measured by stations at sea level or empirically determined from the station pressure and temperature by stations not at sea level. Used as a common reference for analyses of surface pressure patterns.

Sea rainbow: Same as marine rainbow.

Glossary of Meteorological Terms

Sea water thermometer: A thermometer designed for use in measuring the temperature of sea water. One form consists of a mercury-in-glass thermometer protected by a perforated metal case. Another form consists of a mercury-in-glass thermometer surrounded by a metal case which forms a well around the bulb of the thermometer. When the thermometer is raised from the water, a sample is retained in the well. See bucket thermometer, reversing thermometer.

Secchi disk: A white disk 12" or more in diameter which is lowered into the sea to estimate transparency of the water. The depths are noted at which it first disappears when lowered and reappears when raised.

Secondary instrument: An instrument whose calibration is determined by comparison with an absolute instrument.

Secondary rainbow: A rainbow of angular radius of about 50° often seen outside the primary rainbow of 42° radius. The secondary rainbow is formed by two internal reflections (rather than one as in the primary rainbow), plus two refractions. Its spectral color sequence is from red inside to violet outside. Because each reflection introduces light losses, the secondary bow is much less bright than the primary bow.

Seismograph: An instrument used to measure and record earthquake vibrations and other earth tremors.

Sensing element: The element directly responsive to the value of the measured variable.

Sensitivity: The ratio of the output of an instrument to the input value, i.e. a rain gauge with a sensitivity of 1 tip per 0.01".

Sensor: The part of a measuring instrument which responds directly to changes in the environment.

Serial data transmission (serial output): A form of data transmission in which the bits of each character are sent one at a time along a single communication path. Compare to parallel data transmission.

Short-wave radiation: Radiation with wavelengths less than 4 microns.

Shower: Precipitation from a cumuliform cloud. Characterized by the suddenness of beginning and ending, by the rapid change in intensity, and usually by a rapid change in the condition of the sky. The solid or liquid water particles are usually bigger than the corresponding elements in other types of precipitation.

Sigma Theta (wind direction): The standard deviation of wind direction. Provides an indication of the variability of the wind direction. Used in calculations of atmospheric stability.

SIGMET information: Meteorological information issued by a watch office concerning the occurrence or forecast of weather phenomena which may affect the safety of aircraft operations.

Signal conditioning: The processing of the form or mode of a signal so as to make it intelligible to, or compatible with, a given device.

Significant level: In a radiosonde observation, a level (other than a standard level) for which values of pressure, temperature, and humidity are reported because temperature and/or humidity data at that level is sufficiently important or unusual to warrant the attention of the forecaster.

Simplex: Operation mode of a communication circuit in which one end can only transmit and the other end can only receive.

Sine galvanometer: A magnetometer of the electromagnetic type which is used to measure the horizontal intensity of the earth's magnetic field.

Siphon barograph: A recording siphon barometer.

Siphon barometer: A mercury barometer in which the tube is U-shaped and the upper and lower mercury surfaces have the same diameter.

Six's thermometer: A thermometer, invented by James Six in 1782, which simultaneously indicates the maximum and minimum temperatures attained during a given interval of time. A U-tube min/max thermometer.

Sky cover: The amount of sky covered or concealed by clouds or obscuring phenomena. It is reported in tenths, so that 0.0 indicates a clear sky and 1.0 (or 10/10) indicates a completely covered sky. The following classifications are used in aviation weather observations: clear, scattered, broken, overcast, partial obscuration, obscuration.

Skyhook balloon: A large plastic constant-level balloon for duration flying at very high altitudes.

Slant range: The line-of-sight distance between two objects.

Sleet: Frozen or partly frozen rain.

Sling psychrometer: Psychrometer to which a small chain or rotary handle is attached so that the observer can rotate the instrument rapidly to properly ventilate the thermometer bulbs.

SNOTEL: SNOW TELEmetry. An automated network of snowpack data collection sites. The Natural Resources Conservation Service (NRCS), formerly the Soil Conservation Service (SCS), has operated the Federal-State-Private Cooperative Snow Survey Program in the western United States since 1935. A standard SNOTEL site consists of a snow pillow, a storage type precipitation gauge, an air temperature sensor, and a small shelter for housing electronics.

Snow: Precipitation composed of white or translucent ice crystals, chiefly in complex branched hexagonal forms.

Snow board: A flat, solid, white material, such as painted plywood, approximately two feet square, which is laid on the ground or snow surface to obtain more accurate measurements of snowfall and water content.

Snow bridging: An effect noted primarily in wet snow conditions when snow clings to the sides of a precipitation gauge and gradually accumulates until the gauge orifice is capped with accumulated snow. This effect can be minimized by using large collectors, and wind screens around gauges.

Snow core: A sample of either freshly fallen snow, or the combined old and new snow on the ground, obtained by pushing a cylinder down through the snow layer and extracting it.

Snow course: An established line or transect of measurements of snow water equivalent across a snow field in representative mountainous terrain, where appreciable snow accumulates, to monitor seasonal snowpack.

Snow cutter: A saw-toothed piece of metal which slips over the top of the overflow can of a standard rain gauge when it is used to cut snow samples for the determination of water content of snow on the ground. Not required except where ice or dense snow accumulation are persistent problems.

Snow flurry: Snow shower, particularly of a very light and brief nature.

Glossary of Meteorological Terms

Snow gauge: Apparatus designed to measure the amount of precipitation falling in the form of snow. The device determines the weight of the snow or the volume of water after the snow melts.

Snow grains: Precipitation of very small, white, opaque particles of ice, fairly flat or elongated, with diameters less than 1 mm. The solid equivalent of drizzle.

Snow pellets (soft hail): Precipitation of white, opaque, spherical or conical ice particles that are crisp and easily crushed and that have diameters of 2 to 5 mm.

Snow pillow: An instrument used to measure snow water equivalents. Snow pillows typically have flat stainless steel surface areas. The pillow below this flat surface is filled with antifreeze solution and the pressure in the pillow is related to the water-equivalent depth of the snow on the platform.

Snow sampler: Snow gauge composed of a metal cylinder, closed at one end, used to obtain a sample of snow from which the water is measured after melting.

Snow stake: Graduated fixed stake used in regions of abundant snowfall to facilitate the measurement of snow depth.

Snow stick: A portable rod used to measure snow depth.

Snow survey: Determination of the total amount of snow covering a watershed or a given region. Both depth and water content of the snow may be measured, and the results may be used to predict the amount of water that will be available after melting.

Snow tube: Same as snow sampler.

Snow water equivalent (SWE): See water equivalent.

Software: The programs and instructions which direct a computer.

Soil evaporimeter: Instrument used to measure the amount of water evaporated from the soil surface during a given time interval.

Soil moisture: Moisture contained in the soil above the water table, including water vapor which is present in the soil pores. In some cases this term refers strictly to the humidity contained in the root zone of plants.

Soil thermometer (geothermometer): Thermometer for measuring the temperature in the soil at different depths.

Solar constant: Amount of solar radiation incident, per unit area and time, on a surface which is perpendicular to the radiation and is situated at the outer limit of the atmosphere, the earth being at its mean distance from the sun. It equals approximately 2.00 ly/min (1400 W/m²).

Solarimeter: Name sometimes used in place of pyranometer as a generic term.

Solar radiation: The total electromagnetic radiation emitted by the sun. About 99.9 percent of its energy output falls within the wavelength interval from 0.15 microns to 4.0 microns, with peak intensity near 0.47 microns. About one-half of the total energy in the solar beam falls in the visible spectrum from 0.4 to 0.7 microns, and most of the other half falls in the near infrared, a small additional portion falling in the ultraviolet.

Solar radiation shield: See radiation shield.

Solid-state device: An element that can control current without moving parts, heated filaments, or vacuum gaps.

Sonic anemometer: An anemometer which measures wind speed by means of the properties of wind-borne sound waves. It operates on the principle that the propagation velocity of a sound wave in a moving medium is equal to the velocity of sound with respect to the medium plus the velocity of the medium. The sonic anemometer is an absolute instrument and has the advantages of a very short time-constant and an absence of moving mechanical parts.

Sonic thermometer: A thermometer based upon the principle that the velocity of a sound wave is a function of the temperature of the medium through which it passes. Sonic thermometers possess very short time-constants and eliminate radiation error.

Sounding: Same as an upper air observation, but commonly used to refer to a single complete radiosonde observation.

Span: The algebraic difference between the upper and lower limits of the measuring range of an instrument, e.g. a thermometer with a range of -35 to 50°C has a span of 85°C.

Specific humidity: In a system of moist air, the dimensionless ratio of the mass of water vapor to the total mass of the system.

Spectral hygrometer: A hygrometer which determines the amount of precipitable moisture in a given region of the atmosphere by measuring attenuation of radiant energy caused by the absorption bands of water vapor.

Spectral solar radiation: Solar radiation of selected wavelengths.

Spectroheliograph: An instrument for taking photographs of an image of the sun in monochromatic light.

Spectrohelioscope: Similar to the spectroheliograph, but used for visual instead of photographic purposes.

Spectrophotometer: A photometer which measures the intensity of radiation as a function of the frequency (or wavelength) of the radiation.

Spectropyreheliometer: An instrument which measures the spectral distribution of the intensity of direct solar radiation.

Spirit thermometer: A liquid-in-glass thermometer which uses an organic substance such as alcohol as the thermometer liquid. This type of thermometer has a low freezing point and a high coefficient of expansion. It is less accurate, however, than a mercury thermometer.

Splayed tail: A type of wind vane having a split or V-shaped tail. The apex orients itself to the direction of the wind.

Squall: A strong wind characterized by a sudden onset, a duration on the order of minutes, and a rather sudden decrease in speed.

Staff gauge: A graduated scale placed in a position so that the stage of a stream may be read directly from it. Staff gauges may be placed on bridge piers or pilings, etc., or placed on specially constructed supports.

Stage: The elevation of the water surface in a stream as measured by a river gauge with reference to some arbitrarily selected zero datum.

Standard atmosphere: A standard unit of atmospheric pressure, defined as the pressure exerted by a 760 mm column of mercury at standard gravity (980.665 cm/sec²) at 0°C. 1 standard atmosphere is equal to 760 mm Hg, 29.9212 inches Hg, or 1013.250 mb. Also, a hypothetical vertical distribution of atmospheric temperature, pressure, and density which, by international agreement, is taken to be representative of the atmosphere.

Glossary of Meteorological Terms

Standard error: The standard deviation (positive square-root of the variation) of the errors associated with physical measurements of an unknown quantity, or statistical estimates of an unknown parameter or of a random variable.

Standard level (mandatory level): One of several constant-pressure levels in the atmosphere for which a complete evaluation of data derived from upper air observations is required.

Static pressure vent: A vent used with pressure sensors to reduce the effect of wind on the pressure inlet. It is normally mounted remotely and connected to the sensor using airtight tubing.

Station pressure: The atmospheric pressure computed using station elevation as the reference datum level. Station pressure is usually the base value from which sea level pressure and altimeter setting are determined.

Statute mile: A unit of distance equal to 5280 feet. It is sometimes referred to as a land mile.

Stevenson screen: A type of instrument shelter. It is a wooden box painted white with double louvered sides and mounted on a stand four feet above the ground. Designed by Thomas Stevenson, civil engineer (father of Robert Louis Stevenson).

Still well (or stilling well): A cylinder installed in a body of water or an evaporation pan to hold a sensor, such as a float to measure water level or a hook gage. The stillwell is constructed so that there is free movement of water in and out of it, and it therefore provides a representative sample of the water body. It functions to protect the sensor in some cases and to provide an undisturbed water surface in other cases.

Storm: Wind with a speed between 56 and 63 knots (64 and 72 mph); Beaufort scale number 11.

Stream gauge: Same as river gauge.

Strong breeze: Wind with a speed between 22 and 27 knots (25 and 31 mph); Beaufort scale number 6.

Strong gale: Wind with a speed between 41 and 47 knots (47 and 54 mph); Beaufort scale number 9.

Sun dog: Same as parhelion.

Sunshine recorder: An instrument designed to record the duration of sunshine at a given location without regard to intensity. See Campbell-Stokes recorder, Jordan sunshine recorder, Marvin sunshine recorder, Pers sunshine recorder.

Supercooled water: Liquid water at temperatures colder than freezing.

Supernumerary rainbows: A set of weakly colored rainbow arcs sometimes discernable inside a primary rainbow.

Super-pressure balloon: See constant-level balloon.

Switching power supply: A power supply which achieves its output regulation by means of one or more active power handling devices which are alternately placed in the "off" or "on" states. It is more efficient than linear supplies which vary the conduction of power devices to achieve output regulation.

Synchro: A motorlike device containing a rotor and a stator and capable of converting an angular position into an electrical signal, or an electrical signal into an angular position. When several synchros are correctly connected, all of the rotors will align themselves into the same angular position. This is useful, since one synchro whose angular motion is forced to change, can drive another synchro to indicate the angular change.

Synchronous: Having a specific relationship to a time base or clock. In synchronous communications, data characters are sent according to a timing signal which synchronizes the two communicating devices.

Synoptic: In general, pertaining to or affording an overall view. In meteorology, this term has become somewhat specialized in referring to the use of meteorological data obtained simultaneously over a wide area for the purpose of obtaining a comprehensive and nearly instantaneous picture of the state of the atmosphere. Thus, to a meteorologist, "synoptic" takes on the additional connotation of simultaneity.

Synoptic weather observation: A surface weather observation, made at periodic times, of sky cover, state of the sky, cloud height, atmospheric pressure reduced to sea level, temperature, dew point, wind speed and direction, amount of precipitation, hydrometeors and lithometeors, and special phenomena that prevail at the time of the observation or have been observed since the previous specified observation. Compare to aviation weather observation.

Systematic error: That part of the inaccuracy of a measuring instrument, or statistical estimate of a parameter, that is due to a single cause or small number of causes having the same sign, and hence, in principle, is correctable; a bias or constant offset from the true value. In the absence of random errors, the true value is equal to the instrumental reading or statistical mean estimate minus the systematic error.

T

Tail wind: A wind blowing in the same direction as the heading of a moving object, thus assisting the object's intended progress. The opposite of a head wind.

Teardrop balloon: A sounding balloon which, when operationally inflated, resembles an inverted teardrop.

Telemeteorograph: Any meteorological instrument, such as a radiosonde, in which the recording apparatus is located at some distance from the measuring apparatus.

Telemeter: The measuring, transmitting, receiving, and indicating apparatus for obtaining the value of a quantity at a distance.

Telemetry: The transmission of data collected at a remote location over communications channels to a central station.

Telephotometer: A photometer that measures the received intensity of a distance light source.

Telethermoscope: A temperature telemeter.

Temperature: In thermodynamics, the integrating factor of the differential equation referred to as the first law of thermodynamics. In statistical mechanics, a measure of translational molecular kinetic energy (with three degrees of freedom). In general, the degree of hotness or coldness as measured on some definite temperature scale by means of any of various types of thermometers.

Temperature coefficient: (1) The ratio of the speeds of a chemical reaction at two temperatures differing by 10°C. (2) A factor relating the response characteristics of a device with changes in the ambient temperature.

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Temperature correction: The correction applied to an instrument to account for the effect of temperature upon its response characteristics.

Temperature scale: See approximate absolute temperature scale, Celsius temperature scale, centigrade temperature scale, Fahrenheit temperature scale, international practical temperature scale, international temperature scale, Kelvin temperature scale, Rankine temperature scale, Reaumur temperature scale.

Tercentesimal thermometric scale: Sir Napier Shaw's name for the approximate absolute temperature scale.

Terminal: A generic term for any machine that enables a human being to communicate with a computer.

Terrestrial radiation: The total infrared radiation emitted from the earth's surface. To be carefully distinguished from atmospheric radiation, effective terrestrial radiation, and insolation.

Thaw: To free something from the binding action of ice by warming it to a temperature above the melting point of ice. Also, a warm spell when ice and snow melt.

Theodolite: An optical instrument which consists of a sighting telescope mounted so that it is free to rotate around horizontal and vertical axes, with graduated scales so that the angles of rotation may be measured. Used to observe the motion of a pilot balloon.

Thermal shift: The change in the measured transducer output caused by changes in ambient temperature. Usually expressed a percentage of full scale.

Thermistor: A semiconductor which exhibits rapid and extremely large changes in resistance for relatively small changes in temperature.

Thermocouple: A temperature-sensing element which converts thermal energy directly into electrical energy. In its basic form it consists of two dissimilar metallic conductors connected in a closed loop. Each junction forms a thermocouple. If one thermocouple is maintained at a temperature different from that of the other, an electrical current proportional to this temperature difference will flow in the circuit. The value varies with the materials used. Couples of copper and constantan, which generate approximately 40 microvolts per °C of couple temperature difference, are often used for meteorological purposes.

Thermodynamic temperature: A measure, in kelvins (K), proportional to the thermal energy of a given body at equilibrium. A temperature of 0K is called "absolute zero" and coincides with the minimum molecular activity (i.e. thermal energy) of matter. Thermodynamic temperature was formerly called "absolute temperature." In practice, the International Temperature Scale of 1990 (ITS-90) serves as the basis for high-accuracy temperature measurements in science and technology.

Thermoelectric thermometer: A type of electrical thermometer consisting of two thermocouples which are series-connected with a potentiometer and a constant-temperature bath. One couple, called the reference junction, is placed in a constant-temperature bath, while the other is used as the measuring junction.

Thermogram: The record of a thermograph.

Thermograph: A self-recording thermometer.

Thermo-integrator: An apparatus, used in studying soil temperatures, for measuring the total supply of heat during a given period.

Thermometer: An instrument for measuring temperature by utilizing the variation of the physical properties of substances according to their thermal states. Thermometers may be classified into types according to their construction; deformation thermometer, electrical thermometer, gas thermometer, liquid-in-glass thermometer, liquid-in-metal thermometer, sonic thermometer.

Thermometer screen: Same as instrument shelter.

Thermometer shelter: Same as instrument shelter.

Thermometer support: A device used to hold liquid-in-glass maximum and minimum thermometers in the proper recording position inside an instrument shelter, and to permit them to be read and reset. See Townsend support.

Thermopile: A transducer for converting thermal energy directly into electrical energy. It is composed of pairs of thermocouples which are connected either in series or in parallel. Thermopiles are used in thermoelectric radiation instruments when the output of a single pair of thermocouples is not large enough. See Moll thermopile, Eppley pyrheliumeter.

Thermoscreen: Same as instrument shelter.

Thermostat: A device used to switch electrical current at a selectable setpoint temperature.

Threshold (starting speed): The lowest value of a measured quality at which a sensor responds. Compare to tracking.

Tide gauge: A device for measuring the height of tide. It may be simply a graduated staff in a sheltered location where visual observations can be made, or it may consist of an elaborate recording instrument (sometimes called a marigraph) making a continuous graphic record of tide height against time. Such an instrument is usually actuated by a float in a pipe communicating with the sea through a small hole which filters out shorter waves.

Time constant: The time required for an instrument to register 63.2% of a step change in the variable being measured.

Tipping-bucket rain gauge: A rain gauge where the precipitation collected by the receiver empties into one side of a chamber which is partitioned transversely at its center and is balanced bistably upon a horizontal axis. When a predetermined amount of water has been collected, the chamber tips, spilling out the water and placing the other half of the chamber under the receiver. Each tip of the bucket generates a signal.

Torricelli's tube: An early and once universal name for the mercury barometer.

Torsion hygrometer: A hygrometer in which the rotation of the hygrometric element is a function of humidity.

Totalizing anemometer: An anemometer in which the sensor rotation is transmitted to a mechanical counter which directly integrates the air movement past the sensor. Used to determine total air passage (wind run). Average wind speed can be calculated from the difference between successive counter readings divided by the time interval between readings.

Total lift: The upward force produced by the gas in a balloon. It is equal to the free lift plus the weight of the balloon and the attached equipment.

Total radiation: The sum of solar and terrestrial radiation.

Townsend support: A fixed support for mounting maximum and minimum thermometers of the liquid-in-glass type. The support holds the thermometers at the correct operating attitude and also permits their rotation for resetting when desired.

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Trace: A precipitation amount of less than 0.005 inches. Also, the record made by any self-registering instrument.

Trace recorder: Same as ombrometer.

Tracking: The lowest value of a measured quality at which a sensor meets its accuracy specification.

Transducer: A device which converts energy from one form into another, i.e. an ac generator transducer which converts the mechanical motion of anemometer cups into an electrical signal.

Transmissivity: A measure of luminous flux remaining in a light beam after it has passed through a specified distance of the atmosphere.

Transmissometer: An instrument which measures the transmissivity of the atmosphere between two points for the determination of visual range.

Transpiration: The process by which water in plants is transferred as water vapor to the atmosphere. Also, the amount of water so transferred.

Transponder ranging: An addition to a rawinsonde system which allows determination of the slant range to the radiosonde.

Triple-point temperature: The temperature at which all three phases of a substance can exist in equilibrium. This temperature occurs at only one pressure. The triple-point of water is 273.16°K and is the basis of the Kelvin scale.

Tropopause: The boundary between the troposphere and stratosphere, usually characterized by an abrupt change in lapse rate. Its height varies from 10 to 20 km. Regions above the tropopause have greater atmospheric stability than regions below.

True freezing point: The temperature at which the liquid and solid forms of a substance may exist in equilibrium at a given pressure (usually one standard atmosphere). The true freezing point of water is known as the ice point.

True wind direction: The direction, with respect to true north, from which the wind is blowing. Distinguish from magnetic wind direction. In all standard upper-air and surface weather observations, it is true wind direction that is reported.

Trough: An elongated area of relatively low atmospheric pressure. Usually associated with and most clearly identified as an area of maximum cyclonic curvature of the wind flow. The opposite of a ridge.

T-sonde: A radiosonde equipped to measure temperature only.

TTL: Transistor-Transistor Logic.

Tulipan radiometer: A calorimetric radiation instrument of historic interest used for the measurement of outgoing heat radiation from the earth during an interval of time. The time integration is performed by allowing the radiation to fall on an uninsulated vessel containing a volatile liquid. The amount of liquid distilled into a connected insulated vessel is a measure of the incident radiation.

U

Ultraviolet radiation: Electromagnetic radiation of shorter wavelength than visible radiation but longer than x-rays, between 0.02 and 0.4 micron (200 and 4000 angstrom).

Uncertainty: The standard deviation of a sufficiently large number of measurements of the same quantity by the same instrument or method. The non-correctable part of the inaccuracy of an instrument, it represents the limit of measurement precision. The uncertainty of an instrument is caused by the unpredictable effects upon its performance of such factors as friction, backlash, and electronic noise.

Unprotected thermometer: A reversing thermometer (for sea-water temperature) which is not protected against hydrostatic pressure. The mercury bulb is therefore squeezed, and the amount of mercury broken off on reversal is a function of both temperature and of hydrostatic pressure.

Updraft: A relatively small-scale, upward moving current of air.

Upper air: That portion of the atmosphere which is above the lower troposphere. Generally applied to levels above 850 mb.

Upper air observation: A measurement of atmospheric conditions aloft, above the effective range of a surface weather observation. Elements evaluated include temperature, humidity, pressure, wind speed, and wind direction.

Upward total radiation: Solar and terrestrial radiation directed upward (away from the earth's surface); outgoing radiation.

Upwind: In the direction from which the wind is blowing.

USCRN: United States Climate Reference Network, a systematic and sustained network of climate monitoring stations with sites across the conterminous US, Alaska, and Hawaii.

UTC: Coordinated Universal Time.

V

VDT: Video Display Terminal. An input and display device which includes a keyboard and a screen and allows a human to communicate with a computer.

Vane: See wind vane.

Variograph: A recording variometer.

Variometer: A instrument designed to study small fluctuations of some quantity. The microbarograph is an example of a recording pressure variometer.

Vectopluiometer: A rain gauge or array of rain gauges designed to measure the inclination and direction of falling rain.

Vector: Any quantity, such as force velocity, or acceleration, which has both magnitude and direction at each point in space, as opposed to scalar which has magnitude only. Such a quantity may be represented geometrically by an arrow of length proportional to its magnitude, pointing in the assigned direction.

Veering: A change in wind direction in a clockwise sense. The opposite of backing.

Venturi tube: A tube designed to measure the rate of flow of fluids. It consists of a tube having a constriction or throat at its midsection. The difference between the pressure measured at the inlet and at the throat is a function of the fluid velocity. Compare to Pitot tube.

Vernier scale: A small, moveable graduated scale adjacent and parallel to the main scale of an instrument. It provides a means for interpolating between the graduations of the main scale.

Vertical anemometer: General name for an instrument designed to measure the vertical component of the wind speed. See anemoclinometer.

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Vertical-current recorder: General term for an instrument which records the vertical electric current in the atmosphere.

Vertical visibility: The distance that an observer can see vertically into a surface-based obscuring phenomenon such as fog, rain, or snow. The distance estimate must be based upon ceiling balloon ascensions or ceiling light projector measurements.

VFR: Abbreviation for visual flight rules, but commonly used to refer to the relatively favorable weather and/or flight conditions to which these rules apply.

Virga: Precipitation falling from a cloud, usually in wisps or streaks, but evaporating before it reaches the ground.

Virtual temperature: Temperature to which absolutely dry air would have to be brought in order for it to have the same density as moist air, considered at the same pressure.

Visibility: The greatest distance at which it is just possible to see and recognize with the unaided eye (1) in the daytime, a prominent dark object against the sky at the horizon, and (2) at night, a known, preferably unfocused, moderately intense light source.

Visibility meter: General term for an instrument used to make direct measurements of visual range or measurements of the physical characteristics of the atmosphere (or other medium) which determine the visual range.

Visibility sensor: General term for an instrument used to make direct measurements of visual range or measurements of the physical characteristics of the atmosphere which determine the visible range.

Visible radiation: Electromagnetic radiation lying within the wavelength interval to which the human eye is sensitive, the spectral interval from approximately 0.4 to 0.7 microns (4000 to 7000 angstroms). Bounded on the short-wavelength end by ultraviolet radiation and on the long-wavelength end by infrared radiation.

Visual range: The maximum distance, usually horizontally, at which a given object or light source is just visible under particular conditions of transmittance and background luminance.

VOLMET broadcast: Routine broadcast of meteorological information for aircraft in flight.

Vortex thermometer: A thermometer used in aircraft which automatically corrects for adiabatic and frictional temperature rises by imparting a rotary motion to the air passing the thermal sensing element.

Vorticity: A vector measure of local rotation in an airflow.

W

Wadi gauge: Same as river gauge or stream gauge.

Warning stage: The stage on a fixed river gauge at which it is necessary to begin issuing warnings or river forecasts if adequate precautionary measures are to be taken before flood stage is reached.

Water: Dihydrogen oxide, molecular formula H₂O.

Water balance: Balance of the water resources of a region, comparing precipitation and inflow with outflow, evaporation, and accumulation.

Water budget: See hydrologic accounting.

Water equivalent: The depth of water that would result from the melting of snow or ice, assuming measurement on a horizontal surface and no infiltration or evaporation.

Water-flow pyrheliometer: An absolute pyrheliometer, developed by C.G. Abbott, in which the radiation-sensing element is a blackened water-calorimeter.

Water-stage recorder: A device for obtaining a continuous record of stage at a point on a stream. The most common recorders consist of a float-actuated pen which traces a record on a clock driven chart.

Water table: The depth below which the ground is saturated with water. No water table exists if the ground water is confined by an overlying impermeable stratum, as in the case of artesian ground water.

Water year: Any twelve-month period, usually selected to begin and end during a relative dry season. Used as a basis for processing streamflow and other hydrologic data. The period from October 1 to September 30 is widely used in the U.S.

Watershed: The total area drained by a river and its tributaries. Same as river basin.

Watt: A unit of power equal to one joule per second or 10⁷ ergs per second.

Wave pole: A device for measuring sea-surface waves. It consists of a weighted pole below which a disk is suspended at a depth sufficiently deep for the wave motion associated with deep-water waves to be negligible. The pole will then remain nearly as if anchored to the bottom, and wave height and period can be ascertained by observing or recording the length of the pole that extends above the surface.

Wave recorder: An instrument for recording ocean waves. Most recorders are designed for recording wind waves, that is waves of periods up to about 25 seconds, but some are designed to record waves of longer periods such as tsunamis or tides.

Wave staff: Same as wave pole.

Weather: The state of the atmosphere, mainly with respect to its effects upon life and human activities. As distinguished from climate, weather consists of the short-term (minutes to months) variations of the atmosphere.

Weather glass: An old nautical term for mercury barometer.

Weather stick: Made of birch and attributed to northeast Native American tribes, the stick is said to rise indicating fair weather and to drop when inclement weather is approaching. The movement of the tip appears to track the relative humidity.

Weighing rain gauge: A precipitation gauge consisting of a receiver in the shape of a funnel which empties into a bucket mounted upon a weighing mechanism. The weight of the catch is recorded as inches of precipitation.

Weight barograph: A recording weight barometer.

Weight barometer: A mercury barometer which measures atmospheric pressure by weighing the mercury in the column or cistern.

Wet-bulb depression: Difference between the temperatures of the dry-bulb and the wet-bulb thermometers of a psychrometer.

Wet-bulb temperature: The lowest temperature that can be obtained on a wet-bulb thermometer in any given sample of air. Obtained by evaporation of water (or ice) from the muslin wick. Used in computing dew point and relative humidity.

Glossary of Meteorological Terms

Wet-bulb thermometer: A thermometer with a muslin-covered bulb which is moistened. Used to measure wet-bulb temperature.

Wet-bulb zero height (WBZ): The height above ground level (in feet) where the wet-bulb temperature goes below 0°F.

White body: A hypothetical "body" whose surface absorbs no electromagnetic radiation of any wavelength. An idealization exactly opposite to that of the black body. In nature, no true white bodies are known. Most white pigments exhibiting high reflectivity for visible radiation are fairly good absorbers in the infrared range, hence they are not white bodies in the sense of radiation theory. However, one does speak of a white body with respect to a particular wavelength interval. Compare to black body, gray body.

White rainbow: Same as fogbow.

Whole gale: Wind with a speed between 48 and 55 knots (55 and 63 mph); Beaufort scale number 10.

Wien's law: One of the radiation laws which states that the wavelength of maximum radiation intensity for a black body is inversely proportional to the absolute temperature of the radiating black body.

Wild fence: A wooden enclosure about sixteen feet square and eight feet high with a precipitation gauge at its center. The function of the fence is to minimize eddies around the gauge and thus ensure a catch that is representative of the actual rainfall or snowfall.

Wilting point: Value of soil moisture, expressed as a percentage of the mass of dry soil, below which a plant living in the soil dies by wilting.

Wind: Air in motion relative to the surface of the earth. Almost exclusively used to denote the horizontal component.

Wind cone: Same as wind sock.

Wind direction: The direction from which the wind is blowing, measured in points of the compass or in azimuth degrees.

Wind gust: See gust and peak gust.

Wind passage: The distance or length of flow of the air past a point during a given interval of time.

Wind profiler: A radar that is used to measure vertical profiles of the wind. Also called wind profiler radar, wind profiling radar.

Wind rose: A flower-like diagram indicating the relative frequencies of different wind directions for a given station and period of time.

Wind run: The distance or length of flow of the air past a point during a given interval of time.

Wind shear: A local variation of the wind vector or any of its components in a given direction.

Wind sleeve: Same as windsock.

Wind sock: A fabric cone attached to a metal ring and used to indicate wind direction, often at airfields.

Wind speed: Rate of wind movement in distance per unit time.

Wind vane: An instrument used to indicate wind direction.

Wind vector: A component of the wind (often using Cartesian coordinates, i.e. X and Y wind vectors). Also, an arrow representing wind velocity, drawn to point in the direction of the wind and with a length proportional to wind speed.

Wind velocity: A vector term which includes both wind speed and wind direction.

Wind wave: A wave resulting from the action of wind on a water surface.

Windmill anemometer: A rotation anemometer in which the axis of rotation is horizontal. The instrument has either flat vanes (as in the air meter) or helicoidal vanes (as in the propeller anemometer). The relation between wind speed and angular rotation is almost linear.

Winds aloft: The wind speed and direction at various levels in the atmosphere above the level reached by surface weather observations.

Winds aloft observation: The measurement and computation of wind speeds and directions at various levels above the surface of the earth. Methods include pilot balloon observations, rawins, rawin or rawinsonde observations, radar tracking, or acoustic sounding.

Winds aloft plotting board: A graphical aid used in the reduction of data from a winds aloft observation.

Windward: Situated on the side from which the wind blows.

Wiresonde: An atmospheric sounding instrument which is supported by a captive balloon and used to obtain temperature and humidity data from the ground level to a height of a few thousand feet. The data is telemetered to the ground through a wire cable.

Wire weight gauge: A river gauge in which a weight suspended on a wire is lowered to the water surface from a bridge or other overhead structure to measure the distance from a point of known elevation to the water surface.

Word: A fixed-length group of bits representing the largest data element handled as a unit by a computer. Word length is determined by the capacity of the CPU registers.

Wyoming shield: A type of rain gauge shield consisting of two snow fences, developed by the University of Wyoming Water Resources Research Institute. See rain gauge shield.

X-Y-Z

X-ray: Electromagnetic radiation of very short wavelength, lying within the wavelength interval of 0.1 to 1.5 angstroms (between gamma rays and ultraviolet radiation). X-rays penetrate various thicknesses of all solids, and they act on photographic plates in the same manner as light. Secondary x-rays are produced whenever s-rays are absorbed by a substance. In the case of absorption by a gas, this results in ionization.

Yagi-Uda antenna: Commonly known as Yagi antenna. A type of directional antenna used on some types of radar and radio equipment consisting of an array of elemental, single-wire dipole antennas and reflectors. Invented in 1926 by Shintaro Uda and Hidetsugu Yagi of Tohoku University, Japan.

Zephyr: Any soft, gentle breeze.

Zulu time: Same as Coordinated Universal Time (UTC).