

## FOSS Weather and Water, Next Generation Edition

### Glossary

**absorb** to soak up or take in (SRB, IG)

**air** the mixture of gases surrounding Earth (SRB, IG)

**air mass** one huge body of air that has relatively uniform temperature and humidity (IG)

**air pressure** the force exerted on a surface by the mass of the air above it; also called atmospheric pressure (SRB, IG)

**atmosphere** the layer of gases surrounding Earth. Its layers include the troposphere, stratosphere, mesosphere, thermosphere, and exosphere. (SRB, IG)

**atmospheric pressure** the force exerted on a surface by the mass of the air above it; also called air pressure (SRB, IG)

**axis** an imaginary axle that a planet spins on (SRB)

**bar** the unit of measurement for air pressure. A bar is equal to the pressure exerted by the air in the atmosphere at sea level. (IG)

**barometer** a weather tool that measures air pressure (SRB, IG)

**bimetallic strip** a narrow band made of two metals stuck together (SRB)

**blizzard** a severe storm with low temperatures, strong winds, and extreme snow (SRB)

**boundary current** a large-scale ocean current along the coastline (SRB)

**carbon dioxide (CO<sub>2</sub>)** a greenhouse gas found in Earth's atmosphere. Carbon dioxide is created by natural and human-made processes. (SRB, IG)

**carbon sequestration** the process of removing carbon dioxide from the atmosphere, typically by storing it underground (IG)

**climate change** the change in our climate due to increased greenhouse gases and energy usage (IG)

**climatologist** a scientist who studies climate (IG)

**climatology** the study of a region's climate over 30 or more years (IG)

**cold front** a zone where a faster-moving cold air mass collides with a warm air mass, resulting in brief, intense precipitation (IG)

**compress** to push particles closer together (IG)

**condensation** the process by which water vapor changes into liquid water, usually on a surface (IG)

**condensation nuclei** tiny surfaces on which water may condense (IG)

**conduction** energy transfer by contact between particles (SRB, IG)

**constraint** a restriction or limitation (SRB, IG)

**convection** energy transfer during which hot fluid rises and cold fluid sinks, creating a cycle (SRB, IG)

**convection cell** a mass of fluid flowing in a cycle in one place (SRB, IG)

**Coriolis effect** the cause of winds near the equator in the Northern and Southern Hemispheres to curve west (SRB, IG)

**criterion** (plural: **criteria**) requirement (SRB, IG)

**cumulonimbus** clouds that are piled up from low to high levels and bring rain (SRB)

**density** the amount of mass in a sample of matter compared to the volume of that sample (SRB, IG)

**dew point** the temperature at which air is saturated with water vapor and vapor condenses into liquid (IG)

**differential heating** the concept that different materials heat up at different rates (IG)

**doldrums** the calm area around the equator (SRB)

**drought** a less-than-normal amount of rain or snow over a long period of time (SRB)

**dust devil** a small rotating wind that becomes visible when it collects dust and debris (SRB)

**dust storm** a severe weather in which strong winds carry large quantities of dust over an area (SRB)

**El Niño** a flow of unusually warm water in the eastern Pacific Ocean. It causes many changes in weather in other places. (SRB, IG)

**emission** a substance being let out into the atmosphere (IG)

**energy transfer** the movement of energy from one place or form to another; the process that drives the cycle of convection (IG)

**engineering problem** a challenge that needs to be solved by an engineer by identifying the design requirements and limitations (IG)

**equilibrium** when air moves from an area of high pressure to one of low pressure, making the air density equal (IG)

**equinox** a day of the year when the Sun's rays shine straight down on the equator (SRB)

**evaporation** the process by which liquid water changes into water vapor (IG)

**evidence** data used to support claims. Evidence is based on observation and scientific data. (IG)

**exosphere** the layer of the atmosphere above the thermosphere. The exosphere marks the transition from the atmosphere to space. (SRB, IG)

**expand** to get bigger; to take up more space (IG)

**flash flood** a short, rapid, unexpected flow of water and debris (SRB)

**flood** a large amount of water flowing over land that is usually dry (SRB)

**fluid** substance that can flow, such as a gas or liquid (SRB, IG)

**forecast** to predict future events or conditions, such as weather (IG)

**global warming** a worldwide warming trend on Earth that affects global weather (SRB, IG)

**greenhouse effect** the process in which greenhouse gases “trap” heat by absorbing and radiating heat energy so it doesn’t pass through the atmosphere and exit to space (IG)

**greenhouse gas** a gas that absorbs and radiates energy in the atmosphere, trapping thermal energy (SRB, IG)

**groundwater** water stored below Earth’s surface (SRB, IG)

**Gulf Stream** a warm boundary current in the North Atlantic Ocean (SRB)

**gyre** a large system of rotating ocean currents (SRB, IG)

**Hadley cell** a huge convection cell that covers much of Earth at the equator (SRB)

**hail** precipitation in the form of small balls of ice (SRB)

**heat** observable evidence of energy (IG)

**horse latitudes** the windless areas around 30 degrees north and south of the equator (SRB)

**humidity** water vapor in the air (IG)

**hurricane** a cyclone or severe rotating tropical storm that produces high winds in the Northern Hemisphere east of the International Date Line (SRB)

**hygrometer** a weather tool that measures humidity (SRB)

**ice core** a sample from deep, ancient ice near Earth’s poles that provides information about the gas content of the atmosphere in the past (IG)

**infrared** radiant energy that is beyond the red end of the visible spectrum (SRB, IG)

**insulation** material that can reduce energy transfers (SRB, IG)

**isobar** smooth, non-intersecting lines on a map that represent air pressure over a large region (IG)

**jet stream** a narrow band of fast-moving high-altitude wind flowing west to east that affects weather conditions on Earth (SRB, IG)

**kinetic energy** energy of motion (SRB, IG)

**land breeze** a wind that blows from land to sea (SRB, IG)

**latitude** the distance north or south from the equator measured in degrees; a factor that affects local weather and climate (SRB, IG)

**lightning** a bright flash of light caused by an electric discharge between two clouds or from a cloud to Earth (SRB)

**mass** the amount of matter in an object or sample (SRB, IG)

**matter** anything that has mass and takes up space (SRB, IG)

**mesosphere** the layer of the atmosphere above the stratosphere (SRB, IG)

**meteorologist** a scientist who studies the weather (IG)

**meteorology** the scientific study of weather (IG)

**methane (CH<sub>4</sub>)** a variable gas in the atmosphere; a greenhouse gas (SRB)

**microburst** a short, very intense downdraft of air (SRB)

**millibar (mb)** the unit that meteorologists use when reporting air pressures on a weather map; equal to 1/1000 of a bar (IG)

**model** an explanation or representation of an object, system, or process that cannot be easily studied (SRB, IG)

**nitrogen (N<sub>2</sub>)** a colorless, odorless gas that makes up about 78 percent of Earth's atmosphere (SRB)

**nonrenewable** a material that cannot be replaced once used up (SRB)

**North Star** the reference star pointed to by the North Pole (SRB)

**ocean current** a global water pattern affected by winds, differences in water density, tides, and landmasses (SRB, IG)

**orbit** the path and length of time one object takes to travel around another object (SRB)

**oxygen (O<sub>2</sub>)** a gas that makes up about 21 percent of Earth's atmosphere (SRB)

**ozone (O<sub>3</sub>)** a form of oxygen that forms a thin layer in the stratosphere (SRB)

**paleoclimatology** the study of long-term climate trends extending to ancient times (IG)

**particle** an atom or a molecule; what everything is made of (IG)

**permanent gas** a gas in the atmosphere for which the amount stays constant. Oxygen (O<sub>2</sub>) and nitrogen (N<sub>2</sub>) are permanent gases. (SRB, IG)

**photosynthesis** a process used by plants and algae to make sugar (food) out of light, carbon dioxide (CO<sub>2</sub>), and water (H<sub>2</sub>O) (SRB)

**planet** an object that orbits a star and is massive enough for its own gravity to force it into a spherical shape (SRB)

**pollutant** harmful waste (IG)

**precipitation** rain, snow, sleet, or hail that falls to the ground (IG)

**prediction** an estimation about a future event based on data or experience (IG)

**pressure** a continuous force applied to the surface of an object, measured in units per square area (IG)

**prevailing wind** a predictable wind produced by the combination of high- and low-pressure areas and the Coriolis effect (SRB, IG)

**radiant energy** energy that travels through air and space (SRB, IG)

**radiation** energy that is radiated or transmitted through space in the form of rays, waves, or particles (IG)

**radiosonde** an instrument sent into Earth's atmosphere to measure temperature, air pressure, humidity, and wind (SRB)

**ray** a thin beam or line of radiant energy, such as light (IG)

**renewable** able to be replaced or restored by nature (SRB)

**revolution** one complete orbit around something (SRB)

**rip current** a strong local ocean current that moves directly away from shore (SRB)

**rotation** spinning on an axis (SRB)

**salinity** the amount of dissolved salt in water (SRB, IG)

**saturated** when air contains as much water vapor as it can at a certain temperature (IG)

**sea breeze** a wind that blows from sea onto land (SRB, IG)

**season** a period of the year identified by changes in hours of daylight and weather (SRB)

**severe weather** out-of-the-ordinary and extreme weather conditions (SRB, IG)

**solar angle** the angle at which light from the Sun strikes the surface of Earth (IG)

**solar energy** radiant energy from the Sun (SRB)

**solstice** a day of the year when the North Pole is angled farthest toward or away from the Sun (SRB)

**star** a large, hot ball of gas radiating huge amounts of energy (SRB)

**state** a kind or form of matter. The three common states of matter are solid, liquid, and gas. (IG)

**step leader** a downward path of electric charge from a cloud to Earth, producing lightning (SRB)

**straight-line wind** a strong wind that has no rotation (SRB)

**stratosphere** the layer of the atmosphere above the troposphere. The ozone layer is in the stratosphere. (SRB, IG)

**temperature** a measure of how hot or cold the air is (IG)

**thermal energy** radiant energy that heats (SRB, IG)

**thermometer** a instrument that measures thermal energy as temperature (SRB)

**thermosphere** the layer of the atmosphere above the mesosphere (SRB, IG)

**thunder** a loud, explosive sound created by lightning (SRB)

**thunderstorm** severe weather that results from cold air flowing under a warm, humid air mass over the land, resulting in lightning, thunder, heavy precipitation, and possible tornadoes (SRB)

**tornado** a rapidly rotating destructive column of air that extends from a thunderstorm to the ground. Wind speeds can exceed 400 kilometers (km) per hour in a tornado. (SRB)

**trade wind** the predictable moderate wind from between 5° and 25° north or south latitude (SRB)

**transpiration** the continuous process by which water travels through plants and releases as water vapor (IG)

**troposphere** the layer of the atmosphere that begins at Earth's surface and extends upward for an average of 15 kilometers (km). Weather happens in the troposphere. (SRB, IG)

**typhoon** a cyclone or severe tropical storm that produces high winds in the Pacific north of the equator and west of the International Date Line (SRB)

**updraft** a forceful vertical air current (SRB)

**vacuum** space containing no particles of air or anything else (SRB)

**variable gas** an atmospheric gas whose amount changes based on the environment. Carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), and ozone (O<sub>3</sub>) are variable gases. (SRB, IG)

**vortex** a tornado-like swirling column of wind or water (SRB)

**warm front** a zone where a faster-moving warm air mass collides with a cold air mass, resulting in prolonged, light precipitation (SRB)

**water cycle** the repeating sequence of condensation and evaporation of water on Earth, causing clouds and rain and other forms of precipitation (IG)

**water vapor (H<sub>2</sub>O)** the gaseous state of water; a variable gas that is found in Earth's atmosphere (SRB)

**weather** the condition of the air around us (IG)

**weather factor** a variable property of weather, such as temperature, humidity, air pressure, or wind (SRB)

**weight** the measurable pull or force between Earth and the matter in an object or substance (IG)

**wildfire** a fire occurring in nature that can be driven by winds (SRB)

**wind** air in motion (IG)