

Acknowledgments

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Glossary

- acid deposition** the deposition on the earth's surface, either in dry or wet form, of substances derived from natural and human-induced emissions of various compounds, especially those of sulfur and nitrogen which have been transformed by chemical processes in the atmosphere
- acid rain** see *acid deposition*
- aerosol** a suspension of particles, other than water or ice, in the atmosphere and ranging in size from approximately 5 nm to larger than 10 µm in radius; may be either natural or caused by human activity and most of the latter are usually considered to be pollutants
- air emissions inventory** a detailed listing of the amount of emissions to the atmosphere by type and source over time and space; used to establish emission standards
- air NEPM** National Environment Protection Measure for Ambient Air Quality
- air pollutant** any substance in air that could, in high enough concentrations, harm humans, animals, vegetation or material
- air toxics** gaseous, aerosol or particulate pollutants (other than the six criteria pollutants (see *criteria pollutants*) which are present in the air in low concentrations with characteristics such as toxicity or persistence so as to be a hazard to human, plant or animal life
- airshed** a body of air bounded by topography and meteorology in which a contaminant, once emitted, is contained for a reasonable period of time
- albedo** reflectivity of the planet
- ambient air** surrounding outdoor air
- Antarctic Circumpolar Wave** alternating regions of relatively warm and cold water within the Southern Ocean that rotate around Antarctica
- anthropogenic** of human origin or human induced
- atmospheric inversion** a condition occurring when a cool layer of air gets trapped below a layer of warm air and is unable to rise. This 'ceiling' leads to a build up of polluted air close to the ground and prevents vertical mixing and dispersion of smoke and other air pollutants
- background air quality** the naturally occurring mixture of air in the absence of events such as fires
- benzene** a toxic chemical found in coal tar and cigarette smoke and used as an industrial solvent, as a petrol additive, and in some paints or varnishes; a known carcinogen
- biogenic emissions** emissions from natural sources including vegetation, soils and the ocean
- biomass burning** the combustion of organic waste matter, burning in slash-and-burn cultivation, fuel-wood use and land clearing through forest burning
- biosphere** the collective name for living organisms on the planet
- carbon accounting** issues associated with measuring, calculating and valuing the relative benefits of greenhouse gas mitigation measures
- carbon dioxide equivalent** an atmospheric carbon dioxide concentration that would have the same radiative forcing effect as all of the human-produced greenhouse gases combined
- carbon sequestration** the uptake and storage of carbon
- carbon sink** a pool (reservoir) that absorbs or takes up released carbon from another part of the carbon cycle
- carcinogen** a substance or activity that causes cancer
- catalyst** a substance that changes the rate at which a chemical reaction takes place without taking part in the reaction itself
- CFCs (chlorofluorocarbons)** synthetic products, which do not occur naturally and contain chlorine and fluorine; commonly used in various industrial processes and as refrigerants and, prior to 1990, as a propellant gas for sprays; deplete ozone in the stratosphere and are powerful greenhouse gases
- climate** the average weather conditions of a place or region throughout the seasons
- climate variability** the natural year-to-year and season-to-season variation of the climate system
- criteria pollutants** air pollutants traditionally regarded as important in urban air—sulfur dioxide, carbon monoxide, nitrogen dioxide, ozone, particulate matter and lead (particulate and vapours)

- El Niño** an extensive warming of the central and eastern Pacific that leads to a major shift in weather patterns across the Pacific. In Australia (particularly eastern Australia), El Niño events are associated with an increased probability of drier conditions
- enhanced greenhouse effect** the addition to the natural greenhouse effect resulting from human activities such as the burning of fossil fuels and land clearing, which increase the atmospheric levels of greenhouse gases such as carbon dioxide, methane, nitrous oxide, ozone and CFCs; see *greenhouse effect*
- ENSO (El Niño–Southern Oscillation)** a suite of events that occur at the time of an El Niño; at one extreme of the cycle, when the central Pacific Ocean is warm and the atmospheric pressure over Australia is relatively high, the ENSO causes drought conditions over eastern Australia; see *El Niño, Southern Oscillation*
- evapotranspiration** water withdrawn from soil by evaporation and/or plant transpiration
- fossil fuel** any hydrocarbon deposit that can be burned for heat or power, such as coal, oil and natural gas; produces carbon dioxide when burnt
- fugitive emissions** these are greenhouse gases emitted in an uncontrolled manner
- greenhouse effect** a term used to describe the role of atmospheric trace gases—water vapour, carbon dioxide, methane, nitrous oxide, ozone, in keeping the earth’s surface warmer than it would be otherwise; see *enhanced greenhouse effect*
- greenhouse gases** those gases that, by affecting the radiation transfer through the atmosphere, contribute to the greenhouse effect
- halons** halons include bromofluorocarbons and bromochlorofluorocarbons, which are very stable chemicals that are involved in ozone depletion in a similar manner to CFCs
- haze** the presence of very small airborne particles in concentrations large enough to impede vision
- HCFCs (hydrochlorofluorocarbons)** chemicals used as interim replacements for CFCs, largely as refrigerants
- hydrocarbon** an organic molecule containing hydrogen and carbon; the major components of petroleum
- Indian Ocean Dipole** a warm water region in the area around Indonesia and New Guinea, and a relatively colder region in the central Indian Ocean west of Australia; gives rise to rain-producing systems that extend across Australia from north-west to south-east
- indoor air quality** the totality of attributes of indoor air that affect a person’s health and wellbeing
- infrared radiation** radiation invisible to the human eye, which has less energy and longer wavelengths than visible light
- katabatic winds** downhill flows of cool air
- La Niña** warming of the western equatorial Pacific warm pool, north of New Guinea, accompanied by cooling in the equatorial eastern Pacific Ocean. La Niña is often associated with above average rainfall in eastern Australia; see *El Niño*
- monsoon** seasonal pattern of wind and rainfall
- morbidity** the proportion of sickness in a locality
- mortality** relative frequency of death, or death rate
- ozone depletion** the process whereby the natural equilibrium between chemical reactions forming and destroying stratospheric ozone is disturbed by the release of manufactured chemicals
- ozone layer** a region in the stratosphere where there is a small, but significant, amount of ozone
- particles** microscopic or submicroscopic solid or liquid matter, such as soot, dust or smoke
- person-year** a unit of measurement, based on the amount of work done by one person in a year consisting of a standard number of person-days
- photochemical smog** air pollution caused by chemical reactions among various substances and pollutants in the atmosphere in the presence of sunlight; ozone is a major constituent
- photolysis** a process whereby sunlight causes the chemical bonds in a molecule to break
- recirculation** recycling of pollutants over an area or within an airshed in response to reversal in winds
- sinks** processes or places that remove or store gases, solutes or solids in accumulating parts of the environment
- smog** see *photochemical smog*
- SOI (Southern Oscillation Index)** an indicator based on the pressure gradient between the quasi-stationary low pressure region over Indonesia and the centre of the subtropical high

pressure cell over the eastern Pacific Ocean; traditionally, Darwin and Tahiti are used as the sites for determining the magnitude of the Southern Oscillation; a negative SOI is associated with higher than normal pressures over Darwin and drought conditions over much of eastern Australia; see *Southern Oscillation*

Southern Oscillation a fluctuation in the atmospheric circulation, in particular over the tropical areas of the Pacific and Indian Oceans; in general, when atmospheric pressures are high over the eastern Pacific Ocean they tend to be low in the eastern Indian Ocean and vice versa; the fluctuation between the two produces a marked variation in parameters such as the sea-surface temperature and rainfall over a wide area of the Pacific and has a cycle of two to seven years; the phenomenon is strongly linked to the El Niño; see *SOI*

standard temperature and pressure refers to 0°C and 1 atmosphere (101.325 kPa)

stratosphere region of the atmosphere about 15 to 50 km above the earth's surface where typically the temperature changes little or increases with height; the ozone layer occurs in the stratosphere

troposphere the lower layer of the atmosphere extending to about 15 km above the earth's surface where typically the temperature decreases with height; nearly all clouds form and weather processes are found in this region

ultraviolet (UV) radiation electromagnetic radiation of higher frequencies and shorter wavelengths than visible light; UV radiation is divided into three ranges: UV-A (320–400 nm), UV-B (280–320 nm) and UV-C (40–290 nm)

volatile organic compound (VOC) carbon containing compounds occurring in ambient air as gases or vapour with boiling points between 50°C and 260°C. The VOCs that participate in smog formation reactions are called reactive organic compounds (ROCs). Examples of VOCs include benzene, xylene and toluene

Walker Circulation an east-west air circulation confined to equatorial regions of the Pacific Ocean and driven principally by the oceanic temperature gradient

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