= Pressure system =

A pressure system is a relative peak or lull in the sea level pressure distribution . The surface pressure at sea level varies minimally , with the lowest value measured 870 @.@ 0 hectopascals (25 @.@ 69 inHg) and the highest recorded 1 @,@ 085 @.@ 7 hectopascals (32 @.@ 06 inHg) . High- and low @-@ pressure systems evolve due to interactions of temperature differentials in the atmosphere , temperature differences between the atmosphere and water within oceans and lakes , the influence of upper @-@ level disturbances , as well as the amount of solar heating or radiational cooling an area receives . Pressure systems cause weather experienced locally . Low @-@ pressure systems are associated with clouds and precipitation that minimize temperature changes through the day , whereas high @-@ pressure systems normally associated with dry weather and mostly clear skies with larger diurnal temperature changes due to greater radiation at night and greater sunshine during the day . Pressure systems are analyzed by those in the field of meteorology within surface weather maps .

= = Low @-@ pressure system = =

A low @-@ pressure area , or " low " , is a region where the atmospheric pressure at sea level is below that of surrounding locations . Low @-@ pressure systems form under areas of wind divergence that occur in upper levels of the troposphere . The formation process of a low @-@ pressure area is known as cyclogenesis . Within the field of atmospheric dynamics , areas of wind divergence aloft occur in two areas :

on the east side of upper troughs , which form half of a Rossby wave within the Westerlies (a trough with large wavelength , which extends through the troposphere)

ahead of embedded shortwave troughs , which have smaller wavelengths

Diverging winds aloft ahead of these troughs cause atmospheric lift within the troposphere below , which lowers surface pressures as upward motion partially counteracts the force of gravity .

Thermal lows form due to localized heating caused by greater sunshine over deserts and other land masses . Since localized areas of warm air are less dense than their surroundings , this warmer air rises , which lowers atmospheric pressure near that portion of the Earth 's surface . Large @-@ scale thermal lows over continents help create pressure gradients that drive monsoon circulations . Low @-@ pressure areas can also form due to organized thunderstorm activity over warm water . When such an occurrence occurs over the tropics in concert with the Intertropical Convergence Zone , it is known as a monsoon trough . Monsoon troughs reach their northerly extent in August and their southerly extent in February . When a convective low acquires a well @-@ defined circulation in the tropics it is termed a tropical cyclone . Tropical cyclones can form during any month of the year globally , but can occur in either the northern hemisphere or the southern hemisphere during November .

Atmospheric lift caused by low @-@ level wind convergence into the surface low brings clouds and potentially precipitation . The low @-@ pressure area 's cloudy skies act to minimize diurnal temperature extremes . Since clouds reflect sunlight , incoming shortwave solar radiation is less , which causes lower temperatures during the day . At night , the absorptive effect of clouds on outgoing longwave radiation , such as heat energy from the surface , allows for warmer diurnal low temperatures in all seasons . The stronger the area of low pressure the stronger the winds experienced in its vicinity . Around the world , low @-@ pressure systems are most frequently located over the Tibetan Plateau and in the lee of the Rocky mountains . In Europe (in particular , in the United Kingdom) , recurring low @-@ pressure weather systems are typically known as depressions . The lowest recorded non @-@ tornadic barometric pressure was 870 hectopascals (26 inHg) , occurred in the Western Pacific during Typhoon Tip on 12 October 1979 .

= = High @-@ pressure system = =

High @-@ pressure systems are frequently associated with light winds at the surface and

subsidence through the lower portion of the troposphere . In general , subsidence will dry out an air mass by adiabatic or compressional heating . Thus , high pressure typically brings clear skies . During the day , since no clouds are present to reflect sunlight , there is more incoming shortwave solar radiation and temperatures rise . At night , the absence of clouds means that outgoing longwave radiation (i.e. heat energy from the surface) is not absorbed , giving cooler diurnal low temperatures in all seasons . When surface winds become light , the subsidence produced directly under a high @-@ pressure system can lead to a buildup of particulates in urban areas under the ridge , leading to widespread haze . If the low @-@ level relative humidity rises towards 100 percent overnight , fog can form .

Strong but vertically shallow high @-@ pressure systems moving from higher latitudes to lower latitudes in the northern hemisphere are associated with continental arctic air masses . The low , sharp temperature inversion can lead to areas of persistent stratocumulus or stratus cloud , known in colloquial terms as anticyclonic gloom . The type of weather brought about by an anticyclone depends on its origin . For example , extensions of the Azores high bubble pressure may bring about anticyclonic gloom during the winter , as they are warmed at the base and will trap moisture as they move over the warmer oceans . High pressures that build to the north and extend southwards will often bring clear weather . This is due to being cooled at the base (as opposed to warmed) , which helps prevent clouds from forming . The highest barometric pressure ever recorded on Earth was 1 @,@ 085 @.@ 7 hectopascals (32 @.@ 06 inHg) measured in Tonsontsengel , Mongolia on 19 December 2001 .

= = Surface weather maps = =

A surface weather analysis is a type of weather map that depicts positions for high- and low @-@ pressure areas , as well as various types of synoptic scale systems such as frontal zones . Isotherms can be drawn on these maps , which are lines of equal temperature . Isotherms are drawn normally as solid lines at a preferred temperature interval . They show temperature gradients , which can be useful in finding fronts , which are on the warm side of large temperature gradients . By plotting the freezing line , isotherms can be useful in determination of precipitation type . Mesoscale convective systems such as tropical cyclones , outflow boundaries and squall lines also are analyzed on surface weather analyses .

Isobaric analysis is performed on these maps , which involves the construction of lines of equal mean sea level pressure . The innermost closed lines indicate the positions of relative maxima and minima in the pressure field . The minima are called low @-@ pressure areas , and the maxima are called high @-@ pressure areas . A High is often shown as H , and a low is shown as L. Elongated areas of low pressure , or troughs , are sometimes plotted as thick , brown dashed lines down the trough axis . Isobars are commonly used to place surface boundaries from the horse latitudes poleward , while streamline analyses are used in the tropics . A streamline analysis is a series of arrows oriented parallel to wind , showing wind motion within a certain geographic area . Cs depict cyclonic flow or likely areas of low pressure , while As depict anticyclonic flow or likely positions of high @-@ pressure areas . An area of confluent streamlines shows the location of shearlines within the tropics and subtropics .