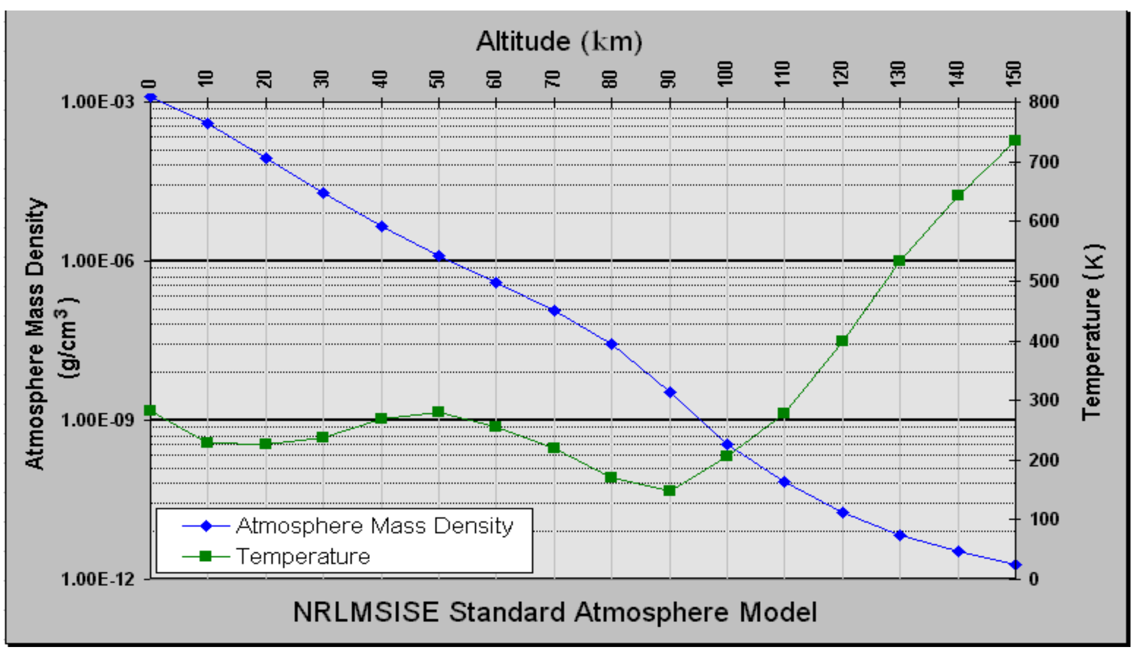
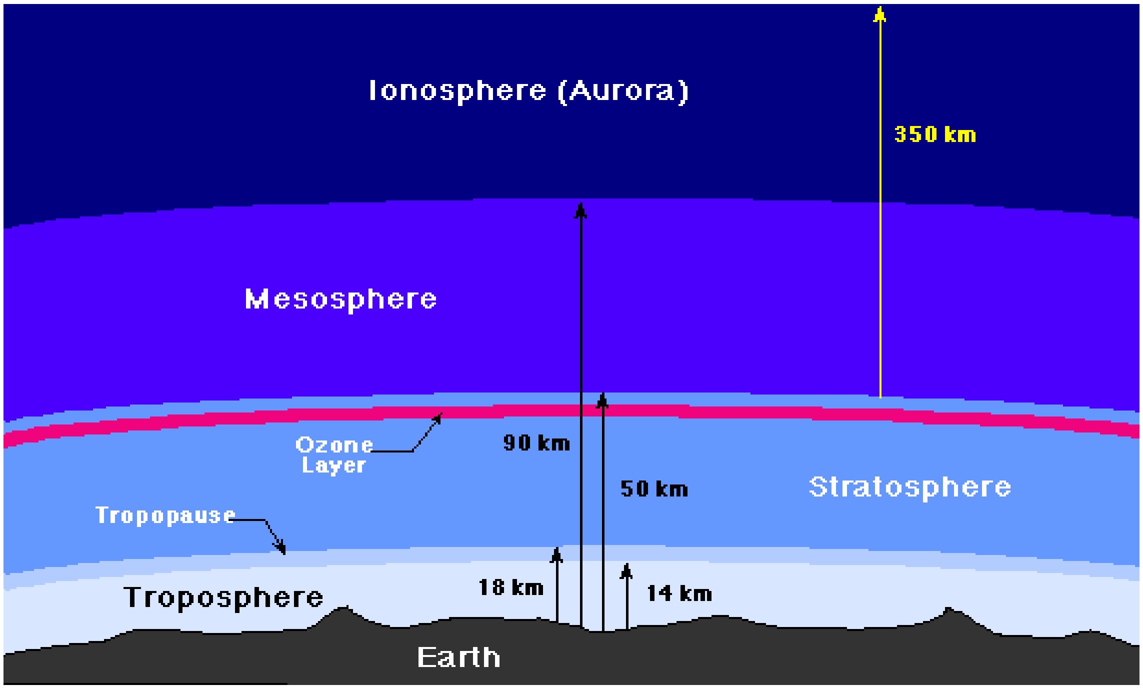
Pole Climatology

The winter months at both the North Pole and later the South Pole are dark as sunlight reverts to summers constant sunshine. This is caused by the tilt of the earth's axis. The angle of summer sun is always low in the sky. Much of the sunlight that does reach the surface travels through a very thick atmosphere only to be reflected back into the atmosphere and space by ocean surface and white snow. This lack of warmth from the sun combined with high latitude, means that the poles have the coldest climates on earth. The North Pole is warmed somewhat by ocean currents and being at sea level. The South Pole is cooled by its continental glacier land mass, high altitudes and reflective clouds. During an ice age the North Pole is much cooler than the South Pole because of the reflective nature of glaciers covering the ocean and land while the South Pole gets some ocean currents.

Usually the temperature in the lower atmosphere steadily decreases as you go up, but this is not true at the South Pole. As the surface gives up its heat and pressures cools the air closest to the surface. While the surface is dark, the atmosphere higher up is still warmed by the sun. The climate at the South Pole is desert like. Air humidity is near zero. Snow accumulation is about 8 inches (20 cm) per year. High winds blow the snow into domes, onto the foot of cliffs or up against buildings. It almost never rains. The lowest recorded temperature anywhere on earth was taken at Vostok Station, Antarctica, of 129.28°F below zero (−89.6°C).

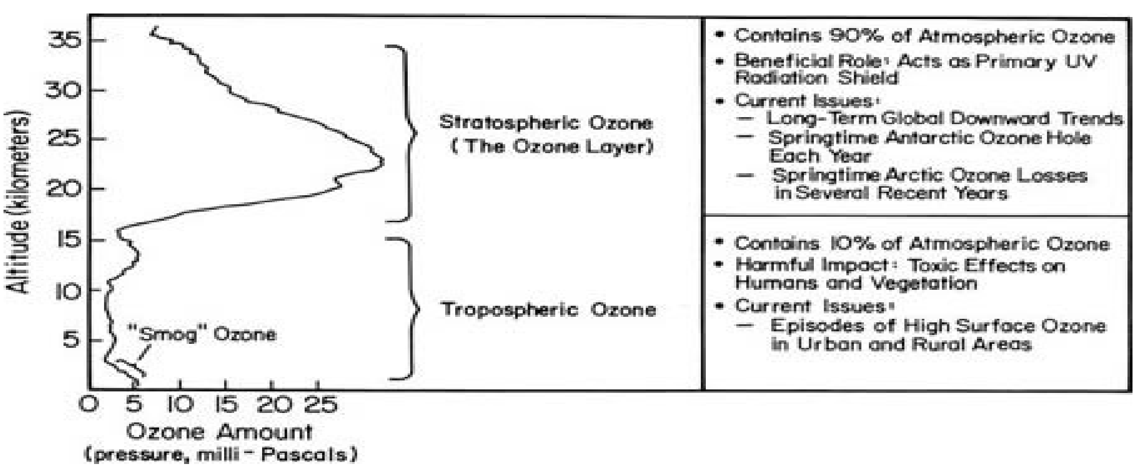
The troposphere is the lowest layer of the atmosphere. The troposphere contains 75% of the mass of the atmosphere including almost all the water vapor and aerosols. Therefore, it is the densest layer of the atmosphere. The boundary between the troposphere and the stratosphere is the tropopause, the lowest level above which the temperature increases. At the poles; the troposphere extends from the surface to four miles (or 7 km) up if there is any inversion layer at all. While at the equator, the troposphere extends upward some twelve miles (20 km) with temperatures 135°F below zero (180 K). Between the pole and the equator, air masses create the subtropical jet stream. This is of major importance for the transfer of heat, air, humidity, ozone, radioactivity, and other aerosols between stratosphere and troposphere.





In attempts to model atmospheric physics over the polar region through fluid flow, radiation balancing and energy transfer processes, what we are now learning is that the near-surface atmosphere is being mixed with the stratosphere and mesosphere. The climatology and meteorology shows stratospheric clouds of extremely cold winter air moving downward to seed the water vapor over the polar region. This happens because of similar temperatures and the lack of an inversion layer. This is seen in the snowpack chemistry. This model explains the elevated presence of nitric oxides, hydroxyl, carbon dioxide and ozone within the snowpack and why it is released from the ice when summer allows solar radiation to warm the glacier. Evidence shows that this oxidizing chemistry stores global warming chemicals. This evidence could be a disaster waiting to happen if we continue to melt the glacier. Excitingly, this discovery gives a new way to store some of the global warming gasses.

As winters darkness gives way to spring and renewed sunshine, on the first day the cloud cover is not reflecting most of the sun energy back into space, there is a flash where solar insulation starts a new cycle of catalectic reactions. This is when the ozone layer disappears.



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