

Atmospheric Inversion Encyclopedia Article

Atmospheric Inversion

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Atmospheric Inversion

Atmospheric inversions are horizontal layers of air that increase in temperature with height. Such warm, light air often lies over air that is cooler and heavier. As a result the air has a strong vertical **stability**, especially in the absence of strong winds.

Atmospheric inversions play an important role in **air quality**. They can trap air pollutants below or within them, causing high concentrations in a volume of air that would otherwise be able to dilute air pollutants throughout a large portion of the **troposphere**.

Atmospheric inversions are quite common, and there are several ways in which they are formed. Surface inversions can form during the evening when the radiatively cooling ground becomes a heat sink at the bottom of an air mass immediately above it. As a result heat flows down through the air which sets up a temperature gradient that coincides with an inversion. Alternatively, relatively warm air may flow over a cold surface with the same results.

Elevated atmospheric inversions can occur when vertical differences in wind direction allow warm air to set up over cold air. However, it is more common in near-subtropical latitudes, especially on the western sides of continents, to get subtropical **subsidence** inversions. Subtropical subsidence inversions often team with mountainous **topography** to trap air both horizontally and vertically. This is the situation on the coast of southern and central California.