Thermosphere Encyclopedia Article

Thermosphere

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Thermosphere

Based on the vertical **temperature** profile in the atmosphere, the thermosphere is the highest layer, located above the **mesosphere**. While in the **troposphere** and the mesosphere, the temperature decreases with altitude. In the **stratosphere** and thermosphere the temperature increases with height (called temperature inversion). It is separated from the mesosphere by the mesopause, in which the temperature does not change much vertically. Above the thermosphere, the upper limit of the atmosphere, the exosphere can be found blending into **space**. The upper part of the mesosphere and a big part of the thermosphere overlap with the **ionosphere**, which is a region defined on the basis of electric properties. The thermosphere and the exosphere together form the upper atmosphere.

Among the four atmospheric temperature-defined layers, the thermosphere is located highest above Earth's surface, beginning at about 57 mi (90 km) above Earth, and reaching into about 300 mi (500 km) height. The name of this layer, thermosphere, originates from the Greek *thermo*, meaning heat, because in this layer the temperature increases with altitude reaching temperatures higher than 1830°F (1000°C). In the thermosphere, **oxygen** molecules absorb the energy from the Sun's rays, which results in the warming of the air. Because there are relatively few molecules and atoms in the thermosphere, even absorbing small amounts of **solar energy** can significantly increase the air temperature, making the thermosphere the hottest layer in the atmosphere. Above 124 mi (200 km), the temperature becomes independent of altitude.

Because the thermosphere and exosphere belong to the upper atmosphere, the density of the air in addition to the **atmospheric pressure** is greatly reduced when compared to the atmosphere at Earth's surface. At these high altitudes, the atmospheric gases tend to sort into layers according to their molecular mass, and chemical reactions happen much faster here than near the surface of the earth.

See Also

Atmospheric Composition and Structure