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### ultraviolet radiation

The energy range just beyond the violet end of the visible spectrum. Although ultraviolet radiation constitutes only about 5 percent of the total energy emitted from the sun, it is the major energy source for the stratosphere and mesosphere, playing a dominant role in both energy balance and chemical composition.

Most ultraviolet radiation is blocked by Earth's atmosphere, but some solar ultraviolet penetrates and aids in plant photosynthesis and helps produce vitamin D in humans. Too much ultraviolet radiation can burn the skin, cause skin cancer and cataracts, and damage vegetation.

### United States Geological Survey (USGS)

A bureau of the Department of the Interior. USGS was established in 1879 following several Federally sponsored independent natural resource surveys of the West and Midwest. The Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. The USGS monitors resources such as energy, minerals, water, land, agriculture, and irrigation. The resulting scientific information contributes to environmental-policy decision making and public safety. For example, USGS identifies flood- and landslide-prone areas and maintains maps of the United States.

### United States Global Change Research Program (USGCRP)

The USGCRP addresses significant uncertainties concerning the natural and human-induced changes to Earth's environment. The USGCRP has a comprehensive and multidisciplinary scientific research agenda. See [Global Change Research Program](#).

### updraft

### Upper Atmosphere Research Satellite (UARS)

A relatively small-scale current of air with marked upward vertical motion. UARS is part of a long-term, international program of space research into global atmospheric change. Beginning in 1991, NASA's UARS program began to carry out the first systematic, detailed satellite study of the Earth's stratosphere, mesosphere, and lower thermosphere; establish the comprehensive data base needed for an understanding of stratospheric ozone depletion; and bring together scientists and governments around the world to assess the role of human activities in atmospheric change. Launched on September 12, 1991, UARS became the first official space component of NASA's Earth Science Enterprise.

### upwelling

The vertical motion of water in the ocean by which subsurface water of lower temperature and greater density moves toward the surface of the ocean. Upwelling occurs most commonly among the western coastlines of continents, but may occur anywhere in the ocean. Upwelling results when winds blowing nearly parallel to a continental coastline transport the light surface water away from the coast. Subsurface water of greater density and lower temperature replaces the surface water, and exerts a considerable influence on the weather of coastal regions. Carbon dioxide is transferred to the atmosphere in regions of upwelling. This is especially important in the Pacific equatorial regions, where 1-2 GtC/year may be released to the atmosphere. Upwelling also results in increased ocean productivity by transporting nutrient-rich waters to the surface layer of the ocean.

### validation

Comparing a climate model's predictions with observations of the real climate, in order to test the reliability and accuracy of the model. The most obvious way to test a climate model is to use it to analyze past events, and then see whether its simulated prediction 'came true,' or how close it was to being correct.

### Van Allen belts or Van Allen Radiation belts

Doughnut-shaped regions encircling Earth and containing high energy electrons and ions trapped in the Earth's magnetic field (the magnetic field has definite boundaries, and is distorted into a tear-drop shape by the solar wind). Explorer I, launched by NASA in 1958, discovered this intense radiation zone. These regions are called the inner and outer Van Allen radiation belts, named after the scientist who first observed them. See [magnetosphere](#).

### vector

A physical quantity that has both a magnitude and a direction and that adds like displacement; velocity, acceleration, and force are prime examples.

### vector-borne disease

A vector-borne disease is one in which the pathogenic microorganism is transmitted from an infected individual to another individual by an arthropod or other agent, sometimes with other animals serving as intermediary hosts. The transmission depends upon the attributes and requirements of at least three different living organisms: the pathologic agent, either a virus, protozoa, bacteria, or helminth (worm); the vector, which are commonly arthropods such as ticks or mosquitoes; and the human host. In addition, intermediary hosts such as domesticated and/or wild animals often serve as a reservoir for the pathogen until susceptible human populations are exposed. See [Mapping Malaria](#)

### Vegetation Canopy Lidar (VCL)

The first satellite mission of NASA's Earth System Science Pathfinder project that will create the first maps of the three-dimensional structure of vegetation in the world's forests. The VCL lidar holds five lasers that each send 242 pulses per second at the Earth's surface. Each beam covers an area 75 feet across. By spacing the five beams a little over a mile apart, each VCL orbit will sample an area 5 miles across. See [VCL fact sheet](#).

<b>velocity</b>	The time rate at which a body changes its position vector; velocity is a vector quantity whose magnitude is expressed in units of distance over time, such as miles per hour. (From the Latin word for "speed.")
<b>vernal equinox</b>	The beginning of spring in the Northern Hemisphere. The time/day that the sun crosses the equatorial plane going from south to north.
<b>visible</b>	That part of the electromagnetic spectrum to which the human eye is sensitive, between about 0.4 and 0.7 micrometers. See spectrum.
<b>Visible/Infrared Spin Scan Radiometer (VISSR)</b>	High-resolution, multi-spectral imaging system flown on the pre-GOES-8 geostationary GOES spacecraft. Similar systems are flown on the METEOSAT and GMS spacecraft.
<b>volcano</b>	A naturally occurring vent or fissure at the Earth's surface through which erupt molten, solid, and gaseous materials. Volcanic eruptions inject large quantities of dust, gas, and aerosols into the atmosphere. A major component of volcanic clouds is sulfur dioxide, a strong absorber of ultraviolet radiation. Chemical interactions between sulfur dioxide and water cause sulfuric acid aerosols which can scatter some of the incident solar radiation back to space, thus causing a global cooling effect. For example, Mt. Pinatubo in the Philippines erupted in June 1991, and in the following year the global surface temperature was observed to decrease by about 0.3 degrees C.
<b>vortex</b>	A mass of fluid rotating about an axis, i.e., whirlpool or whirlwind. <a href="#">all entries</a>   <a href="#">a</a>   <a href="#">b-c</a>   <a href="#">d</a>   <a href="#">e</a>   <a href="#">f-g</a>   <a href="#">h-k</a>   <a href="#">l-m</a>   <a href="#">n</a>   <a href="#">o</a>   <a href="#">p</a>   <a href="#">q-r</a>   <a href="#">s</a>   <a href="#">t</a>   <a href="#">u-v</a>   <a href="#">w-z</a>

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