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habitat

The area or region where a particular type of plant or animal lives and grows.

hail

Precipitation composed of balls or irregular lumps of ice. Hail is produced when large frozen raindrops, or almost any particles, in cumulonimbus clouds act as embryos that grow by accumulating supercooled liquid droplets. Violent updrafts in the cloud carry the particles in freezing air, allowing the frozen core to accumulate more ice. When the piece of hail becomes too heavy to be carried by upsurging air currents it falls to the ground.

haze

Fine dry or wet particles of dust, salt, or other impurities that can concentrate in a layer next to the Earth when air is stable.

heat balance

The equilibrium existing between the radiation received and emitted by a planetary system.

heat island effect

A dome of elevated temperatures over an urban area caused by the heat absorbed by structures and pavement.

hemisphere

Half of the Earth, usually conceived as resulting from the division of the globe into two equal parts, north and south or east and west.

herbaceous

Green and leaf-like.

**High-Resolution Infrared Radiation
Sounder (HIRS)**

Instrument carried by NOAA polar-orbiting satellites that detects and measures energy emitted by the atmosphere to construct a vertical temperature profile from the Earth's surface to an altitude of about 40 km. Measurements are made in 20 spectral regions in the infrared band.

horse latitudes

The subtropical latitudes (30-35 degrees), where winds are light and weather is hot and dry. According to legend, ships traveling to the New World often stagnated in this region and had to throw dead horses overboard or eat them to survive, hence the name horse latitudes.

hurricanes

Severe tropical storms whose winds exceed 74 mph. Hurricanes originate over the tropical and subtropical North Atlantic and North Pacific oceans, where there is high humidity and light wind. These conditions prevail mostly in the summer and early fall. Since hurricanes can take days or even weeks to form, time is usually available for preventive or protective measures.

From space, hurricanes look like giant pinwheels, their winds circulating around an eye that is between 5 and 25 miles in diameter. The eye remains calm with light winds and often a clear sky.

Hurricanes may move as fast as 50 mph, and can become incredibly destructive when they hit land. Although hurricanes lose power rapidly as soon as they leave the ocean, they can cause high waves and tides up to 25 feet above normal. Waves and heavy flooding cause the most deaths during a hurricane. The strongest hurricanes can cause tornadoes.

hydrocarbon

A chemical containing only carbon and hydrogen. Hydrocarbons are of prime economic importance because they encompass the constituents of the major fossil fuels, petroleum and natural gas, as well as plastics, waxes, and oils. In urban pollution, these components--along with NOx and sunlight--contribute to the formation of tropospheric ozone.

hydrochlorofluorocarbon (HCFC)

One of a class of compounds used primarily as a CFC substitute. Work on CFC alternatives began in the late 1970s after the first warnings of CFC damage to stratospheric ozone. By adding hydrogen to the chemical formulation, chemists made CFCs less stable in the lower atmosphere enabling them to break down before reaching the ozone layer. However, HCFCs do release chlorine and have contributed more to atmospheric chlorine buildup than originally predicted. Development of non-chlorine based chemical compounds as a substitute for CFCs and HCFCs continues.

hydrodynamics

The study of fluid motion and fluid-boundary interaction.

hydrologic cycle

The process of evaporation, vertical and horizontal transport of vapor, condensation, precipitation, and the flow of water from continents to oceans. It is a major factor in determining climate through its influence on surface vegetation, the clouds, snow and ice, and soil moisture. The hydrologic cycle is responsible for 25 to 30 percent of the mid-latitudes' heat transport from the equatorial to polar regions. See [The Water Cycle](#)

hydrology

The science that deals with global water (both liquid and solid), its properties, circulation, and distribution, on and under the Earth's surface and in the atmosphere through evapotranspiration or is discharged into oceans.

hydrosphere

The totality of water encompassing the Earth, comprising all the bodies of water, ice, and water vapor in the atmosphere.

hygrometer

Instrument that measures water vapor content in the air and communicates changes in humidity visibly and immediately through a graph or a dial. There are three types of hygrometers:

* The hair hygrometer uses a human hair as the sensing instrument. The hair

lengthens when the air is moist and contracts when the air is dry, but remains unaffected by air temperature. However, the hair hygrometer cannot respond to rapid fluctuations in humidity.

* An electric hygrometer uses a plate coated with carbon. Electrical resistance of the carbon coating changes as the moisture content of the air changes--changes that translate into relative humidity. This type of hygrometer is used frequently in the radiosonde.

* An infrared hygrometer uses a beam of light containing two separate wavelengths to gauge atmospheric humidity. One of the wavelengths is absorbed by water vapor, the other is unaffected, providing an extremely accurate index of water vapor for paths of a few inches or thousands of feet. See psychrometer. describes a sensor that observes hundreds or thousands of virtually continuous wavelengths of electromagnetic energy, or imagery from such a sensor

hyperspectral

ice age

ice core

A glacial epoch or time of extensive glacial activity

A cylindrical section of ice removed from a glacier or an ice sheet in order to study climate patterns of the past. By performing chemical analyses on the air trapped in the ice, scientists can estimate the percentage of carbon dioxide and other trace gases in the atmosphere at that time.

ice sheet (continental glacier)

A glacier of considerable thickness and more than 50,000 sq km in area. It forms a continuous cover of ice and snow over a land surface. An ice sheet is not confined by the underlying topography but spreads outward in all directions. During the Pleistocene Epoch, ice sheets covered large parts of North America and northern Europe but they are now confined to polar regions (e.g., Greenland and Antarctica).

ice shelf

A thick mass of ice extending from a polar shore. The seaward edge is afloat and sometimes extends hundreds of miles into the sea.

imager

A satellite instrument that measures and maps the Earth and its atmosphere. Imager data are converted by computer into pictures.

in situ

Latin for 'in original place.' Refers to measurements made at the actual location of the object or material measured. Compare remote sensing.

inclination

One of the six Keplerian elements, it indicates the angle of the orbit plane to the central body's equator. See Keplerian elements for diagram.

The elliptical path of a satellite orbit lies in a plane known as the orbital plane. The orbital plane always goes through the center of the Earth but may be tilted at any angle relative to the equator. Inclination is the angle between the equatorial plane and the orbital plane measured counter-clockwise at the ascending node.

A satellite in an orbit that exactly matches the equator has an inclination of 0 degree, whereas one whose orbit crosses the Earth's poles has an inclination of 90 degrees. Because the angle is measured in a counterclockwise direction, it is quite possible for a satellite to have an inclination of more than 90 degrees. An inclination of 180 degrees would mean the satellite is orbiting the equator, but in the opposite direction of the Earth's rotation. Some sun-synchronous satellites that maintain the same ground track throughout the year have inclinations of as much as 98 degrees. U.S. scientific satellites that study the sun are placed in orbits closer to the equator, frequently at 28 degrees inclination. Most weather satellites are placed in high-inclination orbits so they can oversee weather conditions worldwide. See orbital inclination.

information system

All of the means and mechanisms for data receipt, processing, storage, retrieval, and analysis. Information Systems can be designed for storage and dissemination of a variety of data products--including primary data sets and both intermediate and final analyses--and for an interface providing connections to external computers, external data banks, and system users. To be effective, the design and operation of an information system must be carried out in close association with the primary producers of the data sets, as well as other groups producing integrated analyses or intermediate products.

infrared radiation (IR)

Infrared is electromagnetic radiation whose wavelength spans the region from about 0.7 to 1000 micrometers (longer than visible radiation, shorter than microwave radiation). Remote sensing instruments work by sensing radiation that is naturally emitted or reflected by the Earth's surface or from the atmosphere, or by sensing signals transmitted from a satellite and reflected back to it. In the visible and near-infrared regions, surface chemical composition, vegetation cover, and biological properties of surface matter can be measured. In the mid-infrared region, geological formations can be detected due to the absorption properties related to the structure of silicates. In the far infrared, emissions from the Earth's atmosphere and surface offer information about atmospheric and surface temperatures and water vapor and other trace constituents in the atmosphere. Since IR data are based on temperatures rather than visible radiation, the data may be obtained day or night.

insolation

Solar radiation incident upon a unit horizontal surface on or above the Earth's surface.

International Geosphere-Biosphere Programme (IGBP)	The International Geosphere-Biosphere Programme (IGBP) is an interdisciplinary scientific activity established and sponsored by the International Council for Science (ICSU). The program was instituted by ICSU in 1986, and the IGBP Secretariat was established at the Royal Swedish Academy of Sciences in 1987 and is focused on acquiring basic scientific knowledge about the interactive processes of biology and chemistry of the earth as they relate to Global Change. See IGBP web site
International System of Units (SI)	The International System of Units prescribes the symbols and prefixes shown in the table to form decimal multiples and submultiples of SI units. The following examples illustrate the use of these prefixes: 0.000,001 meters = 1 micrometer = 1 ^μ m 1000 meters = 1 kilometer = 1 km 1,000,000 cycles per second = 1,000,000 hertz = 1 megahertz = 1 MHz A discontinuous belt of thunderstorms paralleling the equator and marking the convergence of the northern and southern hemisphere surface trade winds. See El Niño's Extended Family
Intertropical Convergence Zone (ITCZ)	
ion	Atom or molecule that has acquired an electric charge by the loss or gain of one or more electrons.
isobars	Lines drawn on a weather map joining places of equal barometric pressure.
isothermal	Of or indicating equality of temperature.
isotherms	Lines connecting points of equal temperature on a weather map.
isthmus	Narrow strip of land located between two bodies of water, connecting two larger land areas.
Japanese National Space Development Agency (NASDA)	The agency reports to the Japanese Ministry of Science and Technology.
Jason-1	Jason-1 is an oceanography mission to monitor global ocean circulation, discover the tie between the oceans and atmosphere, improve global climate predictions, measure sea level rise and monitor events such as El Nino conditions and the Pacific Decadal Oscillation. The Jason-1 satellite carries a radar altimeter and it is a follow-on mission to the highly successful TOPEX/Poseidon mission. It is joint mission between France and USA. The satellite will be launched in late 2000. See Jason web site
Jet Propulsion Laboratory (JPL)	Located in Pasadena, California, JPL is operated under contract to NASA by the California Institute of Technology. Its primary focus is the scientific study of the solar system, including exploration of the planets with automated probes. Most of the lunar and planetary spacecraft of the 1960s and 1970s were developed at JPL. JPL also is the control center for the worldwide Deep Space Network, which tracks all planetary spacecraft. See JPL Web Site
jet stream	Rivers of high-speed air in the atmosphere. Jet streams form along the boundaries of global air masses where there is a significant difference in atmospheric temperature. The jet streams may be several hundred miles across and 1-2 miles deep at an altitude of 8-12 miles. They generally move west to east, and are strongest in the winter with core wind speeds as high as 250 mph. Changes in the jet stream indicate changes in the motion of the atmosphere and weather.
Johnson Space Center (JSC)	The Lyndon B. Johnson Space Center, located between Houston and Galveston, Texas, is the lead center for NASA's manned space flight program. JSC has been Mission Control for all piloted space flights since 1965, and now manages the Space Shuttle program. JSC's responsibilities include selecting and training astronauts; designing and testing vehicles and other systems for piloted space flight; and planning and executing space flight missions. The center has a major role in developing the Space Station. In addition, JSC directs operations at the White Sands Test Facility in New Mexico, which conducts Shuttle-related tests. The nearby White Sands Missile Range also serves as a backup landing site for the Space Shuttle. See JSC Web Site
Joint Education Initiative (JEI)	The JEI project was developed by USGS, NOAA, NASA, industry, and teachers to enable teachers and students to explore the massive quantities of Earth science data published by the U.S. Government on CD-ROM. JEI encourages a research and analysis approach to science education.
Kelvin	The standard unit of thermodynamic temperature. It is defined as 1/273.16 of the temperature of the triple point of water above absolute zero. The symbol for this is K. Kelvin is measured by the same temperature steps as Celsius but is shifted downwards so that 0 degrees K is absolute zero; water freezes at 273 K and boils at 373 K.
Kennedy Space Center (KSC)	Located near Cape Canaveral, Florida, KSC is NASA's primary launch site. The Center handles the preparation, integration, checkout, and launch of space vehicles and their payloads. All piloted space missions since the Mercury program have been launched from here, including Gemini, Apollo, Skylab, and Space Shuttle flights. KSC is the Shuttle's home port, where orbiters are serviced and outfitted between missions, and then assembled into a complete Shuttle 'stack'

kilobit
kilometer (km)
knot
Ku-band

before launch. The Center also manages the testing and launch of unpiloted space vehicles from an array of launch complexes, and conducts research programs in areas of life sciences related to human spaceflight. [KSC Web Site](#)
1024 bits. Also represented as Kb.

Metric unit of distance equal to 3,280.8 feet or .621 statute miles.

Unit of speed of one nautical mile (6,076.1 feet) an hour.

Radar and microwave band in which the wavelengths vary from 1.67-2.4 cm.

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