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nadir

Point on Earth directly beneath a satellite, the opposite of zenith. Compare with subsatellite point.

nanometer (nm)

One billionth of a meter. Nanometers are used to measure wavelengths in the electromagnetic spectrum.

National Aeronautics and Space Administration (NASA)

U.S. Civilian Space Agency created by Congress. Founded in 1958, NASA belongs to the executive branch of the Federal Government. NASA's mission to plan, direct, and conduct aeronautical and space activities is implemented by NASA Headquarters in Washington, D.C., and by nine major centers spread throughout the United States. Dozens of smaller facilities, from tracking antennas to Space Shuttle landing strips to telescopes are located around the world. The agency administers and maintains these facilities; builds and operates launch pads; trains astronauts; designs aircraft and spacecraft; sends satellites into Earth orbit and beyond; and processes, analyzes, and distributes the resulting data and information.

NASA shares responsibility for aviation and space activities with other federal agencies, including the Departments of Commerce, Transportation, and Defense. Much of the work on major projects such as the Space Shuttle and the Space Station is done in the private sector by aerospace companies under government contract.

From its inception, NASA has been directed to pursue the expansion of human knowledge of phenomena in the atmosphere and space. NASA's programs of basic and applied research extend from microscopic sub-atomic particles to galactic astronomy. In addition to enhancing scientific knowledge, thousands of the technologies developed for aerospace have resulted in commercial applications. Science offices at NASA Headquarters carry out a wide range of research activities to fulfill NASA's science goals. [NASA Web Site](#)

National Center for Atmospheric Research (NCAR)

Located in Boulder, Colorado, NCAR's mission is to plan, organize, and conduct atmospheric and related research programs in collaboration with universities, to provide state-of-the-art research tools and facilities to the entire atmospheric sciences community, to support and enhance university atmospheric research education, and to facilitate the transfer of technology to both the public and private sectors. See [NCAR web site](#)

National Centers for Environmental Prediction (NCEP)

The NCEP was established in 1958 as the National Meteorological Center. As a critical part of the National Oceanic and Atmospheric Administration's National Weather Service, NCEP is the starting point for nearly all weather forecasts in the United States.

NCEP is comprised of nine centers. Each center has a specific responsibility for a portion of the NCEP products and services suite, yet they all work together toward the common goals of saving lives, protecting property, and creating economic opportunity. Seven of the centers provide direct products to users, while two of the centers provide essential support through developing and running complex computer models of the atmosphere.

Weather Service field offices, other government agencies, and private meteorological services rely on NCEP's products. Many of the forecasts which reach the public via media outlets originate at NCEP. In addition to weather, NCEP meteorologists prepare seasonal forecasts which extend out to a year in advance. See [NCEP web site](#)

National Oceanic and Atmospheric Administration (NOAA)

NOAA was established in 1970 within the U.S. Department of Commerce to ensure the safety of the general public from atmospheric phenomena and to provide the public with an understanding of the Earth's environment and resources. NOAA includes: the National Ocean Service which charts the oceans and waters of the U.S. and manages 265,000 acres of estuarine reserves; the National Marine Fisheries Service which maintains the world's largest and most complex marine fisheries management system; the NOAA Corps which operates 18 NOAA research and survey ships and flies 15 NOAA aircraft; and the Office of Oceanic and Atmospheric Research which supports experiments, laboratories, and the National Sea Grant College Program, among other efforts. NOAA has two main components: the National Weather Service (NWS), and the National Environmental Satellite, Data, and Information Service (NESDIS).

The National Weather Service provides weather watch and warning services to the public through 57 Weather Service Forecast Offices (WSFO) and over 100 smaller local Weather Service Offices (WSOs) nationwide. Three national forecasting centers provide general and specialized guidance to WSFOs using computer forecast models, satellite data, and conventional surface and upper air

observations from around the world. The centers are:

National Center for Environmental Prediction, Camp Springs, Maryland;
National Severe Storms Forecast Center, Kansas City, Missouri;
Tropical Prediction Center, Coral Gables, Florida.

NWS River Forecast Centers (RFCs) provide river stage and flood forecasts. NESDIS provides support to the Weather Service forecast mission by operating a series of environmental satellites and disseminating satellite imagery and derived products to the National Centers and WSFOs. NESDIS operates three national data and information centers: the National Geophysical Data Center, the National Climatic Data Center (NCDC), and the National Oceanographic Data Center (NODC). See SOCC

NOAA organizations perform numerous services in addition to monitoring weather conditions. They assess crop growth and other agricultural conditions, sense shifting ocean currents, and measure surface temperatures of oceans and land. They relay data from surface instruments that sense tide conditions, Earth tremors, river levels, and precipitation.

National Snow and Ice Data Center (NSIDC)

The National Snow and Ice Data Center (NSIDC) is an information and referral center supporting polar and cryospheric research. They distribute data and maintain information about snow cover, avalanches, glaciers, ice sheets, freshwater ice, sea ice, ground ice, permafrost, atmospheric ice, paleoglaciology, and ice cores, and also publish reports and a quarterly newsletter and maintain a collection of monographs, technical reports, and journals. See [NSIDC web site](#)
The NSSDC provides on-line and off-line access to a wide variety of astrophysics, space plasma and solar physics, lunar and planetary, and Earth science data from NASA space flight missions, in addition to selected other data, models, and software. Located at Goddard Space Flight Center (GSFC) in Greenbelt, Maryland, the NSSDC is sponsored by the Information Systems Office of NASA's Office of Space Sciences. NSSDC on-line data and services are currently free of charge, off-line support (e.g., replications and mailing of magnetic tapes) are available for the cost of fulfilling the request.

National Space Science Data Center (NSSDC)

The NSSDC Master Catalog (NMC) provides an on-line listing of available data sets and the forms that the data are available in (such as CD-ROM), and provides information about the spacecraft and experiments (including past, present, and future NASA and non NASA) from which these data were obtained. The on-line NASA Master Directory (NMD) identifies and briefly describes data of potential interest to the NASA research community, and where possible, provides electronic links to publicly accessible data at sites world-wide. On-line information services are made available through the menu-based NSSDC Online Data Information Service (NODIS).

National Weather Service (NWS)
nautical mile

See National Oceanic and Atmospheric Administration.

A nautical mile is a unit of distance equal to 1,852 meters. The length of the nautical mile is very close to the mean value of the length of 1 minute of latitude, which varies from approximately 1,843 meters at the equator to 1,861.6 meters at the pole.

NCDC

National Climatic Data Center, located in Asheville, North Carolina. See National Oceanic and Atmospheric Administration.

NDVI (normalized difference vegetation index)

NDVI | Abbreviation for normalized difference vegetation index, a model for converting satellite-based measurements into surface vegetation types. The NDVI uses a complex ratio of reflectance in the red and near-infrared portions of the spectrum to accomplish this. Reflectance in the red region decreases with increasing chlorophyll content of the plant canopy, while reflectance in the infrared increases with increasing wet plant biomass. This technique has been used most successfully with data from the AVHRR, and is actually used operationally to predict the degree of drought and potential famine in the Sahel region of Africa. It is a quantity that measures greenness and vigor of vegetation. Electromagnetic radiation with wavelengths from just longer than the visible (about 0.7 micrometers) to about two micrometers. See electromagnetic spectrum.

near infrared

negative feedback

An interaction that reduces or dampens the response of the system in which it is incorporated.

NESDIS

National Environmental Satellite Data and Information Service. See National Oceanic and Atmospheric Administration.

net primary production (NPP)

Plants both take in and emit carbon dioxide. NPP is the net amount of CO₂ taken in by vegetation in a particular area. It is an important element in the balance of carbon exchange between the Earth and the atmosphere. Two main processes are involved: Photosynthesis is the fundamental energy-gathering process of life: sunlight + carbon dioxide + water are transformed into organic carbon + oxygen. This occurs mainly in the leaves of terrestrial plants and in microscopic blue green algae in the ocean. Photorespiration (autotrophic respiration) takes place simultaneously, when plants are exposed to light; the plants take up oxygen from

	<p>the air and release carbon dioxide. It takes place primarily when plants are exposed to light. In an unperturbed world, the balance between these two processes produces a net loss of carbon dioxide _ approximately enough to balance the carbon which is formed into soils and peat, plus the amount consumed in heterotrophic respiration (respiration by microbes, converting organic matter back into atmospheric CO₂). The carbon balance can be changed considerably by human activities and land use changes, and by climate changes. Since the pools and fluxes are large (NPP 50-60 GtC per year), any perturbations that affect photosynthesis or photorespiration can have a significant effect on the atmospheric concentration of CO₂.</p>
Newton's law of universal gravitation	<p>All bodies attract each other with what is called gravitational attraction. This applies to the largest stars as well as the smallest particles of matter.</p> <p>The force of attraction between two small bodies (or between two spherical bodies of any size) is proportional to the product of their masses and inversely proportional to the square of the distance between their centers. In other words, the closer two bodies are to each other, the greater their mutual attraction. As a result, to stay in orbit, a satellite needs more speed in a low than a high orbit.</p> <p>Kepler's three laws of planetary motion, which had been derived empirically by Johannes Kepler, were obtained with mathematical rigor as a consequence of Newton's law of universal gravitation in conjunction with his three laws of motion. See Kepler's three laws of motion.</p>
Newton's laws of motion	<p>Newton's three laws of motion are:</p> <ol style="list-style-type: none"> 1. Every body continues in a state of uniform motion in a straight line unless acted upon by some external force. 2. The time rate of change of momentum (mass x velocity) is proportional to the impressed force. In the usual case where the mass does not change, this law can be expressed in the familiar form: force = mass x acceleration or $F = ma$. 3. To every force or action, there is always an equal and opposite reaction. <p>Kepler's three laws of planetary motion, which had been derived empirically by Johannes Kepler, were obtained with mathematical rigor as a consequence of Newton's law of universal gravitation in conjunction with his three laws of motion. See Kepler's three laws of motion.</p>
NGDC	National Geophysical Data Center, located in Boulder, Colorado. See National Oceanic and Atmospheric Administration.
Nimbus Satellite Program	A NASA program to develop observation systems meeting the research and development requirements of atmospheric and Earth scientists. The Nimbus satellites, first launched in 1964, carried a number of instruments: microwave radiometers, atmospheric sounders, ozone mappers, the Coastal Zone Color Scanner (CZCS), infrared radiometers, etc. Nimbus-7, the last in the series, provided significant global data on sea-ice coverage, atmospheric temperature, atmospheric chemistry (i.e. ozone distribution), the Earth's radiation budget, and sea-surface temperature. See Total Ozone Mapping Spectrometer (TOMS).
nitrogen dioxide nitrogen oxides (NOx)	A gas consisting of one atom of nitrogen and two atoms of oxygen. Gases consisting of one molecule of nitrogen and varying numbers of oxygen molecules. Nitrogen oxides are produced in the emissions of vehicle exhausts and from power stations. In the atmosphere, nitrogen oxides can contribute to formation of photochemical ozone (smog), can impair visibility, and have health consequences; they are thus considered pollutants.
nitrous oxide (N₂O)	A powerful greenhouse gas with a global warming potential of 320. Major sources of nitrous oxide include soil cultivation practices, especially the use of commercial and organic fertilizers, fossil fuel combustion, nitric acid production, and biomass burning.
NODC	National Oceanographic Data Center, located in Washington, D.C. See National Oceanic and Atmospheric Administration.
North Atlantic Oscillation (NAO)	A large see-saw in atmospheric mass between the subtropical high located near the Azores and the sub-polar low near Iceland. See Atlantic Rhythms
NRA	NASA Research Announcement.
NSF	National Science Foundation.
NSFNET	National Science Foundation NETWORK.

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