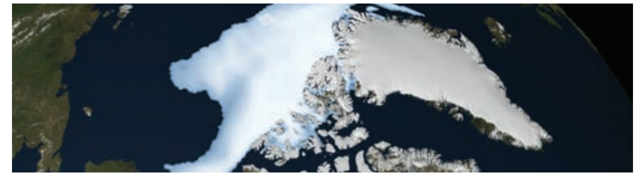
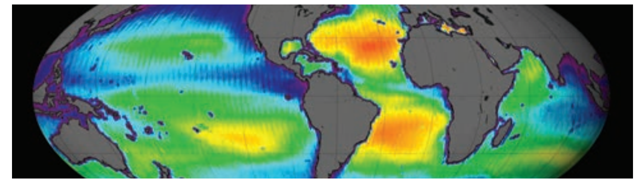
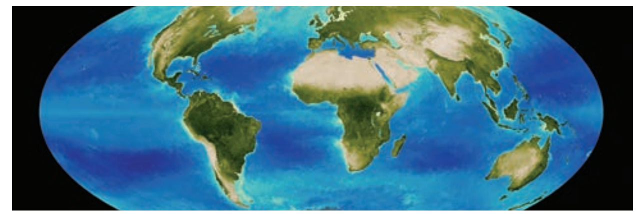
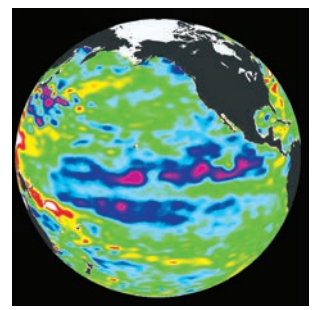
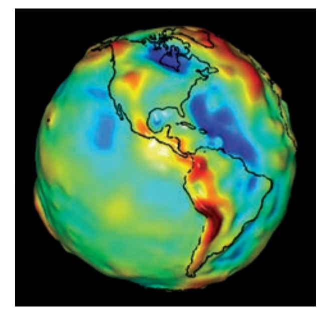
National Aeronautics and Space Administration

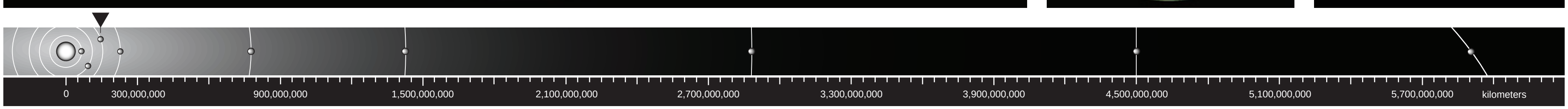












Earth

Earth, our home planet, is the only planet in our solar system known to harbor life — life that is incredibly diverse. All the things we need to survive exist under a thin layer of atmosphere that separates us from the cold, airless void of space.

Earth is made up of complex, interactive systems that create a constantly changing world that we are striving to understand. From the vantage point of space, we are able to observe our planet globally, using sensitive instruments to understand the delicate balance among its oceans, air, land, and life. NASA satellite observations help study and predict weather, drought, pollution, climate change, and many other phenomena that affect the environment, economy, and society.

Earth is the third planet from the Sun and the fifth largest in the solar system. Earth's diameter is just a few hundred kilometers larger than that of Venus. The four seasons are a result of Earth's axis of rotation being tilted 23.45 degrees with respect to the plane of Earth's orbit around the Sun. During part of the year, the northern hemisphere is tilted toward the Sun and the southern hemisphere is tilted away, producing summer in the north and winter in the south. Six months later, the situation is reversed. When spring and fall begin, both hemispheres receive roughly equal amounts of solar illumination.

Earth's global ocean, which covers nearly 70 percent of the planet's surface, has an average depth of about 4 kilometers (2.5 miles). Fresh water exists in the liquid phase only within a narrow temperature span — 0 to 100 degrees Celsius (32 to 212 degrees Fahrenheit). This span is especially narrow when contrasted with the full range of temperatures found within the solar system. The presence and distribution of water vapor in the atmosphere is responsible for much of Earth's weather.

Near the surface, an atmosphere that consists of 78 percent nitrogen, 21 percent oxygen, and 1 percent other ingredients envelops us. The atmosphere affects Earth's long-term climate and short-term local weather, shields us from much of the harmful radiation coming from the Sun, and protects us from meteors as well — most of which burn up before they can strike the surface as meteorites. Our planet's rapid rotation and molten nickel–iron core give rise to a magnetic field, which the solar wind distorts into a teardrop shape in space. (The solar wind is a stream of charged particles continuously ejected from the Sun.) When charged particles from the solar wind become trapped in Earth's magnetic field, they collide with air molecules above our planet's magnetic poles. These air molecules then begin to glow, and are known as the aurorae — the northern and southern lights.

Earth's lithosphere, which includes the crust (both continental and oceanic) and the upper mantle, is divided into huge plates that are constantly moving. For example, the North American plate moves west over the Pacific Ocean basin, roughly at a rate equal to the growth of our fingernails. Earthquakes result when plates grind past one another, ride up over one another, collide to make mountains, or split and separate. Unifying centuries of Earth sciences studies, the theory of motion of lithospheric plates was developed within only the last 47 years.

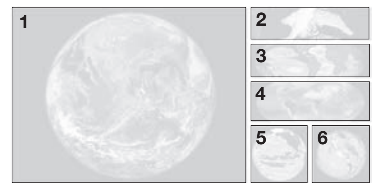
FAST FACTS

Mean Distance from the Sun	149.60 million km (92.96 million mi) (1 astronomical unit)
Orbit Period	365.26 days
Orbit Eccentricity (Circular Orbit = 0)	0.0167
Orbit Inclination to Ecliptic	0.00005 deg
Inclination of Equator to Orbit	23.45 deg
Rotation Period	23.93 hr
Successive Sunrises	24.00 hr
Equatorial Radius	6,378 km (3,963 mi)
Mass	5.9737×10^{24} kg
Density	5.515 g/cm^3
Gravity (Global Average)	9.8 m/sec^2 (32.15 ft/sec^2)
Atmosphere Primary Components	nitrogen, oxygen
Surface Temperature Range	–88 to 58 deg C (–126 to 136 deg F)
Known Moons	1
Rings	0

SIGNIFICANT DATES

1960 — NASA launches the Television Infrared Observation Satellite (TIROS), the first weather satellite.
1972 — The Earth Resources Technology Satellite 1 (renamed Landsat 1) is launched.
1987 — NASA's Airborne Antarctic Ozone Experiment helps determine the cause of the Antarctic ozone hole.
1992 — TOPEX/Poseidon, a U.S.–France mission, begins measuring sea-surface height. Jason 1 continues in 2001.
1997 — TOPEX/Poseidon captures the onset of one of the largest El Niño events of the 20th century.
1997 — The U.S.–Japan Tropical Rainfall Measuring Mission is launched to provide 3-D maps of storm structure.
1999 — Quick Scatterometer (QuikScat) launches in June to measure ocean surface wind velocity; in December the Active Cavity Irradiance Monitor Satellite launches to monitor the total amount of the Sun's energy reaching Earth.
1999–2006 — A series of satellites is launched to provide global observations of the Earth system: Terra (land, oceans, atmosphere), Aqua (water cycle), Aura (atmospheric chemistry) CloudSat (clouds), and the Cloud–Aerosol Lidar and Infrared Pathfinder Satellite Observation mission (aerosols, clouds).
2002 — The Gravity Recovery and Climate Experiment launches to monitor mass variations associated with land features and water movement.
2006 — The Antarctic ozone hole was the largest yet observed.
2007 — Arctic sea ice reaches the all-time minimum since satellite records began.
2008 — The third U.S.–France mission to measure sea-level height, Ocean Surface Topography Mission/Jason 2, is launched, doubling global data coverage.
2009 — NASA and Japan release the most accurate topographic map of Earth.
2011 — NASA launches Aquarius, its first instrument to measure the salinity of the global oceans.

ABOUT THE IMAGES



1 A "blue marble" composite image of Earth taken by NASA's Suomi National Polar-orbiting Partnership (NPP) satellite.

2 Studies show the oldest and thickest sea ice in the Arctic is disappearing even faster than younger and thinner ice at the fringe of the polar ice cap.

3 Color-coded data from Aquarius reveal the Atlantic Ocean's high salinity (orange), due in part to high evaporation, and the Pacific's low salinity (blue) along the tropical rain belt.

4 This map of the global biosphere shows plant growth (green) and phytoplankton (blue green).

5 Sea-level-measuring satellites track El Niño and La Niña in the Pacific; the blue area in this color-coded image shows La Niña (low sea level/cold water) in April 2008.

6 This visualization of a gravity model shows variations in Earth's gravity field across North and South America. Red indicates areas where gravity is stronger.

FOR MORE INFORMATION

solarsystem.nasa.gov/earth

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