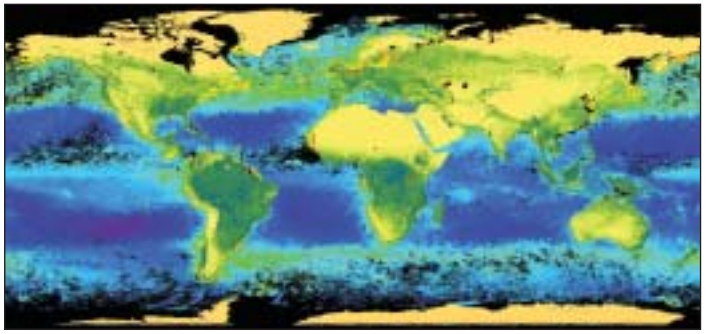
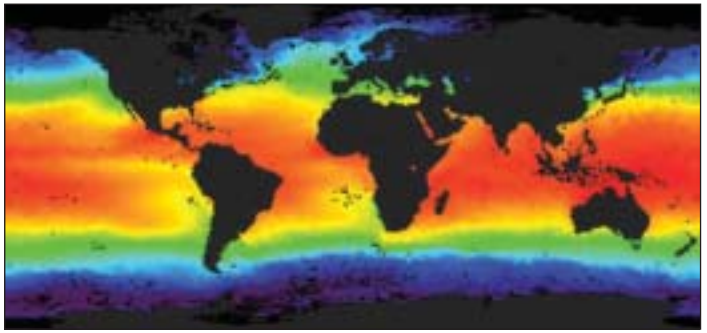
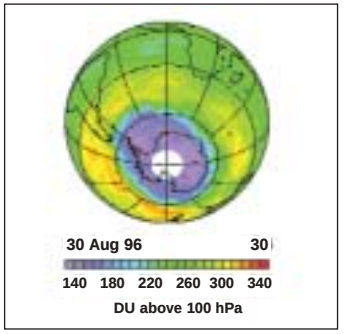
National Aeronautics and
Space Administration

Earth







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EARTH, our home planet, is the only planet in our solar system known to harbor life—life that is incredibly diverse. All of the things we need to survive are provided under a thin layer of atmosphere that separates us from the uninhabitable void of space. Earth is made up of complex, interactive systems that are often unpredictable. Air, water, land, and life—including humans—combine forces to create a constantly changing world that we are striving to understand.

Viewing Earth from the unique perspective of space provides the opportunity to see Earth as a whole. Scientists around the world have discovered many things about our planet by working together and sharing their findings.

Some facts are well known. For instance, 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 more than 23 degrees.

Oceans at least 4 km deep cover nearly 70 percent of Earth's surface. Fresh water exists in the liquid phase only within a narrow temperature span (0 degrees to 100 degrees Celsius). This temperature 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 ocean of air that consists of 78 percent nitrogen, 21 percent oxygen, and 1 percent other ingredients envelops us. This atmosphere affects Earth's long-term climate and short-term local weather; shields us from nearly all harmful radiation coming from the Sun; and protects us from meteors as well—most of which burn up before they can strike the surface. Satellites have revealed that the upper atmosphere actually swells by day and contracts by night due to solar activity.

Our planet's rapid spin and molten nickel-iron core give rise to a magnetic field, which the solar wind distorts into a teardrop shape. The solar wind is a stream of charged particles continuously ejected from the Sun. The magnetic field does not fade off into space, but has definite boundaries. 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, or the Northern and Southern Lights.

Earth's land surfaces are also in motion. For example, the North American continent continues to move 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. These movements are known as plate tectonics. Developed within the last 30 years, this explanation has unified the results of centuries of study of our planet, long believed to be unmoving.

From the vantage point of space we are able to observe our planet globally, as we do other planets, using similar sensitive instruments to understand the delicate balance among its oceans, air, land, and life.

Fast Facts

Mean Distance from Sun	149,597,890 km (1 astronomical unit, or AU)
Orbital Period	365.26 days
Orbital Eccentricity	0.0167
Orbital Inclination to Ecliptic	0.00005°
Inclination of Equator to Orbit	23.45°
Rotational Period	23 h 56 m
Diameter	12,756 km
Mass	5.9742×10^{27} g
Density	5.515 g/cm^3
Gravity	980 cm/s^2
Atmosphere (primary components)	78% nitrogen, 21% oxygen, 1% other
Mean Temperature at Surface	15 °C
Number of Moons	1
Number of Rings	0

Significant Dates

1957 *Sputnik* (U.S.S.R.) becomes Earth's first artificial satellite.
1960 NASA launches *Tiros*, first weather satellite.
1968 *GOES* series of weather satellites begins.
1972 *Landsat* satellite series begins to observe Earth's land surfaces.
1991 *UARS* provides evidence that human-made chemicals are responsible for the Antarctic ozone hole.
1992 U.S./French satellite *TOPEX/Poseidon* details links between Earth's oceans and climate.
1999 *Terra* Earth-observing satellite begins studying global climate change.
2000 *Shuttle Radar Topography Mission (SRTM)* maps 80 percent of Earth's surface at 30-meter resolution.

About the Images

(Left) Earth is an ocean planet. The complex interplay between oceans and air affects our climate and weather (NOAA *GOES-7* false color).
(Right, top) Plants use chlorophyll during photosynthesis. Chlorophyll concentrations around the world indicate the distribution and abundance of vegetation. Since most animal life relies on vegetation for nutrition, directly or indirectly, these images are snapshots of Earth's biosphere (*SeaWiFS*).
(Right, center) The temperatures of the surfaces of Earth's seas are used to help us predict weather patterns, to track ocean currents, and to monitor El Niño and La Niña. Warm water (red) is higher, while cold water (blue) is lower (*Advanced Very High Resolution Radiometer [AVHRR]*).
(Right, bottom left) Spaceborne radar allows us to observe regions that are hard to reach. This false-color radar image of central Africa shows the Virunga Volcano chain along the borders of Rwanda, Zaire, and Uganda. This area is home to the endangered mountain gorillas (*Shuttle Imaging Radar-C*).
(Right, bottom right) Global maps of ozone in Earth's stratosphere show the role of chlorine monoxide in the destruction of stratospheric ozone, especially over the cold polar regions (*Microwave Limb Sounder on Upper Atmosphere Research Satellite*).

References
1) Destination Earth: NASA's Earth Science Enterprise: *http://earth.nasa.gov*
2) NASA Earth Observatory: *http://earthobservatory.nasa.gov*

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