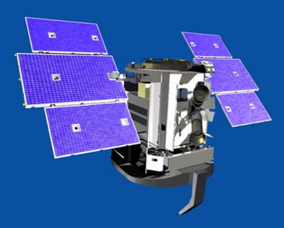
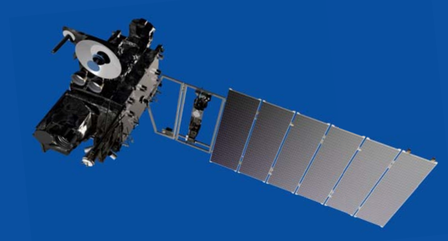
Wild World of Clouds

CLOUDSAT



GOES-R



Studying Clouds from Space

Satellites in orbit above Earth provide images and other information about the atmosphere and enable weather forecasters and climatologists to do their jobs.

CloudSat, a NASA Earth-observing satellite, uses radar to see inside the clouds from top to bottom. CloudSat measures their thickness, their altitude at top and bottom, their reflective properties, and their water and ice content. Data from CloudSat is used to improve our ability to accurately forecast the weather and improve long-term global climate predictions.

GOES-R is a new satellite, the first one planned for launch in 2015. Geostationary Operational Environmental Satellites (GOES) orbit 22,300 miles (35,888 kilometers) above Earth's equator. They orbit once per day as Earth rotates. Thus the GOES look down upon the same part of Earth all the time. One GOES primarily watches the east coast of the U.S. and one GOES watches the west coast. They observe weather developments, including ocean temperatures, and help forecasters warn people of developing storms, such as hurricanes. The new GOES-R will replace the current GOES. GOES-R will be able to do everything the GOES do, and more. GOES-R will gather more detailed, accurate images and other data faster than ever. It will be able to map where lightning strikes are occurring, even in the daytime.

Reading the Clouds

Clouds, which are collections of water droplets, are beautiful and fun to watch. If we learn to "read" them, we can know what is happening at different levels of the atmosphere and what kind of weather may be on the way. Clouds are classified by their shape or appearance and their height above the ground.

High clouds start above around 20,000 feet (6,000 meters). They often look thin and patchy or feathery. Their names start with "cirro," which means "curl of hair" in Latin:

- **Cirrus** clouds look like delicate strands or hooks. They are made mostly of ice crystals.
- **Cirrocumulus** are thin, patchy clouds that may have rippled or wavelike patterns.
- **Cirrostratus** are thin, sheet-like clouds that cover most of the sky.

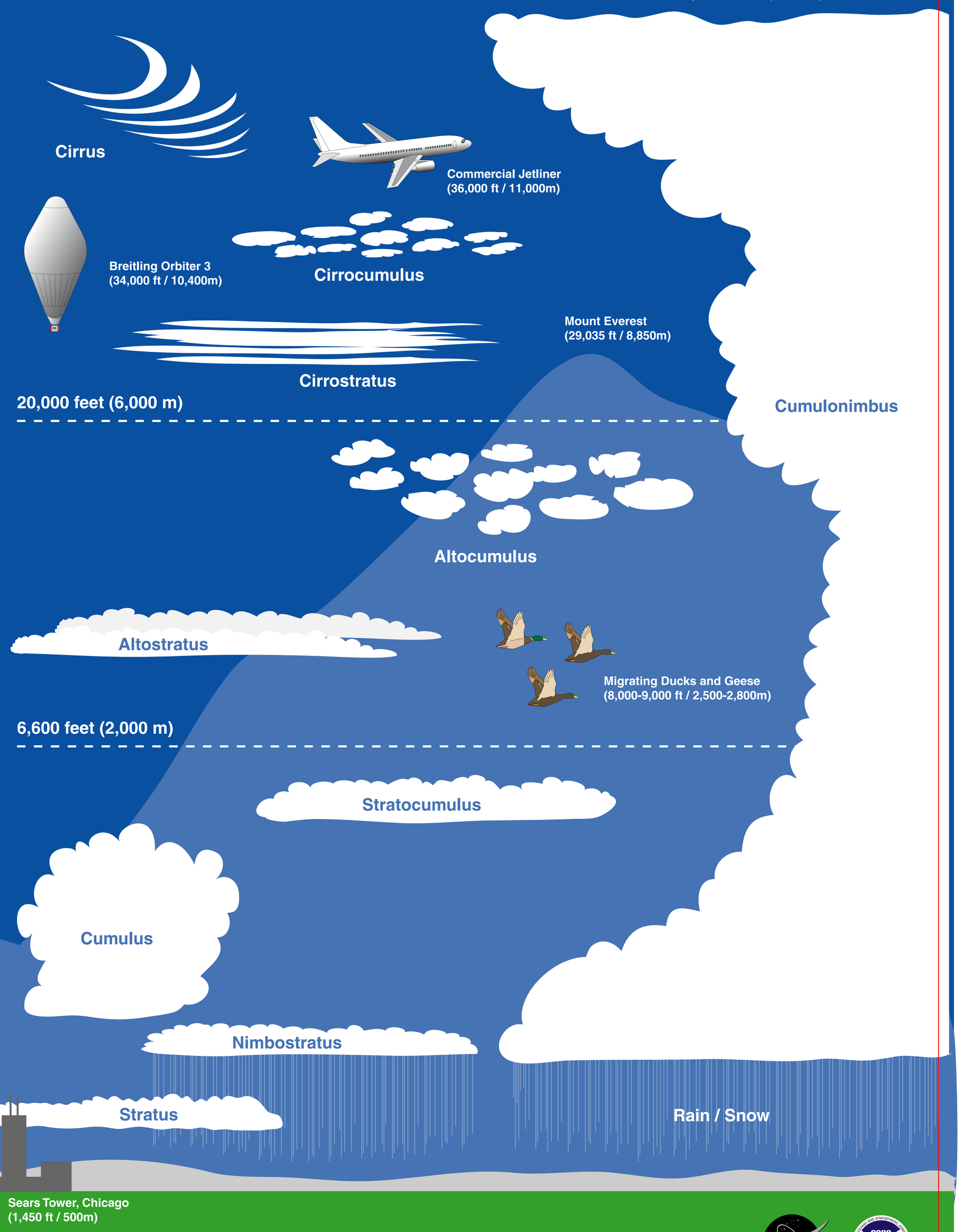
Mid-level clouds form from 6,500 feet (2,000 meters) to 20,000 feet (6,000 meters). They usually look rather flat and layered, because the air at these altitudes doesn't move very much vertically. Their names always start with "alto":

- **Altocumulus** are white or gray puffy, patchy clouds with spaces between them. They may appear to be lined up in rows.
- **Altostratus** form a gray or bluish-gray uniform-looking layer that covers much or most of the sky.

Low-level clouds are found below about 6,500 feet (2,000 meters). They are either flat and layered or rounded on top, with flat bases:

- **Stratocumulus** have distinct gray or whitish rounded patches. They may look rolling or puffy, but are often merged together into layers with no spaces between them.
- **Cumulus** clouds are fluffy and cauliflower-like, with rounded white tops and flat grayish bases.
- **Stratus** form a flat, thin, uniform cloud layer. They usually contain insufficient water to produce significant rain or snow. Stratus clouds that reach down to the ground we call fog.
- **Nimbostratus** are dark, gray clouds that are dropping rain or snow. They usually cover the entire sky. Sometimes nimbostratus are found higher in the atmosphere, in the mid-altitudes.

Cumulonimbus clouds are the kings of all clouds, rising from low altitudes to more than 60,000 feet (20,000 meters) above ground level. They grow due to rising air currents called updrafts, with their tops flattening out into an anvil shape. Cumulonimbus are a sure sign of severe weather, with heavy rain and possibly hail.



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