

TROPOSPHERE

Ground Level - 10 km



Credit: David Kratz/NASA

Cumulonimbus Clouds

AKA thunderclouds, they may extend into the stratosphere.

Altitude: 2-12 km

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TROPOSPHERE

Ground Level - 10 km



Credit: UCAR

Altocumulus Clouds

These usually form in groups & are ~1 km thick.

Altitude: 5.5 km

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Ground Level - 10 km



Credit: UCAR

Nimbostratus Clouds

These vast, dark gray, low clouds mean rain or snow!

Altitude: 2-4 km

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Ground Level - 10 km



Credit: UCAR

Cirrocumulus Clouds

These small, rounded puffs of clouds can look like fish-scales.

Altitude: 5-12 km

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TROPOSPHERE

Ground Level - 10 km



Credit: Lisa Gardiner

Cirrus Clouds

These ice crystal clouds look like long wispy streamers.

Altitude: 5 - 15 km

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TROPOSPHERE

Ground Level - 10 km



Credit: Carlye Calvin/NASA

Stratocumulus Clouds

A common sky visitor, they often form well-defined lumps or patches.

Altitude: .5-2 km

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TROPOSPHERE

Ground Level - 10 km



Credit: Carlye Calvin/UCAR

Cumulus Clouds

Puffy, they form when water vapor rises from earth & condenses.

Altitude: 1.8 km

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TROPOSPHERE

Ground Level - 10 km



Credit: Sara Martin

Stratus Clouds

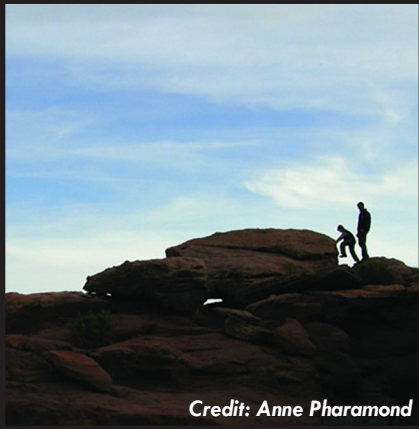
Fog-like, low and gray, sometimes drizzle falls from these clouds.

Altitude: 0-2 km

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TROPOSPHERE

Ground Level - 10 km



Credit: Anne Pharamond

Cirrostratus Clouds

The sun & moon may shine through these & form a halo.

Altitude: 3-6 km

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Ground Level - 10 km



Credit: NASA

Altostratus Clouds

Mid-level gray or blue-gray clouds that often cover the sky.

Altitude: 2-7 km

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Ground Level - 10 km



Credit: Gregory Thompson

Mammatus

These pouches of cloud form under storm clouds.

Altitude: 5-15 km

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Ground Level - 10 km



Credit: DarlArthurS

Hot Air Balloons

A sheep, a duck, and a rooster were the first balloonists!

Altitude: .3-1 km

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TROPOSPHERE

Ground Level - 10 km



Credit: Charles James Sharp

Rüppell's Griffon Vulture

This endangered bird is the highest flying on record.

Altitude: 11 km

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TROPOSPHERE

Ground Level - 10 km



Credit: Emily Webster

Helicopter

Founded in 1955, Whirly-Girls supports women in helicopter aviation world-wide.

Altitude: 3-7.6 km

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TROPOSPHERE

Ground Level - 10 km



Credit: Artemy Voikhansky

Common Crane

These may migrate over the Himalayas to reach summer nesting spots!

Altitude: 10 km

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TROPOSPHERE

Ground Level - 10 km



Credit: Ivar Leidus

Bumblebees

Some species of bumblebee occur naturally as high as 5,600 m in the Himalayas.

Altitude: 5.6 km

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STRATOSPHERE

10 km - 50 km



Credit: Quintin Soloviev

Commercial Jets

They fly up into the calm stratosphere to avoid wind & weather.

Altitude: 9-13 km

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STRATOSPHERE

10 km - 50 km



Credit: Gary Chalker Getty

U-2 "Dragon Lady" Spy Plane

First flown in the 1950's, this spy plane also does science research.

Altitude: 21 km

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STRATOSPHERE

10 km - 50 km



Credit: US Navy

F/A-18 Hornet

A supersonic fighter jet can create a cloud when it breaks the sound barrier.

Altitude: 11 km

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STRATOSPHERE

10 km - 50 km



Credit: Eduard Marmet

Concorde Supersonic Plane

The concorde could cross the Atlantic in 3.5 hours.

Altitude: 5.5 km

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STRATOSPHERE

10 km - 50 km



Credit: NASA/Lamont Poole

Polar Stratospheric Clouds

Polar winter visitors, they diffract sunlight in rainbow hues.

Altitude: 15-25 km

STRATOSPHERE

10 km - 50 km



Credit: National Archives

SR-71 Blackbird

Lockheed's highest flying, manned spacecraft retired in 1999.

Altitude: 25.9 km

STRATOSPHERE

10 km - 50 km



Credit: DTU Space, Daniel Schmelling

Blue Jets

Special lightning that goes up into the stratosphere instead of down to Earth!

Altitude: Up to 50 km

STRATOSPHERE

10 km - 50 km



Credit: NASA

Weather Balloons

This NASA balloon named ASTHROS is the size of a football stadium.

Altitude: 40 km

MESOSPHERE

50 km - 85 km



Credit: Veres Viktor (NASA)

Noctilucent Clouds

Best seen just after sunset, “noctilucent” means night-shining.

Altitude: 80-85 km

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MESOSPHERE

50 km - 85 km



Credit: NASA/Jingyi Zhang & Wang Zheng

Aurora

These many-hued scarves of light delight viewers at both of Earth's poles.

Altitude: 80-500 km

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MESOSPHERE

50 km - 85 km



Credit: Stephen Hummel

Red Sprites

Lightning sprites are mysterious electrical discharges.

Altitude: 80 km

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MESOSPHERE

50 km - 85 km



Credit: NASA

Meteors

The light from space debris that burns up on hitting the mesosphere.

Altitude: 50-85 km

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MESOSPHERE

50 km - 85 km



Credit: NASA/Wallops

Sounding Rockets

Student research projects have been carried on these!

Altitude: 20 to 113 km

MESOSPHERE

50 km - 85 km



Credit: NASA

Falcon 9

Built by SpaceX, the first reusable rocket to travel to the ISS & back!

Altitude: 80 km

MESOSPHERE

50 km - 85 km



Credit: NASA Johnson Space Center

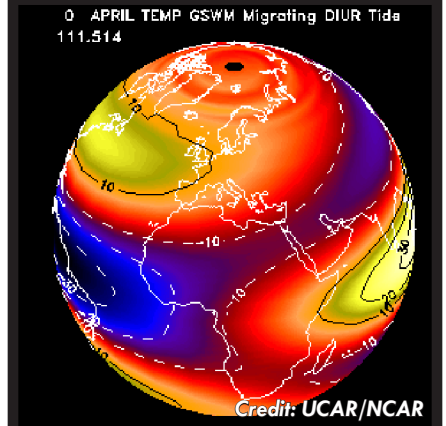
Airglow

This faint light is emitted by our atmosphere, here seen from the ISS.

Altitude: 50 - 300 km

MESOSPHERE

50 km - 85 km



Tides & Waves

Like our ocean, the Mesosphere has tides and waves which move air.

Altitude: 80-120 km

THERMOSPHERE

85 km - 740 km



Credit: NASA

Space Shuttle

It supported ISS development, ferrying cargo & crew to and from Earth.

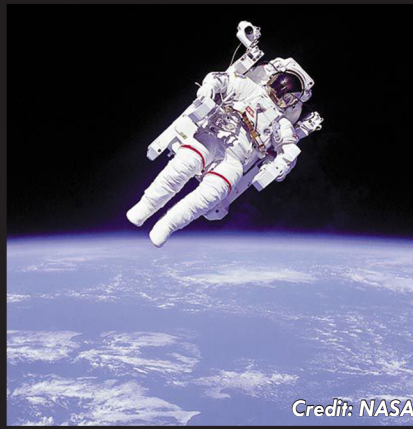
Altitude: 304-528 km

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THERMOSPHERE

85 km - 740 km



Credit: NASA

Space Walk

ISS astronauts go on walks as long as 8 hours, depending on the job.

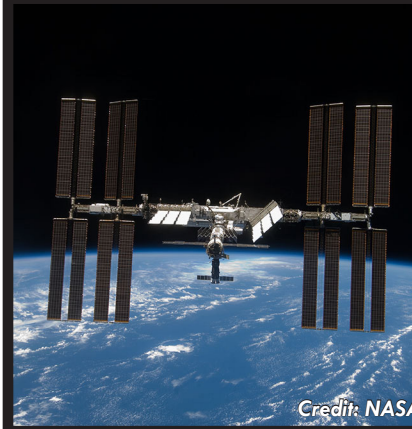
Altitude: 317 km

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THERMOSPHERE

85 km - 740 km



Credit: NASA

International Space Station

Multi-national science teams work together to understand our planet & beyond.

Altitude: 408 km

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THERMOSPHERE

85 km - 740 km



Credit: NASA

Hubble Telescope

Bus-sized & solar-powered, Hubble takes vivid images of planets, stars & galaxies.

Altitude: 547 km

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THERMOSPHERE

85 km - 740 km



Credit: Surrey Satellite Technology Ltd/UCAR

COSMIC-2

Six satellites work in tandem gathering space & weather research.

Altitude: 80 - 250 km

THERMOSPHERE

85 km - 740 km



Credit: NASA/Birkeland Centre for Space Science, Daniel Schmelling/Mount Visual

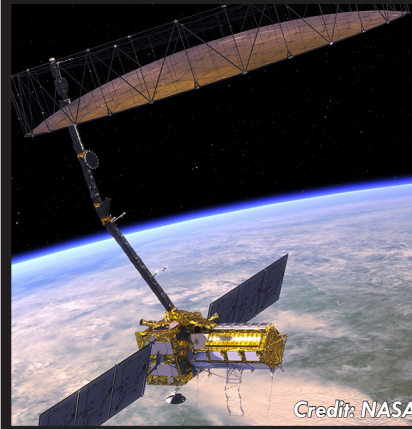
ELVES

These dim, expanding, glowing red rings appear briefly above thunderstorms.

Altitude: 100 km

THERMOSPHERE

85 km - 740 km



Credit: NASA

NASA NISAR Probe

A joint mission with the USA & India to observe climate change.

Altitude: 740 km

THERMOSPHERE

85 km - 740 km



Credit: NASA

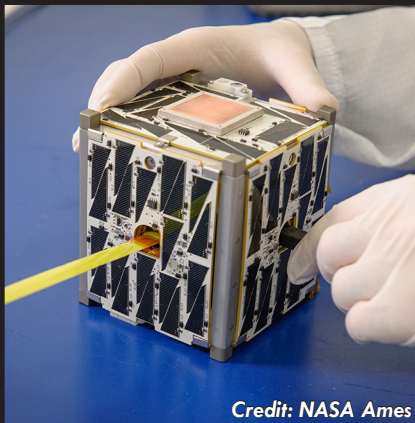
Van Allen Probes

Studied interactions between Earth and space weather driven by the sun.

Altitude: 618-37,000 km

EXOSPHERE

740 km - 1,140+ km



Credit: NASA Ames

Cube Satellites

These mini-science labs can be as small as a jewelry box!

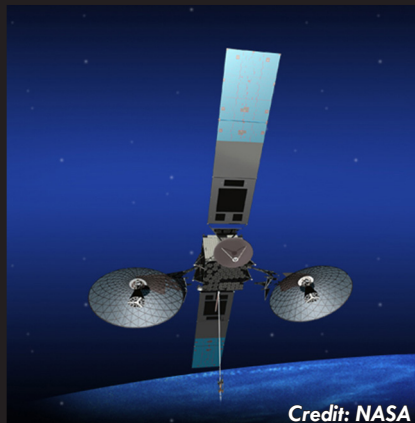
Altitude: 600-800 km

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EXOSPHERE

740 km - 1,140+ km



Credit: NASA

TRDS Satellites

These satellites carry equipment that can see through clouds.

Altitude: 37,000 km

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EXOSPHERE

740 km - 1,140+ km



Credit: NASA

NOAA 15

This environmental research satellite has orbited Earth over 100,000 times!

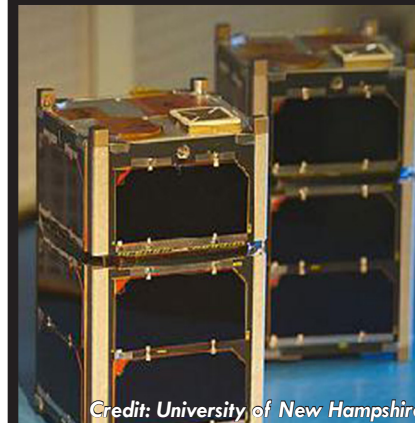
Altitude: 810 km

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EXOSPHERE

740 km - 1,140+ km



Credit: University of New Hampshire

FIREBIRD Satellites

University students explore space data from these 10cm x 10cm CubeSats.

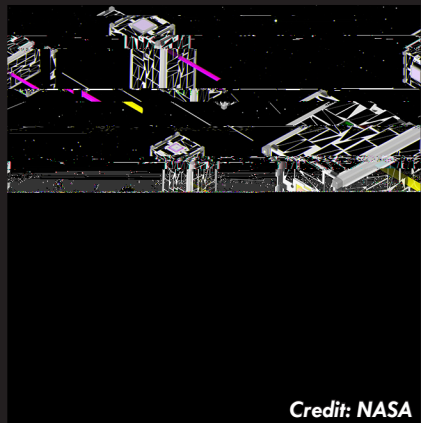
Altitude: 886 km

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EXOSPHERE

740 km - 1,140+ km



Credit: NASA

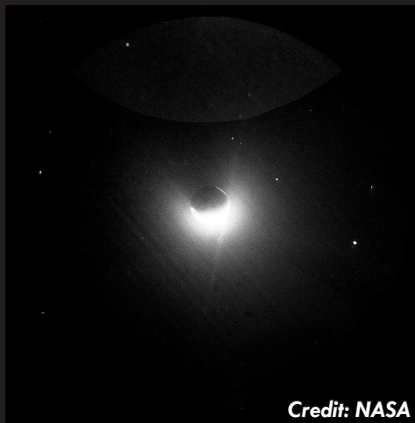
SODA Swarm Satellites

This collection of small cubesats under development will orbit in formation.

Altitude: 600-800 km

EXOSPHERE

740 km - 1,140+ km



Credit: NASA

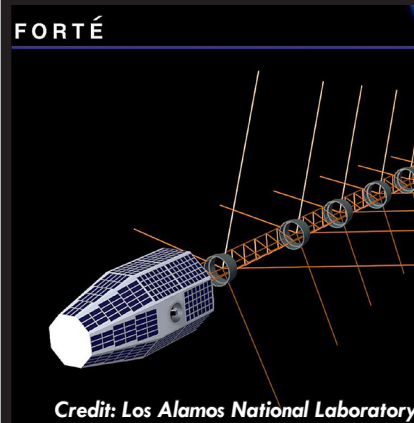
Geocorona

The luminous, outermost region of the exosphere, here seen by Apollo 16.

Altitude: 60,000 km

EXOSPHERE

740 km - 1,140+ km



Credit: Los Alamos National Laboratory

FORTÉ

This satellite studies lightning from space and the ionosphere.

Altitude: 800 km

EXOSPHERE

740 km - 1,140+ km



Credit: NASA/JPL

Jason 2

This satellite studied ocean topography, sea-level rise and climate change.

Altitude: 1,336 km

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TROPOSPHERE

Ground Level - 10 km

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STRATOSPHERE

10 km - 50 km

© EUREKUS/UCAR 2021

MESOSPHERE

50 km - 85 km

© EUREKUS/UCAR 2021

THERMOSPHERE

85 km - 740 km

© EUREKUS/UCAR 2021

EXOSPHERE

740 km - 1,140+ km
