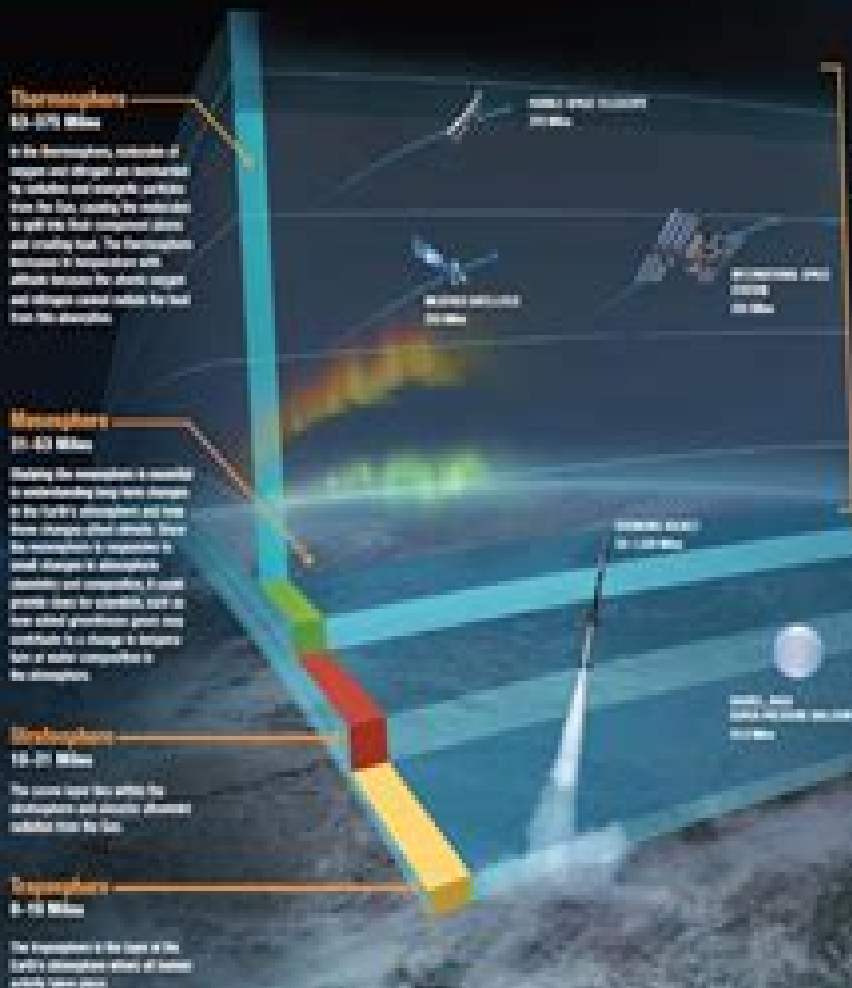


# Upper Atmosphere

The Earth's atmosphere has four primary layers: the troposphere, stratosphere, mesosphere, and thermosphere. These layers protect our planet by absorbing harmful radiation.



## Thermosphere

85-575 Miles

In the thermosphere, molecules of oxygen and nitrogen are ionized by solar radiation. This ionization produces free electrons, which, along with ions, create the ionosphere that surrounds the Earth. The thermosphere extends to temperatures with altitude because the atomic oxygen and nitrogen cannot radiate away heat from this atmosphere.

## Mesosphere

51-62 Miles

During the mesosphere, it is possible to see shooting stars, also known as meteors, which are small pieces of rock that burn up in the atmosphere. In addition, the mesosphere is responsible for most changes in atmospheric density and composition. It is the only layer that is stable, and it is the only layer that is not ionized. It is the only layer that is not ionized.

## Stratosphere

10-50 Miles

The lower layer has stable air, which is why the stratosphere and mesosphere exhibit less turbulence than the troposphere.

## Troposphere

0-10 Miles

The troposphere is the layer of the Earth's atmosphere where all weather activity takes place.

## Aeronomy of Ice in the Mesosphere (AIM)

AIM's primary focus is the Mesosphere (50-85 miles), an altitude range right below clouds in the mesosphere. These noctilucent clouds are made of ice crystals that form over the summer pole at an altitude as high as 80 kilometers and in the winter over the equator.



## Ionosphere

The ionosphere is a layer of plasma formed by the ionization of atomic oxygen and nitrogen by highly energetic ultraviolet and x-ray solar radiation. The ionosphere extends from the bottom of the atmosphere up to the magnetosphere. This layer varies daily in the daytime compared to solar radiation causes the ionization of the atoms, but ionization occurs as well in the ionosphere. However, from upper atmospheric layers are still mostly neutral, with only one in a million particles becoming charged daily. At night, the ionosphere mostly collapses in the dark, but some amount of charged atoms remain by cosmic radiation.

## Balloons, Balloons, and Satellites

AIM scientists use balloons to collect in-situ measurements in the atmosphere. However, the mesosphere and thermosphere are too high for balloons to reach, so scientists use instruments on sounding balloons and satellites to gather more detailed measurements of the upper atmosphere.

## Communication

A unique property of the ionosphere is that it can reflect short-wave radio waves, enabling communication over great distances by "bouncing" signals off the actual atmosphere layer. Variability of the ionosphere can interrupt satellite communication, such as errors in GPS signals for commercial air navigation. During solar storms, this layer can even shut down communication between ground stations and satellites.



## Noctilucent Clouds in the Mesosphere

Evidence of change in the behavior of noctilucent clouds has been observed by the AIM mission. Recent data show dramatically less in one context, leading scientists to speculate about changes in weather conditions and pole-to-pole atmospheric circulation.



## BARREL

The Ballot Army for Radiation-Induced Reliability Electric Losses (BARREL) is a balloon-based mission to expand the measurements of NASA's SPO experiment. BARREL seeks to measure the propagation of relativistic electrons from the ionosphere belts during two multi-balloon campaigns operated in the Southern Hemisphere.

# Upper Atmosphere

**JG Myers**



## **Upper Atmosphere:**

Upper Atmosphere: Bestsellers in 2023 The year 2023 has witnessed a remarkable surge in literary brilliance, with numerous captivating novels captivating the hearts of readers worldwide. Lets delve into the realm of bestselling books, exploring the fascinating narratives that have charmed audiences this year. Upper Atmosphere : Colleen Hoovers "It Ends with Us" This heartfelt tale of love, loss, and resilience has gripped readers with its raw and emotional exploration of domestic abuse. Hoover expertly weaves a story of hope and healing, reminding us that even in the darkest of times, the human spirit can prevail. Upper Atmosphere : Taylor Jenkins Reids "The Seven Husbands of Evelyn Hugo" This spellbinding historical fiction novel unravels the life of Evelyn Hugo, a Hollywood icon who defies expectations and societal norms to pursue her dreams. Reids compelling storytelling and compelling characters transport readers to a bygone era, immersing them in a world of glamour, ambition, and self-discovery. Upper Atmosphere : Delia Owens "Where the Crawdads Sing" This evocative coming-of-age story follows Kya Clark, a young woman who grows up alone in the marshes of North Carolina. Owens weaves a tale of resilience, survival, and the transformative power of nature, captivating readers with its evocative prose and mesmerizing setting. These popular novels represent just a fraction of the literary treasures that have emerged in 2023. Whether you seek tales of romance, adventure, or personal growth, the world of literature offers an abundance of captivating stories waiting to be discovered. The novel begins with Richard Papen, a bright but troubled young man, arriving at Hampden College. Richard is immediately drawn to the group of students who call themselves the Classics Club. The club is led by Henry Winter, a brilliant and charismatic young man. Henry is obsessed with Greek mythology and philosophy, and he quickly draws Richard into his world. The other members of the Classics Club are equally as fascinating. Bunny Corcoran is a wealthy and spoiled young man who is always looking for a good time. Charles Tavis is a quiet and reserved young man who is deeply in love with Henry. Camilla Macaulay is a beautiful and intelligent young woman who is drawn to the power and danger of the Classics Club. The students are all deeply in love with Morrow, and they are willing to do anything to please him. Morrow is a complex and mysterious figure, and he seems to be manipulating the students for his own purposes. As the students become more involved with Morrow, they begin to commit increasingly dangerous acts. The Secret History is a masterful and gripping novel that will keep you wondering until the very end. The novel is a cautionary tale about the dangers of obsession and the power of evil.

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