The Clouds Outside My Window

National Weather Service
NOAA

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Written and illustrated by
John Jensenius

With help from Owlie Skywarn

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Whether I'm outdoors or just looking outside, I like to observe the clouds. Each cloud is different and has a different story to tell. In this book, I'll explain some of the basic cloud types and show you some of the clouds I've observed outside my window at the National Weather Service Office in Gray, Maine.

I hope this book will encourage you to observe the sky. You may want to take pictures outside your home or school and make a book of your own. If you do, let me know, so I can see the clouds outside your window.

-- John Jensenius
Meteorologist
National Weather Service

A Look Out My Window

Here's a look out my window. My office is located across the street from the Pineland Farms Equestrian Center which you'll see in many of the cloud pictures. (The black silhouette of the hawk keeps birds from flying into my reflective windows)

What are clouds made of ?

High in the atmosphere where temperatures are very, very cold, most clouds are made of tiny ice crystals. Closer to the ground, the clouds that we see are made of tiny water droplets.

How do clouds form?

In general, there are two ways clouds form. In both cases, though, the clouds form because the air is cooling.

In the atmosphere, rising air cools and sinking air warms. In most cases, the clouds that you see are caused by rising air.

How do clouds form?

Clouds can also form when the air gets colder for other reasons. This can happen overnight when the air is cooling, or when warm air moves over a cold lake or a snow-covered surface.

How are clouds named?

Clouds are classified based on how high they are in the sky, whether they are made up of tiny water droplets or ice crystals, their general appearance, and whether they are producing precipitation.

On the next few pages, I'll explain some of the basic terminology used to classify clouds.

How are clouds named?

Puffy clouds are called cumulus or have the prefix "cumulo."

Clouds that form a layer are called stratus or have the prefix "strato."

Clouds that are made up of ice crystals are called cirrus or have the prefix "cirro."

Clouds that produce precipitation are called nimbus or have the prefix "nimbo."

How are clouds named?

We often need to combine the various cloud terms to accurately describe the clouds we see.

For example, puffy clouds are called cumulus; however, if the cumulus clouds form a layer, they are called stratocumulus.

If those puffy cumulus clouds grow upward high into the sky and produce rain, they are called cumulonimbus clouds.

Types of Low Clouds

LOW	Stratocumulus Cumulus Stratus	

Types of Low Clouds
Stratus

Stratus clouds often form a blanket of low clouds near the ground. They give the sky a dull, gray appearance.

Types of Low Clouds
Stratus - Fog

When stratus clouds form at the ground, we call it fog. If you've ever been in fog, you've been inside a stratus cloud.

Types of Low Clouds
Nimbostratus

These stratus clouds are producing rain. When rain falls from stratus clouds, the clouds are called nimbostratus clouds.

Types of Low Clouds
Stratus – Ground Fog

Sometimes on clear nights, a thin layer of fog forms in the air just above the ground. We call this ground fog. If you can look over the top of the fog, you're above a cloud.

Types of Low Clouds
Cumulus

These puffy, low clouds are cumulus clouds. More specifically, they are called cumulus humulus clouds. They have distinct bottoms and edges and often form on sunny days as air rises in the atmosphere.

Types of Low Clouds
Cumulus

These low clouds are also cumulus clouds. In this case, they are called cumulus fractus and have rough edges, look darker, and usually form on sunny, windy days.

Types of Low Clouds
Stratocumulus

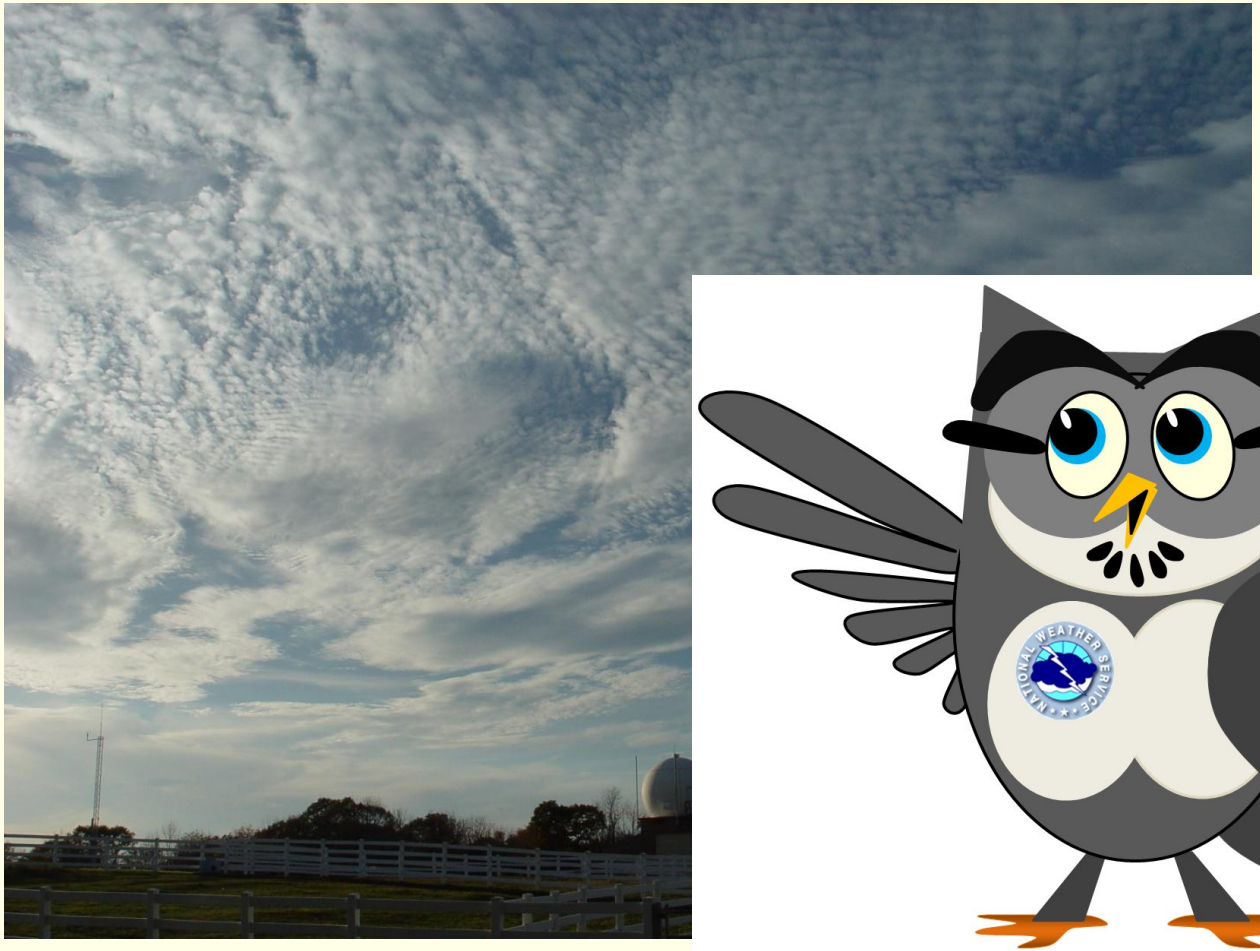
When cumulus clouds form a layer, we call them stratocumulus clouds. Because there are breaks between the clouds, we would say this is a broken layer of stratocumulus.

Types of Middle Clouds

MIDDLE

Altocumulus
Altostratus

Types of Middle Clouds
Altocumulus



These puffy clouds are also cumulus clouds. However, because they are at mid-levels in the sky, we call them altocumulus clouds.

Types of Middle Clouds
Altocumulus

Altocumulus clouds early on a summer morning could be a clue that there might be thunderstorms later in the day.

Types of Middle Clouds
Altostratus

These mid-level clouds are forming a layer across the sky and are called altostratus clouds. Often, you can see the dim sunshine through altostratus clouds.

Types of High Clouds

HIGH		Cirrus Cirrostratus Cirrocumulus

Types of High Clouds
Cirrus

These wispy, high clouds are cirrus clouds. Cirrus clouds are made up of tiny ice crystals. They sometimes resemble the tails of horses.

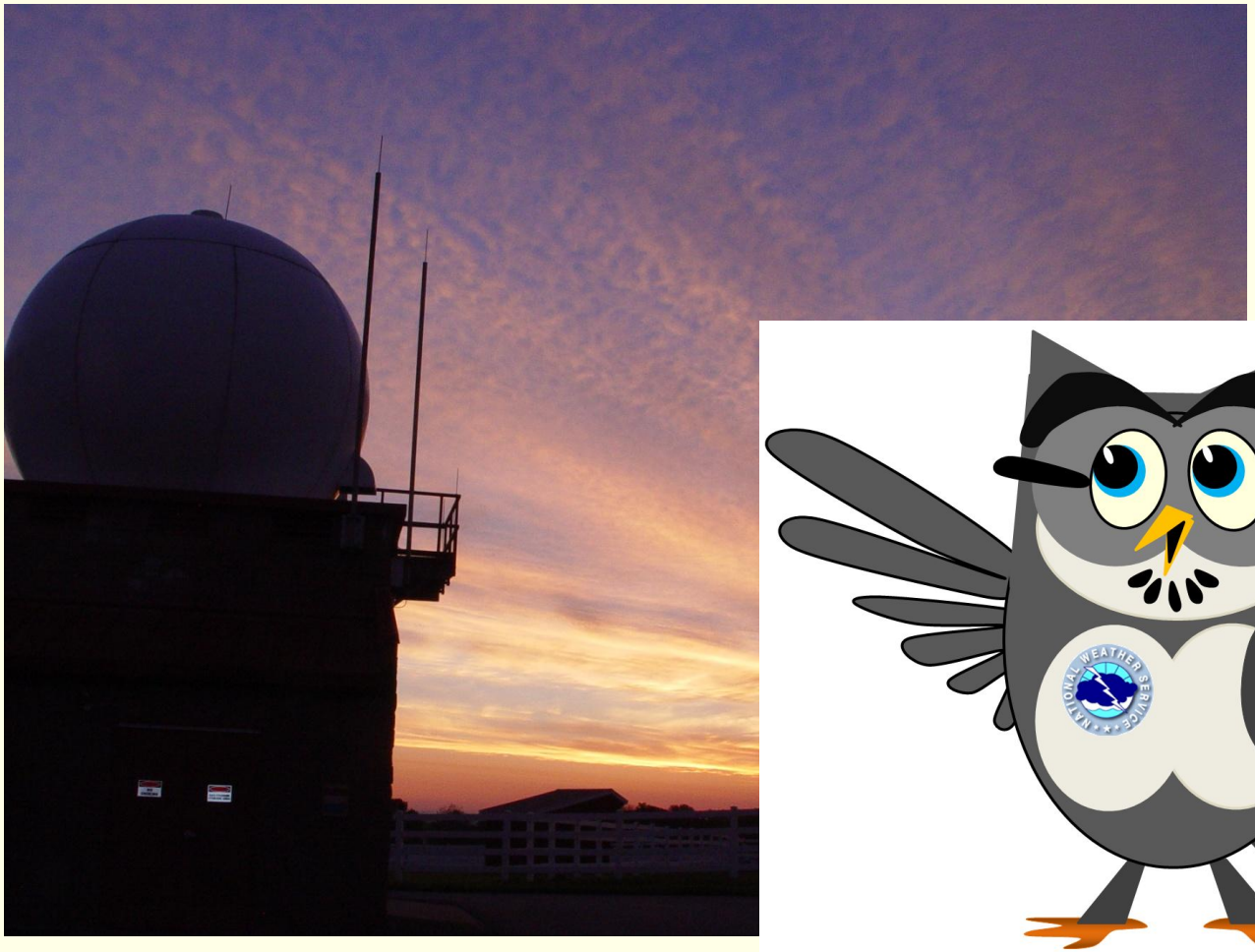
Types of High Clouds
Cirrus

Cirrus clouds are caused by moisture high up in the atmosphere. Their stretched appearance is due to the strong winds at those levels.

High Clouds – Cirrostratus

Cirrus clouds that have formed a layer are called cirrostratus clouds. Sometimes cirrostratus clouds cause a halo around the sun or moon, which can be an indication of an approaching storm.

High Clouds – Cirrocumulus

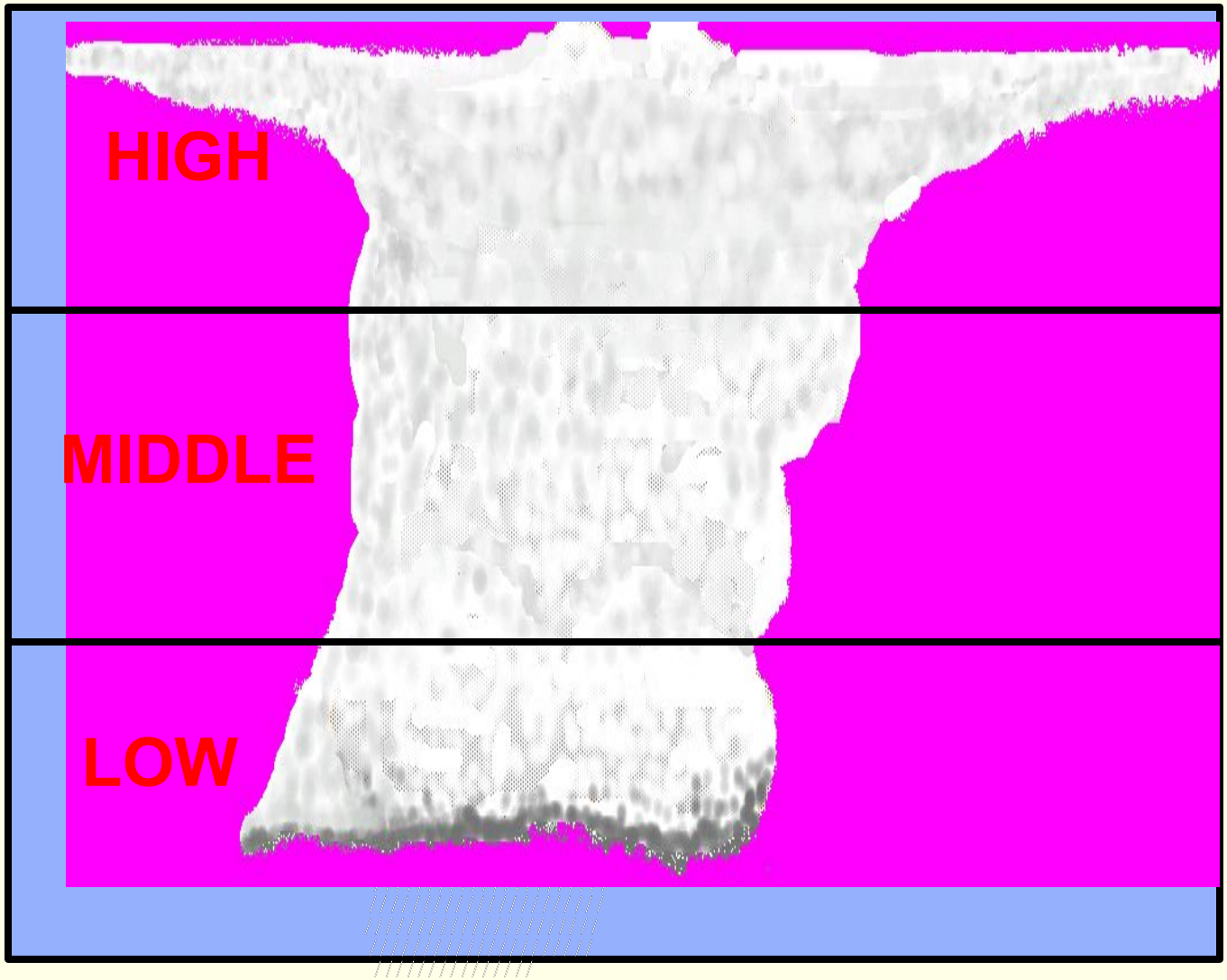


Sometimes puffy cumulus clouds form high in the atmosphere. These are called cirrocumulus clouds and are often most visible at sunrise and sunset.

High Clouds – Contrails

Jets can also cause cirrus clouds to form. The exhaust from the jet engines adds moisture to the air and, under certain conditions, that moisture will form streaks of ice crystals that we call contrails.

Vertically-Developed Clouds



Vertically-Developed Clouds
Cumulonimbus

When cumulus clouds grow high into the atmosphere, they can produce, lightning, thunder and heavy rain. We call thunderstorm clouds cumulonimbus clouds.

Colors In The Sky

Colors In The Sky

Sunlight is made up of all different colors of light.

Some particles in the atmosphere, such as raindrops and ice crystals, act as prisms and separate the sun's light into the various colors.

Other particles cause certain colored light to be scattered in many different directions.

Why is the sky blue?

When sunlight strikes tiny particles high in the sky, the blue portion of the sun's light is scattered in all directions. Because we see the blue light that is scattered toward us from all over the sky, the sky looks blue.

Sunrise Colors

Sunrises and sunsets are red, orange, and yellow for the same reason that the sky is blue. Because the sun's light must travel through more atmosphere at sunrise and sunset, the violet, blue, and green light gets scattered in other directions by particles in the atmosphere, leaving only the red, orange and yellow light.

Sunrise Colors

Sometimes, high- and mid-level clouds reflect the yellow, orange, and red light from the sun at sunrise or sunset.

Sunset Colors

Clouds at sunset are colored for the same reason as they are at sunrise. Beautiful sunsets often occur when the sky to the west is clearing. In this case, there were clouds overhead and rain (and a rainbow) just to the east.

Rainbows

Rainbows are caused when raindrops act like little prisms and separate the sun's light into the various colors that we see as a rainbow. For the main rainbow, the red is on the outside, followed by orange, yellow, green, and blue, indigo, and violet (if visible).

Rainbows

In some cases, the raindrops can cause a secondary rainbow. In this case, the secondary rainbow is barely visible. The colors are reversed for secondary rainbows, and the sky between rainbows is darker than either side.

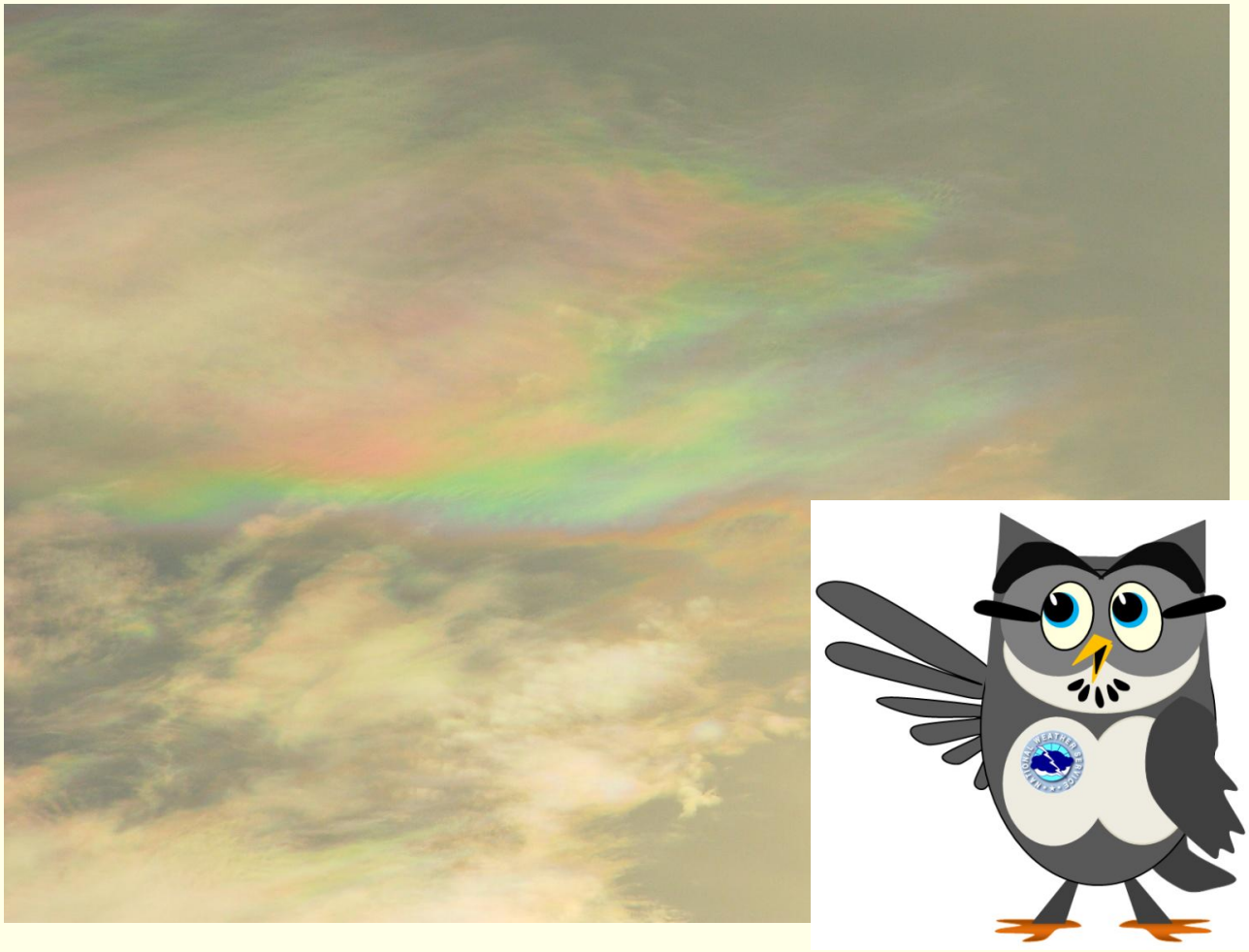
Sundogs

Ice crystals can also act as prisms to separate the sun's light. In this case, ice crystals have created a sundog in the sky. Sundogs can occur on one or both sides of the sun when the sun is near sunrise or sunset.

Sundogs

If we take a closer look, we see that the red light is closest to the sun followed by orange, yellow, green, blue, indigo, and violet.

Iridescence



Thin clouds composed of tiny water droplets or ice crystals can also cause iridescence. This typically occurs near the sun and is often difficult to see.

Now It's Your Turn !

So, that's a quick look at some of the clouds and colorful skies outside my window during this past year. I'd like to see the clouds outside your window.

If you make a book of the clouds outside your window and post it on the web, please let me know and send me a link!

If you have any comments or suggestions, please email:

John.Jensenius@noaa.gov

More Information

NWS Jetstream Online School for Weather (Clouds)
http://www.srh.weather.gov/jetstream/clouds/clouds_intro.htm

NOAA/NASA Cloud Chart
http://www.nws.noaa.gov/om/brochures/cloudchart.pdf

The GLOBE Program – Clouds Story Book
http://globe.gov/web/elementary-globe/clouds/story-book

Template to create your own book:
http://www.nws.noaa.gov/om/brochures/CloudsOutMyWindow_template.ppt

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The End